**Author**: Fenema, H.P. van
**Title**: The international trade in launch services : the effects of U.S. laws, policies and practices on its development
**Issue Date**: 1999-09-30

# THE INTERNATIONAL TRADE
# IN
# LAUNCH SERVICES

## The effects of U.S. laws, policies and practices on its development

# THE INTERNATIONAL TRADE
# IN
# LAUNCH SERVICES

## The effects of U.S. laws, policies and practices on its development

PROEFSCHRIFT

ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van de Rector Magnificus Dr. W.A. Wagenaar,
hoogleraar in de faculteit der Sociale Wetenschappen,
volgens besluit van het College voor Promoties

te verdedigen op donderdag 30 september 1999
te klokke 16.15 uur

door

**Hector Petrus van Fenema**

geboren te Zeist in 1944

Fenema, H. Peter van

The international trade in launch services -
The effects of U.S. laws, policies and practices on its development

Proefschrift ter verkrijging van de graad van Doctor
aan de Universiteit Leiden

H. Peter van Fenema - Leiden
Met noten en lit.opg.
ISBN 90-9013064-0 NUGI 698
trefw.: ruimterecht, lanceerdiensten, export controles,
strategische goederen, internationale handel,
Verenigde Staten

International Institute of Air and Space Law
Faculty of Law
Leiden University
P.O. Box 9520
2300 RA Leiden
The Netherlands

Meijers Institute of Legal Studies
Faculty of Law
Leiden University
Witte Singel 103
2313 AA Leiden
The Netherlands



Uitgever/publisher: H. Peter van Fenema
pvanfenema@hotmail.com
http://surf.to/launchtrade

**Promotion Commision/Promotie Commissie**

Prof.dr. Henri A. Wassenbergh, promotor (Leiden University)
Dr. Peter D. Nesgos, referent (New York)

Prof.dr. Peter P.C. Haanappel (Leiden University)
Prof.dr. Carel J.J.M. Stolker (Leiden University)
Prof.dr. Armel Kerrest de Rozavel (Université de Bretagne Occidentale, Brest)
Prof.dr. Toshio Kosuge (University of Electrocommunications, Tokyo)
Prof.dr. Nicolas Mateesco Matte (McGill University, Montreal)
Prof.dr. Vladlen S. Vereshchetin (International Court of Justice, The Hague)
Dr. Olivier M. Ribbelink (Asser Institute, The Hague)
Dr. Frans G. von der Dunk (Leiden University)

TABLE OF CONTENTS

## INTRODUCTION

The mighty Saturn V which put Neil Armstrong and his crew on the moon can be described as a rocket or, alternatively, as a transportation vehicle.
This is not a question of semantics, but one of perception.
To a military observer, the rocket symbolizes security concepts such as power, agression, self-defense, victory, defeat, in other words a weapon. In the eyes of his civilian colleague, that same rocket is primarily a means of transportation of passengers and cargo.

Both observers are right, as the actual use of the rocket shows. Depending on that use, we call the rocket a missile (when it is meant to carry bombs) or an expendable launch vehicle (when it performs civilian tasks).

Similar diverging perceptions, based on actual or potential uses, will apply to other modes of transport, like trucks and aircraft. Trucks may carry military personnel; their civilian versions are used as moving vans or schoolbusses. A B-52 aircraft carries bombs, a B-747 carries passengers and cargo.

Space transportation/launching has a military-strategic origin. Though the Wright brothers were not developing warplanes, aviation does have a similar background.

In the course of about three quarters of a century, air transport has shed most of its military- strategic beginnings. Put more precisely, the two uses/users have 'split up', resulting in both a specialized military aircraft catering to military needs, and a worldwide commercial air transport service industry, using dedicated aircraft, in which hundreds of airlines from virtually all sovereign states participate.

The term *service industry* is used here intentionally. Airlines serve their customers wordwide by providing transportation. These customers have requirements and those requirements have to be met, both by each individual airline (lest the customers go to a competitor) and by the whole world airline industry, because the world economy can not do without international air transport.
International air transport today is considered a commercial activity which is vital for world trade and the global economy, not as an activity involving the use of military modes of transport.
For that reason, regulatory intervention, based on military-strategic/security considerations, is for all practical purposes absent in this service industry.

As we will see in this study, the space launch industry has not reached that stage yet. Its military-strategic and national security background is still an aspect which strongly influences the behavior of some important players. On

**Author**: Fenema, H.P. van
**Title**: The international trade in launch services : the effects of U.S. laws, policies and practices on its development
**Issue Date**: 1999-09-30

the other hand, the commercial use of launchers, the trade in launch services, is growing substantially, and the requirements of economically powerful private customers are increasingly driving the development of this service industry. In other words, the international space launch industry is at a cross-roads: for the sake of its clients, it has to perform like a 'normal' service industry, but in practice it is not yet allowed to do so.

That conflict, between national security and international trade, and the way it affects the development of the international trade in launch services, is the central theme of this study.

The central *player* is undoubtedly the Unites States. Not so much because of the size, scope and importance of its civil and military space industry in general and of its launch industry in particular, impressive as these may be. But rather because of the effect U.S.laws, policies and practices have on the development of other countries' commercial launch activities.

This brings us to the starting point and the rationale for this study.

The commercial satellite launch market, that is the number of satellites awaiting launch into orbit, including forecasts of future demand, shows a healthy growth for years to come. That trend is in particular built on projects in the field of global commercial communications, and to a lesser extent on other satellite-supported activities such as meteorology, earth resources surveying, astronomical and other research. All in all, at least some hundred non-governmental satellites per year will have to be transported into space. One would assume that, in view of the size of that market, an equally healthy number of competing launch companies would be ready to conclude lucrative contracts with the respective satellite manufacturers and/or prospective owners for the launch of those satellites.

In fact, though there are indeed a number of countries with indigenous launch companies and a variety of launch vehicles, on closer inspection the suggested competiton - and thus the choice for customers - is limited in a number of ways. The U.S., Europe, Russia, China, Ukraine, Japan, India, Israel, and Brazil all have launch vehicles to offer to the market. And the U.S. and Russia have a number of launch 'families' and launch sites from which the customers may chose the right combination, depending, *inter alia*, on the size, weight and intended orbit of the satellite and the cost involved. And the geographic and socio-political variety and spread of the above 'launching states' also provides choice for similarly varied customers.

But why are these the only countries providing launch services?
Where are the competitive launch service providers of countries like South Africa, Argentina, Taiwan, South Korea, Iran, Saudi Arabia and Australia?

And why is it that the U.S., with Boeing and Lockheed Martin, and Europe, with Arianespace, dominate the launch market, while Russia and China, though possessing all the necessary technical capabilities, trail behind, with Ukraine and Japan hardly started, India succesful, but not established in the market, Israel established in the market but not yet succesful and Brazil still trying to prove its expertise in this field?
Where are the newcomers and where is the innovation (particularly outside the U.S)? And what about international mergers and acquisitions *c.q.* the international alliances in this service industry?

In the field of international aviation, one is accustomed to the phenomenon that every state feels incomplete without its own national airline. Arguments for promoting the start of a national airline range from military-strategic (emergency airlift) to purely commercial and economic reasons, with national prestige, 'guaranteed access to the outside world' and other, more mundane, motivations (fun, power) also playing a role. A prospective airline-operator, whether government-sponsored or private entrepreneur, and regardless of his motivation, will buy or lease the necessary aircraft, hire the pilots, engineers and sales staff, fit an airport, *and apply for permission from foreign aviation authorities to start operations to the respective desired foreign destinations.*
In international air transport, it is in particular the latter, regulatory aspect which may stand in the way of a successful entry and access to the market. Barriers to entry and restrictions on the extent to which the market may be 'conquered' may be the impediments which first have to be addressed before the flying and selling - and the competition- may truly get off the ground. And the more vital, strategic or otherwise valuable the industry is in the perception of a country or its government, the more it will try to guarantee its survival in the face of threatening competitors from abroad. (Of course such efforts may in a way be self-defeating: protection as such will seldom create the 'fittest' in the Darwinian sense of the word).

With this background, and with the United States as the most influential player in the field of satellite manufacturing and launch services, it was relatively easy to formulate the aim of this study. *First,* to find out whether and, if so, to what extent U.S. laws, policies and practices have had, and continue to have, an effect on the development of the international trade in launch services, in particular in the sense of creating impediments to market entry and market access to foreign launch companies. *Second,* to 'take sides' in the sense of determining whether and, if so, to what extent the result of these U.S. actions provides an acceptable regulatory environment for the international launch industry and its global customers. And, *third,* to make recommendations with respect to the U.S. approach where appropriate.

The aim of the study calls first for an analysis of the global market in which the launch companies presently operate, a description of the companies which manufacture satellites and of the satellite owners and operators. Against the

background of these customers, we review the performance and the development plans of the various launch companies, as they try to cater to future launch demands created by the introduction of next generation satellites. These include a number of international cooperative projects (with the U.S. launch companies taking the lead).
**Chapter 1** deals with this topic and concludes with the listing of a number of possible *practical* barriers which prevent launch 'have nots', *i.e.* countries without a launch industry, as well as launch 'haves', *i.e.* countries which do possess a launch industry, from starting such a business or from turning an existing one into a commercial success.
Here, the concept of *regulatory impediments*is introduced and the stage is set for a mostly chronological review and analysis, in **Chapter 2**, of the U.S. laws, policies and practices applied to the development of its own private launch industry and, successively - and increasingly - , to the launch activities of other countries.
Noteworthy in this connection is the shift from NASA and Defense Department launches, with launch vehicles procured from U.S. private industry for the Government's own civil and military programs in the 1960's and 1970's, to the commercialization of expendable launch vehicles in the 1980's. As we will show, the policy change to promote U.S. private enterprise launch services was not only filosophically unavoidable, it was also brought about by the space shuttle Challenger disaster in early 1986. Where *assured access to space* continued to be the primary paradigm, based on requirements of national security and foreign policy, at least part of that access should, in the view of the U.S. government, be guaranteed by stimulating domestic private enterprise launch services.
To give private enterprise a fair chance, NASA and the Department of Defense were ordered to not compete with private industry for the same commercial customers, whether domestic or foreign, and to make launch site facilities available for the companies.
It is at this stage that the U.S. private launch industry, still in its infancy but freed from 'unfair' domestic competition, met foreign competition in the form of Europe's Arianespace. The Chapter discusses a number of U.S. Government measures with which it strengthened the position of the U.S. launch providers in the face of foreign competition.

Important for understanding the evolving views of the Government on the domestic launch industry is an analysis of the various policy directives and pieces of legislation which were successively adopted and a review of the sometimes heated discussions in the framework of Congressional hearings on the subject. As we will illustrate, three trends are particularly noticable: the overriding importance attached to *national security* (in the safeguarding of which a healthy U.S. private launch industry should play a role) and foreign policy, second, the complicated relationship between the Administration and Congress, whose often divergent priorities and agendas affect both the domestic launch industry and U.S. relations with foreign countries in this field.

And third, the conflicting requirements of the U.S. launch service providers and the satellite manufacturers.

Chapter 2 is also where the U.S. export controls are scrutinized. The legislation governing the export of arms or munitions and of so-called sensitive 'dual-use' goods and technologies, and the way these rules are being applied to the sale of U.S. launch vehicle technology and satellites to foreign countries, turn out to have a decisive influence on the well-being of most of the players introduced in Chapter 1, in particular the U.S. satellite manufacturing and launch industry and foreign launch providers.

The battle between the national security establishment and those defending international trade interests is fought in Congress as well as between Congress and the Administration, and affects the development and application of domestic legislation and the U.S. position in the international fora where the export controls are multilateralized.

Chapter 2, finally, deals with the changes in both U.S. and international export controls resulting from the end of the cold war, and describes the relatively modest liberalization of these controls and the effect this has had on the launch and satellite manufacturing industry.

In summary, this Chapter investigates, on the basis of an analysis of the pertinent laws, policies and multilateral arrangements on the subject, including their application, to what extent launch 'have nots' face regulatory hurdles when trying to join the club of launch service providers, how international cooperation in this field is being affected, and to what extent U.S. laws and policies influence foreign launch providers market access.

**Chapter 3** continues to deal with the themes developed in the previous Chapter, but focuses primarily on the relations of the U.S. with specific launch 'haves', namely China, Russia, Ukraine and Europe. This Chapter explores in detail the U.S. policies and practices as applied in particular to China and Russia, when they sought entry into the international commercial launch market, and the domestic decision making process, with U.S. satellite manufacturers and launch providers at opposing ends. It describes the developments preceding the bilateral agreements the U.S. Administration concluded with these countries on the basis of the U.S. export control laws applicable to U.S. satellites and components, and analyzes the restrictions on market access these agreements contain.

Political aspects, including diverging views of Congress and the Administration on the weapons proliferation behavior, peaceful intentions or human rights score of these countries, and the pros and cons of U.S. 'engagement' policies in this connection, play an important role. The aftermath of Tiananmen shows the power of Congress to legislate the sanctions it deems fit, confronting the statutory authority of the President to set and execute policies in the field of national security and foreign policy. This confrontation produces an element of unpredictability for the Chinese and Russian launch companies and their customers, which, as we will see in this Chapter, may discourage customers from buying U.S. satellites if they prefer to use a foreign launch company for the actual launch. Also here the national security vs. trade dilemma will be reviewed by looking at the practice of domestic policy making and the resulting Government actions vis-à-vis these two countries.

Special attention will be paid to Europe, both a U.S. ally and the U.S. launch industry's first and foremost competitor. The background and development of an independent launch services industry in Europe and the reaction of the U.S. thereto (already briefly reviewed in Chapter 2) precede a discussion of the European launcher policy and of the efforts of the European Space Agency and Arianespace to reserve ESA and national government launches for their own launch industry. We will introduce and discuss here another *regulatory impediment* the international launch industry faces, namely the 'fly U.S.' laws and policies, and compare the effects thereof to those resulting from the 'fly Europe' policy.
Additionally, attention will be paid to the efforts of the U.S. and Europe to agree on common 'rules of the road' governing their respective behavior in the marketplace, and possibly including such aspects as subsidization and entry into the respective government markets.

The Chapter concludes with a brief discussion of the U.S. Administration's stated goal since 1990 to achieve "free and fair trade in commercial launch services", and to that end, to abolish the launch trade agreements concluded with China, Russia and Ukraine. The chances for this goal to be met at the expiration of the current agreements are evaluated in the light of the so-called 'China affair' of 1998, involving unauthorized transfer of sensitive 'missile-relevant' U.S. technology to the Chinese launch industry.

The concluding part of Chapter 3 sets the stage for a discussion, in **Chapter 4**, of the U.S. concept of "free and fair trade in launch services". To what extent does the present regime satisfy the requirements of the parties in this respect and what *should* the concept mean according to the various U.S. domestic and foreign players?
In this connection, special attention is given to the more recent views and actions of the Administration and Congress.
As for the Administration, we will again look into its approach towards Europe, a party with which competition has not been regulated in the way reserved for the above three 'non-market economies'. Taking the actions of the two parties in the field of GATS as a starting point, we will discuss the chances of having GATS applied to the trade in launch services and briefly look at the implications for the launch industries concerned.
Congressional action, both in the form of the imposition of sanctions in general, and of the adoption of recent legislation aimed at launches by, and trade with, China in particular, is the subject of further scrutiny, with the aim

of determining its impact on the launch trade now and of evaluating the prospects for a 'free and fair trade in launch services' in the future.

Finally, in this Chapter, we will survey the possibilities for the affected industries to seek remedies against the effects of the U.S. controls as outlined in the previous chapters. Two options are reviewed, U.S. law and space law. Under the latter heading, the provisions of the Space Treaty of 1967 and the "Outer Space benefits declaration" of 1996 are weighed as to the obligations they may have created for a spacefaring country to share its launch technology with other countries' industries, to permit other countries to launch its satellites or to permit foreign launch providers to use its spaceports.

**Chapter 5** contains the conclusions and recommendations resulting from this study. It looks at the role of the United States as a guardian of national and global security and recalls the actions the U.S. has taken to serve that worthy goal. It concludes that, as a result of these actions, the trade in launch services, including cooperation, competition and innovation in the field of launch technology and launch services, has suffered, and provides recommendations which address, and may contribute to the solution of, the 'national security versus international trade' dilemma.
Important in this connection is the aim to give national and global security its proper place and attention, including the necessary multilateral support for arrangements in this field, by striving for a clear distinction between real and serious security concerns on the one hand and matters of legitimate international trade on the other hand.
After all, an important goal of this study is to contribute to the 'normalization' of the international trade in launch services.

CHAPTER 1

# The global satellite launch market and the launch companies

## 1.1 The global satellite launch market

The trade in launch services is part of a booming, multi-billion dollar industry.

An authoritative report published in 1997 estimates that global space industry revenues in 1996 totalled about USD 77 billion, and are expected to exceed USD 121 billion annually by the year 2000.
The two largest sectors of the industry are infrastructure and telecommunications. Infrastructure, which in the above report includes satellite-manufacturing, ground installations and operations, spaceports, launch vehicles, the space station, and related science and R&D represented 61 percent or USD 47 billion in 1996, and will increase to USD 59 billion, representing 49 percent of global space revenues, in 2000.
Telecommunications services provided by/through satellites will surge from USD 23 billion in 1996 (30%) to USD 46 billion annually by the year 2000 (38%).[1]

The manufacture, launch and use of communications satellites is 'big business' indeed.

1. See *State of the space industry - 1997 outlook*, published by Space Vest, KPMG Peat Marwick, Space Publications and Centre for Wireless Communications, hereinafter referred to as State of the space industry, at 9. The report distinguishes four categories of activities or sectors: infrastructure, telecommunications, support services (engineering, technical support, business consulting, financial and legal services, and space insurance) and emerging applications (remote sensing, geographical information services, global positioning systems and services, and materials processing). Support services totalled $3 billion (4%) in 1996 and will remain at the same level in 2000 (2%), whereas emerging applications will grow from $4 billion (5%) in 1996 to $13 billion (11%) in the year 2000. The report also observes that commercial utilization of space hardware in 1996 represented approximately 53% of the industry, the first year on record that commercial revenues surpassed government expenditures. This percentage is likely to increase as, according to the report (and supported by developments in 1997 and 1998), the industry is continuing its evolution from a government-driven, project-defined industry to one in which the government plays a lesser role and commercial forces predominantly dictate growth, see *id.*, at 10.

A distinction can be made between the Geostationary Earth Orbit (GEO) market on the one hand and the combined Low Earth Orbit (LEO) and Medium Earth Orbit (MEO) markets on the other hand.

A 1997 market overview forecasts that, from 1997 through the year 2006, a total of *273* commercial communications satellites will be launched into GEO orbit, with a total value of about *USD 37.8 billion* (excluding launch cost).[2]

The same market overview forecasts that over the same period a total of *1,062* commercial communications satellites will be launched into either LEO or MEO orbits, with a total value of just under *USD 11.2 billion* (excluding launch cost).[3]

A more recent study, produced by the U.S. FAA's Associate Administrator for Commercial Space Transportation, forecasts the following global demand for commercial launch services for the period 1999-2010 (in average number of launches per year):

| | |
|---|---|
| GEO satellites: | 25 launches of medium-to-heavy launch vehicles |
| LEO/MEO/elliptical satellites: | 15 launches of medium-to-heavy launch vehicles |
| LEO satellites: | 11 launches of small launch vehicles |
| Total launches per year: | 51 (+40%) |
| Total launches in 12 years period: | 610, for a total of 1369 satellites.[3a] |

2. See *World space systems briefing*, Teal Group Corporation (1997), hereinafter referred to as 1997 Teal Group briefing. The GEO/LEO/MEO market development data which follow are derived from this market study, unless indicated otherwise. Though, in its 1998 update, the aerospace and defense analysis group scaled back its assessment of the world market for commercial satellites for the years 1999 to 2008 in view of both the Asian economic crisis and recent launch failures which affect the start-up/completion dates of a number of satellite constellations, it continues to forecast a bright commercial and financial future for, in particular, space-based communications (notwithstanding these 'short-term' setbacks), and is joined in this positive long-term view by Merrill Lynch analysts of the industry, see 2 (16) International Space Industry Report (Sep 28, 1998), hereinafter referred to as ISIR, at 1, 4.
3. Another figure, provided in the State of the space industry, *supra* note 1, at 24, quoting Via Satellite, puts total sales of all GEO/LEO commercial communications satellites in the period 1996-2000 at USD 54 billion. Other figures in the same report show a rather stable international government (gov) demand for satellites, and an increasing commercial (com) market: (in approx. $billions) 1996: gov 6, com 3; 1997: gov 6, com 4; 1998: gov 6, com 5; 1999: gov 6, com 6,5;2000: gov 6, com 8,5, see *id.*, at 25.
3.a See *1999 Commercial space transportation forecasts*, FAA's Associate Administrator for Commercial Space Transportation (AST) and the Commercial Space Transportation Advisory Committee (COMSTAC) (May 1999).

A private market research firm gives the following forecast for the years 1999-2008, a 10-year period, including an approximate total value of the satellites concerned:

| | |
|---|---|
| commercial communications satellites: | 1.017 (value: USD 49.8 billion) |
| commercial earth imaging satellites: | 40-50 (value: USD 3.5 billion) |
| military satellites: | 305 (value: USD 35.1 billion)[3b] |

*GEO market*

In the GEO market, the customers, *i.e.* the buyers and users of the satellites, consist of government agencies, private telecommunications entities and companies, international global and regional organizations, who use the satellites and satellite systems for such programs as telecommunications/tv broadcasting, direct-to-home tv, broadband multimedia and mobile communications.

- The U.S. customers, such as PanAmSat, Loralsat, Lockheed Martin's Astrolink and Hughes Communications' Spaceway, are expected to buy 101 satellites, for some 26 of the above programs. Together with a small number of Canadian orders, this represents about USD 17.3 billion and 39 percent of the worldmarket of GEO satellites launched;
- Asia and the Pacific Rim will buy 78 satellites at approximately USD 10.3 billion;
- Nine European countries and the European Telecommunications Satellite Organization (Eutelsat) will together obtain 32 satellites with a value of approximately USD 5.1 billion;
- Africa and the Middle East, made up of four customer countries and the Arab Satellite Communications Organization (Arabsat) will spend approximately USD 1.3 billion for 8 satellites;
- Intelsat and Inmarsat, the two global communications organizations will buy 12 and 6 satellites respectively at a total value of close to USD 1.9 billion;
- Latin America and the Caribbean account for 10 satellites at approximately USD 1.1 billion, with Brazil dominating that regional market with 6 satellites; and, finally,
- Russia is expected to acquire 20 GEO satellites for close to USD 1 billion.

3.b See *Satcom market buffeted by economic uncertainties*, Marco Antonio Caceres, Teal Group Corp. (January 11, 1999), Aviation Week & Space Technology Online <http://www.aviationweek.com/aviation/sourcebook/99satel.htm> The military forecast is based on an estimated 15 satellites per year launched by the Russians, and 10-11 per year launched by the U.S, with Europe, China and some other countries responsible for the remainder.

The *satellite manufacturers* most likely to produce the large majority of the above satellites are three U.S. and two French companies, namely:
Hughes Space and Communications (48 satellites (sats) at USD 8.4 billion),
Lockheed Martin Telecommunications (36 sats, at USD 5.2 billion),
Space Systems/Loral (27 sats at USD 3.6 billion),
Matra Marconi (13 sats at USD 2.1 billion), and
Aerospatiale (14 sats at USD 1.6 billion).[4]

*LEO/MEO market*

A plethora of satellite programs for at least three different applications will make use of LEO/MEO satellites: systems will be dedicated to broadband multimedia (fixed, high-powered digital voice, data and video services), mobile (hand-held) voice and data communications (faxing, paging, messaging and positioning), and mobile data communications (regional or global data relay, faxing, etc.)
Broadband multimedia systems, such as the U.S. Teledesic and M-Star and the French Skybridge will use a total of *458* 0.6 to 4 ton satellites, with a start of launches in 2001. A shortage of sufficient launchers could delay the entry into service of these systems by a few years. An estimated 5 mobile voice and data systems, among which Globalstar, ICO, Iridium and Odyssey will consist of *374* satellites, with the LEO systems (Globalstar and Iridium) using small satellites of less than 1 ton, and the MEO programs using satellites of 2 to 3 tons in weight. Finally, mobile data systems such as Orbcomm and Starsys will need some 230 small to very small (less than 100 kilo) satellites.

Even more so than in the GEO market, U.S. customers will dominate this market, with 85 percent of the satellites destined for U.S. systems, such as Globalstar, Iridium, Orbcomm and Teledesic. They are followed by European programs such as Alcatel's Skybridge, Belgian IRIS and Matra Marconi's WEST, taking 10.5 percent of the satellites. ICO owned by Global Communications, a subsidiary of Inmarsat, and two Russian systems will also operate in this market segment.

The satellite manufacturers which will produce and sell the great majority of these satellites will be:
Motorola, which early in 1998 replaced Boeing Defense and Space as designer and builder of about 325 Teledesic satellites (at almost USD 3.3 billion),

4. Via Satellite gives the following market shares of communications satellites in orbit as of January 1997: Hughes 36%, Lockheed Martin 17%, Space Systems/Loral 13%, Matra Marconi 8%, Aerospatiale 8%, other 18%. For communications satellites under construction, the following market shares are given: Hughes 29%, Space Systems/Loral 18%, Lockheed Martin 17%, Aerospatiale 14%, Matra Marconi 10%, Alcatel 4%, other 8%, as quoted in State of the space industry, *supra* note 1, at 26, 27.

Lockheed Martin Missiles and Space (168 Iridium satellites for USD 1 billion), Space Systems/Loral (116 Globalstar satellites at USD 290 million), Alcatel Espace (112 satellites for Skybridge and Starsys at approximately USD 784 million), and Orbital Sciences which will build 92 satellites for its own Orbcomm system (USD 132 million).

The above commercial communications satellites represent approximately 70 percent of the total of all payloads to be launched. The remaining 30 percent cover such other categories as civil and military government satellites, earth imaging and meteorological satellites, scientific and technology development satellites. Civil satellites, *i.e.* all government satellites which are not military, make up about 13 percent (scientific, earth observation, meteorological, communications and technology development satellites), while military satellites (*inter alia* communications, reconnaissance and surveillance, meteorological satellites) are expected to account for approximately 9 percent of worldwide payloads to be launched in the years to come.
One may conclude that the space industry in general and the satellite manufacturing industry in particular (and the U.S. companies concerned) are extremely healthy, poised for further growth and, as a consequence, employing an increasing number of people around the globe.[5]

5. Worldwide, some 800,000 people are actively employed in the space industry. The commercial sector is creating over 70,000 new jobs per year, see State of the space industry, *supra* note 1, at 10. According to William A. Reinsch, U.S. Under Secretary for Export Administration, Dept of Commerce, "U.S. [satellite manufacturing] industry revenues last year were $23.1 billion, a 15% increase from the previous year. Employment in 1997 was over 100,000, a 10% increase from the previous year.", see *The adequacy of Commerce Department satellite export controls*, testimony before the Subcommittee on international security, proliferation and federal services (Jun 18, 1998) <http://www.bxa.doc.gov/press/98/sattest.htm>; also Gary R. Bachula, Acting Under Secretary for Technology, Dept of Commerce: "[t]he Satellite Industry Association estimates that the worldwide commercial satellite industry already represents a $44 billion industry, providing over 150,000 high-wage, high-tech jobs. Roughly half of those revenues and jobs are in the United States. Annual growth in this area was over 14% in 1997, and is projected to remain strong as the global demand for satellite services expands,", see *Remarks on commercial space transportation*, Science, Technology, and Space Subcommittee, Commerce, Science, and Transportation Committee, U.S. Senate (Sep 23, 1998) <http://www.ogc.doc.gov/ogc/legreg/testimon/commerce.052/bach0923.htm>

## 1.2 The launch companies and the spaceports

### *1.2.1 The launch companies*

A report of the U.S. FAA Associate Administrator for Commercial Space Transportation covering 1997 worldwide launch activity, listed a total of 89 orbital launches involving 150 payloads (satellites) performed in that year for commercial, civil and military purposes.[6]
Of these 89 launches worldwide, 35 were considered *commercial, i.e.* launches which were in principle open to international competition.
The launch companies concerned had revenues exceeding *USD 2.4 billion*. The U.S. launch companies in the same year earned a total revenue (for commercial launches) of close to USD 1.0 billion. Arianespace, with sales of FF 6.6 billion (about USD 1.1 billion), earned slightly more.[7]
Those amounts will grow substantially in the coming years thanks to the explosive expansion of satellite systems, particularly in Low Earth Orbit (LEO). On the other hand, the international government launch market, though still the largest in overall revenues, is not expected to show any substantial growth in the next few years. A 1997 study of historic and forecasted launch revenues produced the following picture:[8]

*Launch Vehicle Revenues ($ Millions)*

| | 1995 | 1996 | 1997 (F) | 1998 (F) | 1999 (F) | 2000 (F) | Compound Growth |
|---|---|---|---|---|---|---|---|
| Expendable Launch Vehicles - Commercial | 1325 | 1811 | 2214 | 2400 | 2594 | 2700 | 49% |
| Expendable Launch Vehicles - Government | 3101 | 3143 | 3143 | 3220 | 3215 | 3205 | 2% |
| Total | 4426 | 4954 | 5348 | 5620 | 5809 | 5905 | 19% |

Where the actual worldwide commercial launch revenues as reported *c.q.* forecasted by the FAA for the years 1997 and 1998, *i.e.* USD 2.4 and 3.0 billion respectively, are higher than the above figures, the difference in growth

6. See *Commercial Space Transportation: 1997 Year in review*, Department of Transportation (DOT), Federal Aviation Administration (FAA), Associate Administrator for Commercial Space Transportation (AST) (Jan 1998) hereinafter referred to as AST Report 1997, at 3.
7. See Arianespace - Espace Newsletter No.134 (Jul/Aug 1998) hereinafter referred to as Espace newsletter 134 <http://www.arianespace.com/english/news_letter.html>.
8. See State of the space industry, *supra* note 1, at 34.

percentages becomes only bigger and the gap between the two markets smaller.[9]

Only 4 'launching states', (groups of) countries whose companies perform these launches, were involved in the above commercial launches: U.S (14), Russia (7), Europe (11) and China (3).
The launch providers of these states also performed non-commercial, mostly government-launches, and were, in those latter activities, joined by 3 other states, Japan (2), India (1) and Brazil (1).

The U.S., Russia, Europe and China are the main players, which dominate the international commercial launch market. Of these, only the U.S. and Russia also have a sizable non-commercial, *i.e.* mainly government (civil and military), launch manifest: in 1997, the U.S. performed 24 such launches, and Russia 22.

The list of active launch companies *per country* is not a very long one as yet: In the **U.S.**, 2 major companies and one smaller enterprise performed the commercial launches in 1997:
- *Lockheed Martin*, operating the Atlas family of launchers and a new small launch vehicle, the Athena 1, launched once in 1997.
- *Boeing*, operating the (formerly McDonnell Douglas) Delta, and
- *Orbital Sciences*, operating the small, air-launched Pegasus.

The three companies use and plan to employ additional launch vehicles, either developed within the company or through arrangements with other launch companies (see below).

(The U.S. government also makes use of the above companies for its launch needs, and has, in addition, NASA's Space Shuttle and the Air Force's Titan IV, for its various civil and military government missions. The latter two do not operate in the commercial market)

**Russia** employs a wide range of launch vehicles, and increasingly offers its launch services with those vehicles through a number of (semi-) governmental companies on the international market.
In 1997, it was primarily the *Proton* heavy-lift vehicle which was used for commercial launches. The commercial debut of the small *Start* vehicle, a refurbished missile, also occurred in 1997. Other launch vehicles, sofar only used for domestic (government-) missions are the Cosmos, Cyclone (Tsyklon),

9. The 1998 figure is mentioned in Commercial Space Transportation, 3rd Quarter 1998, DOT, FAA, AST (Jul 31, 1998), hereinafter referred to as AST Report 1998 (3d Q), at 12. Proton and Delta 3 failures kept launchers on the ground resulting in fewer 1998 launches than originally foreseen actually taking place and in 1998 total launch revenues reaching an estimated USD 2.1 billion, see *infra*.

Molniya, Soyuz and Zenit, some of which form the subject of international cooperation with European and American companies (see below).

**China**'s Great Wall Industry Corporation (CGWIC) employs and sells the *Long March* family of launchers. Of its 6 launches in 1997, 3 were commercial, the other 3 non-commercial.

The **European Space Agency** (ESA) financed the development of the *Ariane* launch vehicle, successfully sold by Arianespace on the international commercial launch market. (Until 1997, Arianespace traditionally performed the majority of the world's commercial launches, but a record number of U.S. launches for LEO satellite constellations in 1997 reduced the European share to 31 percent, lower, for the first time in close to a decade, than the U.S. (40 percent). This trend will continue in 1998.
Arianespace performed only one launch of a non-commercial nature, a second test flight of the new Ariane 5. ESA, in the light of the stormy LEO developments, also sees the need for a small European-built launch vehicle.

**Japan**'s first indigenously built launch vehicle, the H2, was first launched in 1994. This was followed in 1997 by the M5, a much smaller vehicle carrying a scientific satellite. In 1997 each of the vehicles was launched once, both for non-commercial purposes. The hopes of Japan's (future) international launch clients with large satellites are pinned on a heavier-lift version of the H2, the H2A, which is not yet operational.

**India** is one of the most experienced new entrants into the exclusive club of commercial launching states. In 1980 it performed its first successful launch with an indigenous launch vehicle, thus becoming the seventh launch nation. Though the launch capability now provided by its Polar Satellite Launch Vehicle (PSLV), first successfully launched in October 1994, is primarily used for domestic needs, such as the launch of Indian Remote-sensing Satellites (IRS), the PSLV is also marketed for commercial launches. The one launch performed in September 1997 was a non-commercial one. The next launch will take place in late 1998 and will carry both an IRS and a small Korean scientific satellite, the latter under a commercial contract. The Indian Space Research Organization (ISRO) proposes to build 5 more PSLV's in the next 5 years to carry IRS spacecraft.[10] In July 1998, Antrix Corporation, the commercial wing of India's Department of Space, signed on behalf of ISRO its third commercial contract for the launch of a Belgian microsatellite; the satellite will share space with an IRS on the PSLV.[11]

10. See Space News Online (Jun 8, 1998) at 1 ("India increases space funding by 52 percent/largest budget hike ever targets communications, launch vehicles") <http://www.spacenews...members/sarch/sarch98/sn0608q.htm>, hereinafter referred to as India space funding).
11. See Space News Online (Jul 13, 1998) at 38

**Israel**, though it did not perform any launch in 1997, should be introduced here, because, in 1988, it became the eighth member of the space launch club with the launch of the small Shavit launch vehicle. It has not yet made a commercial launch but an upgraded version called LK-1/*Next* is being developed for commercial use, in close cooperation with a U.S. and a French aerospace firm (see below). Israel's special handicap is its small territory surrounded by less than launch-friendly neighbours, which severely limits trajectories available for launches. For that reason, a determined effort is being made to get U.S. government permission for launches from U.S. bases.

**Brazil** has been working for some years on the development of the Veiculo Lancador de Satellites (VLS), designed to place small satellites into equatorial low earth orbit. So far the test flights, including one in 1997, have not been successful. Nevertheless, Brazil has the ambition to market the VLS commercially once it is operational.

**Ukraine**, not included in the above FAA report because it did not perform any commercial launches in 1997, needs to be mentioned here nonetheless as the manufacturer of the well-proven Tsyklon (Cyclone) and Zenit launchers. In its ambition to commercialize these vehicles, its space industry has concluded an agreement with Boeing for the sale of an advanced version of the Zenit, and the government has entered into a launch trade agreement with the U.S. which makes commercial Zenit launches of Western satellites possible.

*1998 developments*

FAA reports on 1998 worldwide launch events show little change in the above picture of launch service providers and launch vehicles:

In the first two quarters of the year, the launch companies of the U.S., Europe, Russia, China, Japan and Israel performed together 39 launches (through the launch companies and with the launch vehicles mentioned above), 20 of which were commercial ones.[12]
New were the launch of U.S.' Orbital Sciences other small vehicle, the Taurus and Lockheed Martin's successful launch of another version of the Athena, the Athena 2.

<http://www.spacenews ...members/sarch/sarch98/sn0713j.htm>.

12. The U.S. was responsible for a total of 20 launches, 13 of which were of a commercial nature, Europe took care of 4 launches (3 commercial), Russia 11 (3 commercial), China 3 (2 commercial), and Japan's H2 and Israel's Shavit were each launched once (both were non-commercial and failed), see AST Report 1998 (3d Q) *supra* note 9, at 3, 8 and similar report for the second Quarter (Apr 27, 1998) hereinafter referred to as AST Report 1998 (2d Q), at 3, 8.

In July 1998, the Russian Shtil rocket entered the commercial launch market. The Shtil, which carried two small Tubsat satellites of the Technical University of Berlin into low Earth orbit, is a converted missile launched from a submarine located about 30 meters beneath the sea surface. With Russia's impressive missile inventory now in principle available for commercial purposes, the small satellite owners have an additional low-cost launch option for their missions.[13]

Later in 1998, Ukraine's entry into the international commercial launch market, based on a 1995 contract with Globalstar to perform three Zenit launches carrying 12 satellites each, was dealt a serious blow with the failure of the first launch on September 10, 1998, which destroyed the 12 Globalstar satellites and resulted in the remaining two Zenit launches being cancelled.[14] Apart from affecting the reputation of the Zenit (and increasing insurance cost for the launcher), it was not immediately clear to what extent this failure would affect the U.S.-Ukrainian Sea Launch project, which uses a more powerful version of the vehicle (See *infra*).

Finally, in October 1998, the third and final testflight of the Ariane 5 heavy-lift European launcher took place. The new vehicle performed as planned, thus paving the way for commercial operations starting in 1999.

The worldwide totals for 1998 as reported by the FAA were as follows:[14a]

13. See Space News Online (Sep 21, 1998) hereinafter referred to as Space News Online 0921, at 1 ("Small satellite makers seek first-class rides into space"), <http://www.spacenews...members/sarch/sarch98/sn0921m.htm>)
14. Loral Space and Communications in the mean time used existing options on the Russian Soyuz vehicle and the U.S. Delta 2 to carry the satellites - with a costly delay - into orbit, see Space News Online (Sep 14, 1998) at 1 ("Globalstar shifts launchers after failure of Zenit/Mishap will cost $100 million"). <http://www.spacenews...members/sarch/sarch98/sn0914bg.htm>
14.a *See Commercial space transportation: 1998 Year in review*, FAA Associate Administrator for Commercial Space Transportation (AST) (Jan 1999) hereinafter referred to as AST Report 1998, at 3, 4. For purposes of this report, a "commercial launch" is defined as a launch that is internationally competed, *i.e.* available in principle to international launch providers, or whose primary payload is commercial in nature. U.S Government launches procured commercially are considered to be government launches. The term "commercial payload"refers to a spacecraft which serves a commercial function or is operated by a commercial entity, without regard to how it was launched. For this report, communications satellites launched for international consortia such as Intelsat are considered commercial, see *id.*, notes 1 and 3.

*launches performed:*

| | commercial launches | non-commercial launches | total |
|---|---|---|---|
| U.S. | 17 | 19 | 36 |
| Russia | 5 | 19 | 24 |
| Europe | 9 | 2 | 11 |
| China | 4 | 2 | 6 |
| Japan | 0 | 2 | 2 |
| Ukraine | 1 | 0 | 1 |
| Israel | 0 | 1 | 1 |
| North Korea | 0 | 1 | 1 |
| TOTAL | 36 | 46 | 82 |

*payloads (spacecraft) launched:*

| | commercial payloads | non-commercial payloads | total |
|---|---|---|---|
| U.S. | 59 | 21 | 80 |
| Russia | 12 | 33 | 45 |
| Europe | 13 | 3 | 16 |
| China | 8 | 2 | 10 |
| Ukraine | 12 | 0 | 12 |
| Japan | 0 | 2 | 2 |
| Israel | 0 | 1 | 1 |
| North Korea | 0 | 1 | 1 |
| TOTAL | 104 | 63 | 167 |

The above report notes that, out of the above 104 commercial payloads, 78 were spacecraft destined for the Iridium, Globalstar and Orbcomm LEO telecommunications constellations alone, which continued a trend started in 1997. European Arianespace did not participate in the LEO launches, but launched 13 telecommunications satellites into GEO orbit.

Launch failures at the end of 1997 and in 1998 and the resulting temporary grounding of the respective launch vehicles led to a lower number of launches than originally foreseen and lower revenues than previously predicted. According to the FAA report, revenues from the 36 commercial launches conducted globally reached an estimated USD 2.1 billion, with the U.S. companies earning USD 911 million, followed by Europe (763), Russia (313), China (90) and Ukraine (35).[14b]

14.b *Ibid.*

*International launch ventures*

The Sea Launch project is a joint venture of Boeing Commercial Space Company, KB Yuzhnoye/PO Yuzhmash of Ukraine, RSC Energia of Russia and Kvaerner Maritime a.s. of Norway. The partners will operate the Ukrainian Zenit launch vehicle from a self-propelled, semi-submersible launch platform, the *Odyssey*, a former North Sea oil-drilling rig, with Boeing operating the Sea Launch Home Port at Long Beach, California and acting as overall project manager. The Russian firm will contribute the Block DM-SL upper stage and be responsible for Sea Launch vehicle integration, launch operations and range services, and Kvaerner, which modified the platform and was responsible for the design and manufacture of the Assembly and Command Ship, the Sea Launch Commander, a floating mission control centre and rocket-assembly plant.[15]
Sea Launch will offer (geographically) flexible launch services and, thanks to its possibility to move the launch platform to near the equator, will be able to put heavy satellites into geostationary orbit, and has thus the potential to become a formidable competitor for both Arianespace and another international venture, *International Launch Services.*[16]
Sea Launch's first commercial customer is Hughes Space and Communications, whose Galaxy XI communications satellite is slated for launch from the Pacific Ocean in August 1999. (Sea Launch in the meantime acquired a package of 13 firm launch orders from Hughes and 5 from Loral Space and Communications), and performed a successful inaugural flight on March 27, 1999 (without commercial payload).

A second international venture, *International Launch Services* (ILS), preceded Sea Launch. It was formed in 1995 when Lockheed Martin Commercial Launch Services and Lockheed Khrunichev Energia International (LKEI) joined forces to market two launch vehicles, the U.S. Atlas and the Russian-built Proton. (LKEI itself was formed in 1992, when Lockheed, a major U.S. defense company without a launch vehicle of its own, concluded a joint marketing agreement with the two Russian manufacturers of the Proton, Khrunichev Enterprise and NPO Energia of Kaliningrad, and created a new company LKE International, headquartered in California, to sell the Proton launcher internationally). The merger of Lockheed with Martin Marietta (builder of the Titan and - since 1994 - owner of General Dynamics, the manufacturer of the Atlas) brought the international sale of the Proton and the

15. See Sea Launch, <http://www.boeing.com/defense-space/space/sealaunch/>. The shares in Sea Launch are distributed as follows: Boeing 40%, Energia 25%, Kvaerner 20%, Yuzhnoye 15%.
16. On the U.S.-Ukrainian bilateral launch trade agreement, by virtue of which Ukraine, both independently and through Sea Launch, offers its launch services on the international market, see *infra*, Chapter 3.3.

Atlas launch vehicles into one hand, to the benefit of both the U.S. and Russian partners.[17]

The above U.S.-led joint ventures give the two U.S. aerospace giants powerful additional tools to compete with Arianespace and CGWIC in the market of medium to heavy payload launches. To partially answer that competitive challenge, Arianespace, together with the French aerospace company Aerospatiale, in August 1996, teamed up with the Russian Space Agency (RKA) and the Russian Samara Space Centre to form *Starsem*, a company which is to sell commercial launch services using the Soyuz launch vehicle family (which includes the four-stage Molniya launcher) for low and medium Earth orbit missions. Where the Ariane 5, once operational, will easily accommodate 10 LEO satellites at one time, the Soyuz will take care of smaller numbers (at lower prices). By 1996, Starsem had signed three contracts with Loral Space and Communications for the launch of 12 Globalstar constellation satellites, and is scheduled in 2000 to launch ESA's four scientific Cluster satellites, two per Soyuz.[18]

Arianespace took another step to cater for the (very) small satellite launch market, by signing an agreement with Antrix Corporation, the commercial wing of India's Department of Space/ISRO to jointly market the Indian Polar Satellite Launch Vehicle and Arianespace's Ariane 5 for the launch of auxiliary payloads in the weight class of up to 100 kilograms.[19]
This may be only the beginning of an important 'alliance' between an established launch provider and a newcomer in the international commercial launch market.

In 1995, German DASA (Daimler-Benz Aerospace) and Russian Khrunichev jointly created a company, *Eurockot* Launch Services GmbH of Bremen, with the aim to market refurbished Russian SS-19 ICBM's ("Rockots") for small LEO satellite launches. In September 1998, Eurockot was reported to be close to signing firm contracts for two commercial launches of the Rockot in late

17. See *e.g.* Lockheed Martin Today - August 1998 ('Progressive partners - cooperative ventures with Russia grow business and build cultural bridges').
<http://www.lmco.com/files3/lmtoday/9808/progressive.html>
18. See Loral Press Release (Dec 5, 1996) ("Space Systems/Loral signs an agreement with Starsem to launch 12 Globalstar satellites")
<http://www.loral.com/starsemagreement.html>. As we saw earlier, the September 1998 Zenit failure resulted in Globalstar's affirming the Starsem launch contract reservations. The first such launch - of 4 Globalstars - took place on Feb 8, 1999. The shares in Starsem, which is led by a French chairman and CEO and a Russian COO, are distributed as follows: Aerospatiale 35%, Arianespace 15%, RKA and Samara 25% each. For further info on Starsem, see Starsem brochure (1997) and Espace newsletter 134, *supra* note 7, at 4-6.
19. See Arianespace News & Information (Jun 10, 1998) ("ISRO and Arianespace to jointly market launch services for small satellites").
<http://www.arianespace.com/english/news_news.html>

1999. These contracts would come on top of the 10 launches U.S. communications company Motorola has booked for future replenishment of the Iridium LEO constellation and of 2 E-sat messaging satellite launches. In addition, Eurockot has also collected reservations from undisclosed customers for 12 more flights.[20]

Cosmos International OHB-System GmbH of Bremen is mentioned in the trade press as the Western company marketing the small Russian Cosmos launcher. The company is reported to have three firm contracts for the launch of small satellites (up to 1,300 kg) into LEO.[21]
The Russian-U.S. company Cosmos USA, a joint venture of AKO Polyot of Omsk, Russia and the American company Assured Space Access has also been promoting the Cosmos for launching small satellites.[22]

In the small launch services market at least one other international venture will compete with OSC's Pegasus and Lockheed Martin's Athena, *i.e.*, the *LeoLink* Consortium, set up by Israel Aircraft Industries (IAI) with Coleman Research Corporation (CRC) of Florida. CRC attempts to sell the *LK-1*, a launcher developed on the basis of the design of the Israeli Shavit, but with sufficient U.S. content to qualify for U.S. government launch contracts.[23]

20. Space News (Jan 25, 1999) reports, at 8, that Eurockot had signed a contract for the launch of 2 Iridium satellites in Dec 1999. "The contract also includes an option for 12 more launches of Iridium satellites". Eurockot will operate from the Plesetsk Cosmodrome, but may also use Baikonur, Russia's main launch base in Kazakhstan.
See also Space News (Feb 20, 1995) at 3: Khrunichev is shareholder in the Iridium venture, whereas DASA has purchased a stake in the Loral-led Globalstar network; both are LEO constellations, for which Eurockot offers its launch capabilities. Eurockot 's first demonstration launch is now scheduled for October 1999, see Space News Online 0921, *supra* note 13. Also, see ISIR *supra* note 2, at 1, 17 ("Eurockot prepares for first flight with launch commitments"). DASA was also reported to be working on an arrangement with the Yuzhnoye Design Bureau of Dnieprpetrovsk, Ukraine, to operate the latter's Cyclone rocket from the Guyana Space Centre in Kourou, French Guyana).
21. See Space News Online (Mar 9), 1998, at 10 ("Russian rockets factor heavily in strategy"), hereinafter referred to as Space News Russian rockets, <http://www.spacenews...members/sarch/sarch98/sn03091.html>
22. See Liudmila Bzhilianskaya, *Russian launch vehicles on the world market: a case study of international joint ventures*, 13 (4) Space Policy 323-338 (1997) hereinafter referred to as Bzhilianskaya, at 332-333. Prominent advertising by Cosmos USA (Assured Space Access Inc.) appears to show Western competition in exercising sales rights pertaining to the same Russian launcher, see State of the space industry, *supra* note 1, at 35 (ad), 36.
23. For that purpose, the main stages have to be US-built. In Oct 1998, NASA did select the launcher as one of the two candiates for contracts under its Small Expendable Launch Vehicle Services 2 (SELVS 2) program of 16 small payload launches, valued at about USD 400 million, see Space News (Nov 2, 1998) at 1. Matra Marconi of France, the third partner, provides *i.a.* the fourth stage, see ISIR, *supra* note 2, at 16; on the 'fly US' policy, see Chapter 3.4.4 *infra*. On CRC's efforts to be selected by NASA for government launches under the SELVS 2 program, see Space News Online (Jul 27, 1998) at 6 ("Unproven launcher in running for NASA payloads").

### *(Other) launch vehicle development plans and projects*

Where in the past the size of commercial satellites was limited by the capability of the available launchers which had been designed and built for government payloads, this trend has now reversed. Commercial requirements increasingly determine the design and development of the launchers.
As a consequence, both the existing launch companies and new enterprises are developing more powerful and increasingly sophisticated upgrades of current vehicles. New launchers are also being designed to cater to the expanding satellite launch market and meet specific demands of their customers, the satellite manufacturers and satellite owners/operators, with respect to capacity, flexibility, reliability and cost. (Noteworthy in this connection is that the large (GEO) satellites become larger and the small (LEO) satellites become smaller.)

### *U.S. projects*

#### *Boeing*

The Delta II, Boeing's reliable 'workhorse' which has been in operation since 1989, launching medium weight satellites (with a maximum of 4,120 lb/1,860 kg) into GTO, has been joined by the Delta III, developed by Boeing to compete with the Ariane and Proton heavy lift launchers, with a GTO capability of 8,400 lb/3,810 kg, *i.e.* twice the payload of the Delta II.
Delta III's maiden flight took place on August 26, 1998, but one minute after ignition the vehicle lost control and had to be destroyed. The payload, a Galaxy 10 communications satellite owned by PanAmSat, was destroyed as well, bringing the total loss of vehicle and payload (including insurance) to USD 225 million.[24]
Notwithstanding this loss, Boeing will forge ahead with the Delta III and is expected to have this new and powerful launch vehicle in operation for the commercial launches it is committed to. In June 1998, Boeing reported to have contracts for 18 launches, 13 for Hughes and 5 for Space Systems/Loral.[25]

#### *Lockheed Martin*

Like Boeing, Lockheed Martin in 1995 initiated a new program to be able to carry the larger satellites being developed by Hughes and other satellite

<http://www.spacenews...members/sarch/sarch98/sn0727as.htm>

24. See NYT (Aug 26, 1998) at 1; also "Boeing begins investigation into rocket failure", Boeing (Aug 27, 1998) <http://www.boeing.com/defense-space/space/delta/delta3/d3invest.htm> and Boeing, Delta III inaugural flight (Aug 28, 1998) ("Boeing rocket investigation focuses on control system") <http://www.boeing.com/news/feature/delta3webcast/>.
25. See Boeing Space systems, Delta expendable launch vehicles, <http:/www.boeing.com/defense-space/space/delta/deltahome.htm>

manufacturing companies. The Atlas 2AR, and its larger 'cousin', Atlas 2ARC, recently renamed Atlas 3A and Atlas 3B respectively, and both powered by Russian-designed RD-180 first-stage engines, will have a slightly larger capacity than the Delta III: the Atlas 3A, expected to have its maiden flight with a commercial payload around June 1999, will be capable of launching 4,055 kg satellites into GTO, whereas the Atlas 3B, offered for launches in mid-2000, can lift 4,500 kg. (this is not sufficient capacity to accommodate the latest Hughes HS 702 communications satellites of up to 5,200 kg/11,464 lb in weight).

A U.S. government initiated launch vehicle modernization plan called *EELV* (evolved expendable launch vehicle) will, in the years to come, result in a new generation of medium to heavy-lift launchers. Built by the two above companies, it will be used for both government (USAF) and commercial launches, thus strengthening the competitive position of the U.S. launch industry.
For an initial investment of about USD 2 billion, the goal of the EELV system is to reduce the costs for the government of launching its satellites into space by at least 25 percent compared to using the existing vehicles, Delta, Atlas and Titan. The current vehicles, which are acquired by DOD, are used for a variety of national security and civil government missions. Not only do they operate at or near their maximum performance capability, but they (in particular the Titan IV) are also considered by DOD and congressional sources to be very costly to produce and launch. Since 1987, the government has made various efforts to develop a new, more efficient and less costly launch vehicle system, but none of these projects got off the ground, either because of funding issues, changing requirements, or controversy regarding the best way to meet these requirements. In 1994, DOD was directed by Congress to develop a launch vehicle modernization plan, which led to the present EELV system program. Fierce competition for the contract between Lockheed Martin and McDonnell Douglas (later Boeing) was resolved in November 1997, when the Air Force, in stead of choosing for one specific company's rocket, decided that the two companies would share the contract. The USAF's change in plans came after a six month review of the commercial launch market which confirmed that that market was growing much faster than originally forecast.[26] Instead of giving one company an unchallengeable lead over the other as far as governmental launches are concerned, the two companies would both profit from this government investment in upgraded technology and would both enjoy an enhanced competitive position in the international commercial launch market. They would produce more launchers for the commercial market also, resulting in recurring cost reductions by virtue of a significantly larger

26. See News release, USAF (Nov 6, 1997) ("New acquisition strategy for evolved expendable launch vehicle") hereinafter referred to as USAF News release <http://www.laafb.af.mil/SMC/PA/Releases/eelvchng.htm>

customer base (government and commercial). DOD has a clear interest in seeing that EELV is used for commercial purposes in order to lower the cost per launch (particularly if the companies, in view of these important commercial spin-offs, also make private investments in the EELV development).[27] The shared contract approach was reported to help USAF to save between USD 5 and 10 billion in program costs through the year 2020.[28]
EELV is intended to be the federal government's only medium-, intermediate and heavy-lift expendable space transportation capability for several years after the beginning of the 21st century. It is supposed to take care of - in early 1997 estimates - 193 government launches for fiscal years 2002 through 2020, 177 for defense and intelligence purposes and 16 for NASA.[29] To prepare for their EELV launch activities, both Lockheed Martin and Boeing in the meantime announced plans to upgrade/build new launch facilities at Cape Canaveral, in Florida, and at Vandenberg AFB in California.

The U.S. government sponsors another program of new launch vehicles, that of the *reusable launch vehicles* or RLV's. The only RLV now in operation is the space shuttle, which is managed, for NASA, by the United Space Alliance (USA), a joint venture of - again - Boeing and Lockheed Martin.[30] The space shuttle is, as a rule, not available for the commercial satellite launch market. One of NASA's goals is that of providing, and *in casu* assisting in the development of, low-cost reliable access to space.[31] Its 1993 "Access-to-space" study concluded that the best opportunity to reduce launch costs, and improve safety and reliability, was to develop a fully reusable single-stage-to-orbit vehicle capable of delivering 25,000 lb to the International Space Station. This required a focused technology development program and, since NASA

27. See GAO's report *Access to Space: Issues associated with DOD's evolved expendable launch vehicle program*, Letter report, GAO/NSIAD-97-130 (Jun 24, 1997) <http://www.access.gpo/cgi-bin/getdoc.cgi?dbname=gao&docid=f:ns97130.txt>
28. See Boeing, Lockheed to share EELV contract, Florida today space online (Nov 7, 1997) <http://www.flatoday.com/space/explore/stories/1997b/110797f.htm>; also USAF News release, *supra* note 26: "Pentagon and Air Force officials see this as an opportunity to partner with industry, and develop a national launch system supporting both government and commercial requirements. This will reduce the Government's overall launch costs by more than 25 percent. This also supports the Air Force goal of saving between $5 billion and $10 billion in program life-cycle costs through the year 2020."
29. More recent estimates are lower, about 165 in total, and involving smaller military satellites which reduces the USAF need for the EELV successor of the heavy-lift Titan IV and thus also results in substantially smaller cost savings from using that EELV successor.
30. In Sep 1996, USA and NASA signed the Space Flight Operations Contract, which designated USA as the prime contractor for Space Shuttle operations and gave USA authority to proceed with full operation of the contract effective Oct 1, 1996.
31. See, also for the informations which follows, Powell, Lockwood and Cook, NASA, *The road from the NASA Access-to-space study to a reusable launch vehicle*, IAF-98-V.4.02, 49th International Astronautical Congress (Sep 28-Oct 2, 1998), Melbourne, Australia, hereinafter referred to as IAF Melbourne Congress.

would henceforth purchase future launch services in stead of operate the space shuttle, a commercial entity which would develop and market the new vehicle. As NASA realized that no private U.S. company would commit to the costly and highly complicated development, it decided to aid in the maturation of the required technologies and, to that end, NASA entered into a cooperative agreement with Lockheed Martin to develop the X-33, a half-scale demonstrator of a single-stage-to-orbit, all rocket-powered vehicle. The development of the X-33, together with some other related NASA test programs and design studies, will provide the necessary information to determine, by the year 2000, the viability of a commercially developed launch vehicle. The project should result in airplane-like operations at significantly lower cost: the goal is to reduce the cost to deliver payload to low earth orbit from the current estimated USD 10,000 per pound to USD 1,000 per pound. Lockheed Martin calls its commercial X-33 based RLV system, which should be operational and on the market by 2005, *VentureStar*.[32]

Independent from the above NASA-sponsored RLV project, a private U.S. company, Kistler Aerospace Corporation, is building its own RLV, the K-1, "the world's first fully reusable aerospace vehicle".[33]
Kistler plans to build a fleet of K-1 vehicles with a capacity of 100 flights per year (at USD 17 million per flight). It aims particularly at the growing LEO communications satellite constellations market. By late 1999, Kistler plans to start commercial operations from the Woomera launch site in South Australia, but will also (later) use launch facilities in southern Nevada, U.S. The use of two launch sites and a fleet of 5 vehicles will, in Kistler's view provide a unique launch scheduling flexibility for its customers. Kistler has in the

32. See on the VentureStar project, Sumrall (NASA), Lane and Cusic (Lockheed Martin Skunk Works), *VentureStar-Reaping the benefits of the X-33 program*, IAF-98-V.3.03, IAF Melbourne Congress. Another part of NASA's efforts to reduce the cost of access to space is the X-34 program. The X-34 is a reusable suborbital rocketplane, which, like the Pegasus, is carried by a Lockheed L-1011 aircraft to a specific height in airspace before 'taking off' as a launch vehicle. The X-34 program's general goals are two-fold: to provide a testbed vehicle capable of demonstrating key RLV technologies as well as operational systems and techniques that will enable a dramatic reduction in the cost of space access, and to provide a testbed vehicle capable of carrying a variety of experiments supporting the needs of the aeronautical sciences community. Orbital Sciences Corporation (OSC), contracted by NASA on Aug 23, 1996 to develop the X-34, sees the vehicle as a precursor for the development of a fully reusable, liquid propellant replacement for its Pegasus expendable launch vehicle. The first flight is scheduled for 1999, see London III and Lyles (NASA), *X-34 program status*, IAF-98-V.4.04, IAF Melbourne Congress, *supra* note 31.
33. The above and following information on the K-1 is based on two papers presented at the IAF Melbourne Congress by Kistler Aerospace Corporation officials, Mueller, Brandenstein, Cuzzupolli and Kohrs, *The K-1 commercial reusable aerospace vehicle*, IAF-98-V.1.01, and Wang, Mueller, Brandenstein, Lepore, *The K-1 reusable aerospace vehicle: Meeting the demand for LEO satellite delivery services*, IAA-98-IAA.1.2.03. The two articles also provide detailed vehicle designs and market forecasts,

meantime entered into a contract with Space Systems/Loral for 10 K-1 launches.

Other private RLV manufacturers, poised to bring their own launch vehicles on the promising LEO satellite launch market are Kelly Space & Technology, which is developing the air-launched, piloted *Eclipse Astroliner* (and has already signed a launch services contract with Motorola for 10 flights to carry 20 Iridium satellites into LEO), Rotary Rocket Co., which is testing its vertical-lift, vertical-landing *Roton space helicopter*, and Pioneer Rocketplane, developing the piloted, partially reusable *Pathfinder spaceplane*. All companies concerned are in various stages of raising the capital required to get their vehicles 'of the ground', but, given Wall Street's interest, spurred by the successful financing of the commercial satellite constellations such as Iridium, PanAmSat and Globalstar and (forecasts of) a booming satellite market, financing appears to be quite feasible for the most promising of these new transportation companies.[34]

The U.S. government shows a keen interest in promoting research and development (R&D) in the small launcher (technology) field, witness a NASA program, *Bantam*, originally aimed at funding the development of low-cost launchers for light-weight scientific satellites built by universities, and a more recent USAF small launcher procurement program, which, through a competitive bidding process aimed at small launcher companies such as Orbital Sciences and Kelly Space & Technology, should result in new, low-cost launchers becoming available for USAF needs.[35]

34. See Space News Online (Jan 19, 1998) at 6 ("Rlv firms scramble to finance systems") <http://www.spacenews.com/spacenews/members/sarch/sarch98/sn0119cr.htm> and Space News Online (Mar 23, 1998) at 16 ("Wall Street warms up to new rocket firms") <http://www.spacenews...members/sarch/sarch98/sn0323p.htm>.

35. See Space News Online (Jan 19, 1998) at 10 ("Bantam under fire by commercial launch firms") <http://www.spacenews...members/sarch/sarch98/sn01119dg.htm> and Space News Online (Jul 20, 1998) at 6 ("Usaf to open small launcher competition") <http://www.spacenews...members/sarch/sarch98/sn0720x.htm>. In the latter article, OSC's Pegasus and Taurus and Lockheed Martin's Athena are mentioned as the only proven launchers in the size class sought by the Air Force. Apart from these programs, OSC has a contract with USAF to develop a small launcher based on the Minuteman 2 ballistic missile and including Pegasus components, dubbed the Minotaur, which will be capable of launching small payloads for 30% less than the air-launched Pegasus. The same article reports that, after complaints from the private industry ("the government should buy launch services rather than fund selected rocket development efforts"), NASA recently restructured the Bantam program to focus on generic rocket technology development.

*European projects*

With the successful third and final qualification flight of the Ariane 5 on October 21, 1998 this new heavy-lift launch vehicle is now ready for commercial service. The first commercial flight is scheduled for July 1999, and will possibly be followed by 3 more in the same year. Compared with the Ariane 4, capacity has increased considerably: Where Ariane 4 has the power to lift a satellite of approximately 4,900 kg (9,965 lb) into GTO, thereby surpassing all its foreign commercial competitors except for the Proton (12,100 lb), the Ariane 5 offers a capacity of 6,700 kg (15,000 lb) for a single launch and 5,970 kg (13,134 lb) for a dual launch (*i.e.* two spacecraft on the same launch), thereby exceeding not only the Proton's performance, but also the capacity of the (non-commercial) space shuttle (13,000 lb), and thus trailing only the U.S. military Titan 4 (19,000 lb).

For the period 2000-2010, the launch service market, as forecast by Arianespace, presents two major characteristics, (1) a further increase in the mass of geostationary satellites, which should still represent the majority of launches (an estimated 30-35 satellites per year), and (2) a diversification of space applications, with particular focus on the LEO satellite constellation market segment. Arianespace therefore sees the need for higher performance GEO/GTO launch vehicles and is in the process of further upgrading the Ariane 5 to that end (more than 9,000 kg/19,800 lb in 2001 up to a GTO capacity of more than 11,000 kg/24,200 lb by 2005-2006!); flexibility should also be increased to cater to LEO missions with diverse orbital characteristics.[36]

At its June 23-24, 1998 meeting in Brussels, the ESA Council approved funding for initial studies for the *Vega* small launch vehicle, an Italian-backed development project that should produce a commercially usable small launcher (in 2002) designed for launching small (700-1,000 kg) scientific, Earth-observation and military satellites into low Earth orbit. Available ESA documents estimate a market of six launches per year; whether the ESA Council of Ministers, meeting in 1999, will give a go-ahead to the program, is a matter of debate.[37]

36. See Espace Newsletter 134, *supra* note 7. Also, Astorg, Ruault (CNES), Durand (ESA), Bartholomey (Arianespace) and Dutheil (DASA), *The Ariane 5 launcher and its future*, IAF-98-V.1.03, IAF Melbourne Congress, *supra* note 31. The latter base the Ariane 5 capacity requirements on the following satellite mass predictions: "[t]oday, the average communication satellite mass is around 3000 kg. In 2002 - according to the most recent market analysis - 60% of the satellites will have a mass between 3000 and 5000 kg, and in 2005 around 50% will have a mass over 4000 kg." With a preference for dual launches this translates into the capacities as given in the text.

37. See Space News Online (Jun 22, 1998) at 3

*Japanese projects*

With the H-2, operational since early 1994,[38] both too expensive for the market and with insufficient lift (approximately 4,000 kg/8,800 lb) for the larger GEO satellites now being built and planned, NASDA, the National Space Development Agency of Japan, is developing a new family of launchers under the name H-2A. Considerable cost reductions have been obtained through the use of American solid-rocket motors and fuel tanks. The H-2A will come in three models: the H-2A-202 (standard version) with about the same capacity as the H-2, which is expected to fly in mid-2000, an augmented version, the H-2A-212, planned to be available a few years later (maiden flight in 2002?), with a capacity of up to 7,500 kg, and a possible future version that could reach a capacity of 9,500 kg. Rocket System Corporation, the private company selling Japanese launch services worldwide, in 1996, concluded contracts with both Hughes Space and Communications and Space Systems/Loral for 10 H-2A launches each.[39]

NASDA has also developed the smaller J-1 launcher, capable of putting about 1,000 kg into low Earth orbit; its first test flight in 1996 was a success, and will be followed by a second flight in 2001. The J-1 is primarily built for domestic (NASDA) requirements (which does not exclude commercial uses at a later stage).

For scientific research experiments and programs, including planetary missions and astronomical research, the Institute of Space and Astronautical Science (ISAS), an interuniversity research organization falling under the Japanese ministry of Education, science, sports and culture, has developed its own M-series of launchers. An enhanced version, the M-5 performed its first launch in July 1998, putting a scientific satellite into an elliptical orbit.

Finally, NASDA's plans include a step-by-step development of reusable launch vehicles, a project which has a 2000-2030 timeframe.[40]

<http://spacenews...members/sarch/sarch98/sn0622g.htm> and Space News Online (Jun 29, 1998) at 1 <http://www.spacenews...members/sarch/sarch98/sn0629ak.htm>

38. The maiden flight of the H-2 took place in february 1994. Since then, the vehicle has been launched six times, five of which were successful. The sixth flight, on Feb 21, 1998 failed. Altogether eight spacecraft have been launched, but with an excessive price tag of USD 140-160 million, the H-2 had no chance to compete in the international market.

39. See, on the H-2A program, Watanabe and Hirata (NSDA), *H2-H2A redesign for more efficient and active space development - enhanced capability and reduced launch cost*, IAA-98-IAA.1.1.01, IAF Melbourne Congress, *supra* note 31.

40. For further info on these programs, see Shigeaki Nomura (NASDA), *Japanese activities for future space transportation system*, IAF-98-V.3.01, *id.*

*Chinese projects*

The growing size and weight of satellites also forces China to upgrade its launch vehicles to meet its customers' needs. The two launch vehicles presently employed by Great Wall Industries, the Long March 2E (LM-2E) and the 3B version (LM-3B), will both be upgraded, resulting in a payload capacity of the new LM-2E(A) of 5,000-6,000 kg available for the market in the year 2000. And, if the same performance measures are applied to the LM-3B, the latter's capacity, now 4,500 kg/9,900 lb, could be raised to close to 7,000 kg/15,400 lb.[41]

*Russian projects*

Russia's 'workhorse' the Proton-K/Block DM, the most powerful commercial launcher until the advent of the Ariane 5, with a lift of between 4,800-5,500 kg (10,560-12,100 lb), will be upgraded through the replacement of the Energia Block DM fourth stage with a newly developed Khrunichev "Breeze" upper stage. This new Proton-M will ultimately be capable of launching up to 7,800 kg/17,160 lb to GTO. Further plans involve the capability of launching heavy dual payloads like the upgraded Ariane-5.[42]

*Indian projects*

In the years to come, India plans to enhance the capability and reliability of the PSLV for mainly domestic payloads.
One of the more ambitious projects undertaken by ISRO, however, is the development of a launch vehicle for geostationary launches, the Geostationary Satellite Launch Vehicle (GSLV-Mk1), which uses a Russian cryogenic upper stage. With tests having progressed in 1997, a first flight is being planned for early 1999. Though this launch vehicle is primarily developed for India's own 'independent access to space', with one flight per year in the coming five years for domestic (communications) satellite launch needs, commercialization, on a limited scale, is not excluded.[43]
Between mid-1998 and 2003, 11 indigenous launch vehicle missions are planned, further enhancing India's experience in this field.[44]

41. See Hatfield and Middleton, *Implications for Asia Pacific launchers of the global GEO launch market after 2000*, IAA-98-IAA.1.2.07, *id.*
42. See *ibid.*
43. See Space News Online (Jan 26, 1998) at 22 ("Krisnaswamy Kasturirangan/Chairman, Indian Space Research Organization")<http://www.spacenews...members/sarch/sarch98/sn0126ae.htm>.
44. See India space funding, *supra* note 10.

Over the horizon is the Indian AVATAR project to build a miniature, reusable, single-stage-to-orbit, hydrogen-fueled space plane, for small satellite launches into LEO. India's own substantial aerospace technology expertise will, however, have to be supplemented by that of other countries to turn this 10-year plan into a reality.[45]

Though the above review of present and prospective launch providers and launch vehicles may not do justice to plans and projects of all countries or companies aspiring to become involved in the (commercial) launch trade, it is suggested that it nevertheless gives a fair picture of the relatively limited number and the type of 'players' most active in the field. In the following chapters, other (former/would-be) launch participants may be reviewed in the context of specific issues dealt with therein.

### *1.2.2 The spaceports*

#### *United States spaceports*

Since the 1950's, the U.S. government has built, operated and maintained a space launch infrastructure for its military and civil launches. The most frequently used of these government-operated launch sites were, and still are, Cape Canaveral Air Station in Florida, and Vandenberg Air Force Base in California.
Since the early 1980's, these ranges have increasingly also accommodated commercial launch activities. Gradually, the launch infrastructure has followed the launch services industry in commercializing its activities. This has led to Federal government agencies paying more attention to meeting commercial launch needs through modernization and upgrading of the launch ranges. Pressure of commercial users has also resulted in a move towards commercially operated, non-governmental launch sites or spaceports catering in particular to private launch companies' requirements.

The following is a brief description of the main federal and 'private' launch sites now actively wooing (commercial) customers among the above present and prospective launch providers.[46]

45. See Space News Online (May 18, 1998) at 15 ("India sees bright skies for space plane") <http://www.spacenews...members/sarch/sarch98/sn0518u.htm>
46. See *e.g. Six states in contention for launches - investing in spaceports seen as way to attract spinoff businesses, jobs*, Florida Today (Dec 1997) <http://www.flatoday.com/space/explore/spacial/floridasfuture/pg08.htm> The information on spaceports which follows is to a large extent derived from *An overview of the U.S. commercial space launch infrastructure*, Special Report, AST Report 1998 (3d Q), *supra* note 9, SR-1-14).

*Federal*

- Cape Canaveral Air Station (CCAS) in Florida, in operation since 1950; operated by the USAF; launch complexes 17 and 36, available for Delta and Atlas launches respectively. Also supports launches of Athena, Titan and Pegasus vehicles and, in the future, EELV's and RLV's (all orbits);
- Vandenberg Air Force Base (VAFB) in California, in operation since 1958; operated by the USAF; available for LEO launches by all types of launch vehicles;
- Kennedy Space Centre (adjacent to CCAS) in Florida, in operation since 1964; operated by NASA; originally created for the Apollo program, it is now exclusively used for space shuttle launches (to all orbits);
- Wallops Flight Facility, Virginia, in operation since 1945; operated by NASA; used for Pegasus LEO launches and, in the future, for converted Minuteman missile launches.

Other Federal (mostly military) launch sites offering their services for commercial launches, include Barking Sands (Hawaii), operated by the U.S. Navy, White Sands Missile Range (New Mexico), operated by DOD, Edwards Air Force Base (California), the U.S. Army's Kwajalein Missile Range (Marshall Islands, near the Equator), Poker Flat Research Range (Alaska), operated by NASA and the Department of Energy's Nevada Test Site.
The latter has in principle been made available to Kistler for the launch of its K-1 reusable launch vehicle (Kistler awaits FAA-AST approval for its operations).

*Commercial*

- California Spaceport, at VAFB, operated by Spaceport Systems International (SSI), a private company; not in use yet, but available for LEO launchers such as Athena, Taurus, Minotaur and various RLV's. SSI was the first private operator to be granted a commercial launch site operator's license by DOT's Office of Commercial Space Transportation (FAA-AST), in September 19, 1996;
- Spaceport Florida, at CCAS, Launch Complex 46, operated by the Florida Spaceport Authority, a public transportation authority; in use by Athena and available for all orbital launches; the second operator to receive a licence, on May 22, 1997;
- Virginia Space Flight Centre, on Wallops Island, operated by Virginia Commercial Space Flight Authority (VCSFA), a public organization, which was awarded a commercial launch site operator's license by FAA-AST on December 19, 1997. Also in 1997, the VCSFA signed an agreement with NASA to use the latter's facilities at Wallops on a cost reimbursement basis; to be used for LEO launches by Athena, Taurus, and various RLV's.
- Kodiak Launch Complex (Alaska), operated by the Alaska Aerospace

Development Corporation (AADC), a public corporation founded by the Alaska State government; for suborbital and LEO launches (Athena, Taurus, various RLV's). AADC obtained its launch site operator's license on September 24, 1998. The first commercial launch, for the USAF, took place in early 1999. In April 1999 NASA awarded a contract to Lockheed Martin for the Athena 1 launch of a scientific satellite; this will be the first LEO launch from the Alaska facility.

In addition, proposals to develop commercial spaceports involve at least one additional candidate:
- Southwest Regional Spaceport, adjacent to White Sands Missile Range (New Mexico), to be operated by the New Mexico Office of Space Commercialization, State of Mexico; for various RLV's.

Two U.S. launch systems are special in this connection, Sea Launch and Orbital Sciences' Pegasus. The Sea Launch partners perform launches from their own mobile, floating launch platform in the Pacific Ocean, along the equator, about 1,400 miles from Hawaii.
The Pegasus is air-launched from underneath an aircraft (L-1011), which can take off from any launch site/spaceport fit for aircraft operations: one such launch started from a base on the Spanish Canary Islands.

*Europe*

Both Norway and Sweden have sounding rocket ranges (Andoya Rocket Range and Esrange respectively), both in operation since the 1960's and used by ESA and ESA member states for suborbital launches.
Additionally, Italy owns and operates the San Marco launch platform, located 4,8 km off the coast of Kenya. The facility, situated conveniently close to the equator, has been used between 1967 and 1988 for (U.S.-built) Scout launches. Italy's sponsorship of the, yet to be developed, European small launcher Vega, based on an upgraded San Marco Scout launcher, may bring new operations to the platform.

The launch base for all Ariane launches is the Guyana Space Centre, at Kourou, French Guyana. The centre has been operational since 1968. On the basis of a contract between ESA and the French Space Agency, CNES, the latter manages the Centre. It has two launch pads, ELA-2 and now ELA-3, built more recently for the Ariane 5. The Centre's ideal (near-equatorial) geographic location translates into substantial fuel and - thus - cost savings for launches with a GEO destination.[47] Some consideration has been given to

47. Compared to launches from Cape Canaveral, those from Kourou require approximately 15-17% less fuel to deploy a payload into GEO, see 1997 Teal Group briefing, *supra* note 2.

making the facility available for use by non-European launch vehicles. One would assume that, for competitive reasons, this would only make sense if done within the framework of a strategic alliance with the launch provider concerned.

*Russia*

Baikonur is Russia's prime 'cosmodrome', until 1991 the site of some 40 to 50 - mostly military - launches per year. The demise of the Soviet Union and the economic problems that have since plagued Russia, including its space programs, has reduced the number to some 28 per year. All Russian manned space flights (on Soyuz vehicles), Zenit and Proton launches take place from this spaceport. The launch site is based in the former Soviet republic Kazakhstan and Russia rents the site for USD 115 million per year. Though the income derived from commercial launches with the Proton (acquired through ILS) is of vital importance to Russia, government (military and civil) launches continue to have priority use of the launch vehicle. The Ministry of Defense's control of the launch site is reported to be transferred to the Russian Space Agency by the year 2000.[48]
The Plesetsk cosmodrome, located near Archangelsk in Rusia, is the country's second spaceport, with a rich history of Soviet launches for also mainly military purposes. Eurockot's Rockot launch vehicle will use this launch base, and probably also the Start and Cosmos launchers.
A third launch site, currently unused, is Svobodny, a military base, close to the Russian-Chinese border in Khabarovsk, formerly used for ballistic missile launches.
By virtue of a Presidential decree of December 1997, the control over the above spaceports will be transferred from the Russian Ministry of Defense to the Russian Space Agency by the year 2000 (which will presumably also bring the revenues earned by the use of the facilities into civil rather than military hands).

*China*

CGWIC uses three satellite launch centers for operating the various Long March launch vehicles:
- Xichang, in the southwest China Sichuan province, primarily for the heavy-lift LM-3B;

48. For this and other information on Baikonur and the other Russian launch sites, see *e.g.* Space News Online (Feb 23, 1998) at 10, (Aug 3, 1998) at 4, and (Sep 7, 1998) at 6, <http://www.spacenews..members/sarch/sarch98/sn0223bx.htm, /sn0803bo.htm and /sn0907x.htm> repectively.

- Taiyuan, in the Shanxi province, for the medium-lift LM-2C and -4 launch vehicles, and
- Jiuquan, 1,600 km west of Beijing, in the Kansu province, also for the medium-lift LM 2C and 2D. At the latter site, a new launch pad is being constructed.

*Japan*

Both the H-2 and the J-1 make use of the Tanegashima Space Centre on Tanegashima Island in the South of Japan. The Centre is operated by NASDA. A new launch pad is being constructed for the H-2A. Until 1997, an agreement with the local fishing community limited launchings to two 45-day periods per year, which made it in practice impossible to have more than two launches per year. A new agreement reached in June 1997 expanded this allotment to 190 days per year, which, depending on the amount of reduction in preparation time at the launch pad, may result in 4 to 8 launches per year.[49] The M-5 was launched from the Kagoshima launch site.

*Brazil*

The Instituto de Aeronautica e Espaco is responsible for operations at the Alcantara Launch Centre, located on the Atlantic coast near the equator. The Centre is available for the indigenous VLS launches.
In 1994, the Centre's launch pads were used by NASA for sounding rocket launches. And a number of other foreign launch providers, including the Chinese, Russians and Ukranians, have in the meantime shown interest in using Alcantara for GEO launches.[50]

*India*

Sriharikota, India's spaceport, located on an island on the east coast, provides launch services for ISRO's Rohini sounding rockets and the PSLV, and is being modified for the first launch of the GSLV in 1999.

49. The Teal Group anticipates Tanegashima will start averaging about 4-5 launches annually early in the next decade (for both H-2 and J-1 launches), see 1997 Teal Group briefing, *supra* note 2; a NASDA official more recently stated that, as a result of the new agreement, "NASDA can at maximum launch eight H-IIA launch vehicles annually if it can cut down preparation period at the launch pad from 90 days to 20 days.", see Masahiko Sato, *The Japanese legal framework: third party liability resulting from NASDA launch activities*, IISL-98-IISL.2.05, IAF Melbourne Congress, *supra* note 31.
50. See 1997 Teal Group briefing, *supra* note 2.

*Australia*

The Woomera Prohibited Area, north of Adelaide, was originally a missile test facility. In the 1960-70s, the facilities were used extensively for sounding rocket launches by Europe, the U.S. and other countries. The Australian government now offers Woomera as a space launch centre to commercial users. As a result, agreements have been concluded with a number of countries, reportedly including the Russians and the Japanese, to develop space launch service facilities in the area.[51]
Kistler Australia has also concluded an agreement for the use of Woomera, for operations of its K-1 RLV.

## 1.3 Factors affecting the development of the (free) trade in launch services

The international commercial launch market is - at present - essentially dominated by the U.S. firms Boeing and Lockheed Martin and the European firm Arianespace. Although China, Russia and Ukraine have considerable capabilities in this field, with a long-time experience in domestic government launch activities, in practice they have yet to establish themselves as full-fledged members of the club of international launch service providers. In the meantime, Russia and Ukraine sell their services primarily through joint ventures with Western companies, and the three launch providers concerned have the relative luxury of eager (GEO and LEO) satellite manufacturers and operators clamouring for launch vehicles: it is, and is expected to remain for years to come, a seller's market.
Japan is late in entering the commercial launch market, and India will not make a competitive impact for years to come.

Altogether, there are only a few serious players in the market, and innovation, in the sense of new companies with new products, appear to be almost all of American nationality.
Obviously, there are some serious handicaps and barriers which prevent other countries and their companies from joining the 'club' of launching states.

A number of practical barriers for these launch 'have-nots' are obvious:

*Technology*

The manufacture of indigenous launch vehicles is a high tech activity requiring extremely sophisticated expertise which either has to be developed from scratch

51. *Ibid.*

or borrowed from a full-fledged domestic military missile industry (which uses virtually identical technologies). For example, Japan, with little or no missile expertise to speak of, has been building sounding rockets since the mid-1950s and, since approximately 1969, developing launchers on the basis of imported U.S. Delta hardware and technology. Its decision to build its own, 100% Japanese, launcher started a 10 year effort which NASDA describes as follows:

"The H-II rocket was entirely different to the H-I rocket, developed in a completely different way. The new [first stage] engine, LE-7, was extremely difficult to develop and it failed at test firing several times. In an effort to reduce weight and thus improve efficiency, and to increase tolerance to vibration, noise and high temperatures, developers encountered numerous difficulties. But developers' enthusiasm helped them to overcome these difficulties and in February 1994 - two years later than originally planned - the first rocket made entirely in Japan was launched. The successful launch represented the culmination of 10 years o[f] gruelling effort".[52]

And it took the collective European expertise in and knowledge of rocketry (primarily available in France, U.K and Germany) 7 years, from decision in 1972 to first launch in 1979, to get the first Ariane successfully into space.

The Ariane 5 took some 10 years of development before the first flight could take place.

Proof that this is indeed a 'high tech, high risk' industrial activity may also - and even more conclusively - be found in launch failures suffered by both established and new launch service providers. For example, in 1996, a Chinese Long March 3 and a 3b, a European Ariane 5 and a Russian Soyuz malfunctioned; in 1997, a U.S. Delta 2, a Russian Proton and a Brazilian VLS failed, followed in 1998 by a Japanese H-2, an Israeli Shavit, a U.S. Titan 4 and Delta 3, and a Ukrainian Zenit 2. In the first half of 1999, the U.S. experienced four launch failures, two Titan 4, one Delta 3 and one Athena 2. A private industry database on all spaceflights performed shows 60 significant launch failures since 1990.[53]

52. See - *H-II - an entirely Japanese-made rocket, History of Japanese rocket development* (5), Online space notes/launch vehicles <http://spaceboy.nasda.go.jp/note/Rocket/E/roc105_his5_e.html>

53. U.S.-based Aerospace Corporation, as quoted in NYT (May 12, 1999) at 1 ("Series of rocket failures unnerves U.S. space launching industry"). In the same article a U.S. space program expert, John Pike, is quoted: "[s]pace launch vehicles are inherently unreliable and people should understand that is still a risky business".

*Development cost and commercial prospects*

Building a launch vehicle, including the necessary infrastructure, from scratch is a costly affair: The Ariane 5 development price tag up to mid-1996 had reached USD 8.5 billion.
The cost of upgrading existing (families of) launch vehicles also gives an indication.
The partners in Arianespace, for example, will spend some USD 1,3 billion to give the Ariane 5 its two satellites/11,000 kg lift capacity by the year 2006.
Close to that same figure will be spent in USAF funding on the EELV program of Atlas, Titan and Delta modernization and upgrading. But the companies at the receiving end will also have to invest several hundreds of millions USD, before the upgraded products actually become available.
The price per launch also illustrates (to some extent) the amounts involved in the manufacture of the respective vehicle. The FAA gives the following approximate 1998 figures (in USD millions) for a number of medium-to-heavy lift GEO/GTO launchers:[54]

- Ariane 5: 115-143; Ariane 4 (depending on the 'intermediate' version used): 75-110
- Long March 3B: 60-70, the medium-lift versions 2C and 4: 20-30
- Titan 4: 240-270, the medium-lift Titan2: 41-47
- Proton: 50-70
- Sea Launch (Zenit 3): 90-100
- Zenit 2: 25-40

In the same "intermediate" class of launchers as the Ariane 4, the Atlas 2A will command a price of USD 65-80 million with its stronger version, the Atlas 2AS is worth USD 90-100 million, and its colleague, the Delta 3 USD 55-60 million.
The "medium" class Delta 2 costs USD 45-50 million per launch, and the Japanese M-5 USD 41-47 million.

The above '10 years gruelling effort' to build the Japanese H-2 brought the launch price of that indigenous heavy-lift vehicle to a hefty USD 182-201 million.[55]

The development cost of the smaller launch vehicles is understandably lower, partly because of the technology base already available through the earlier manufacture of the above larger launchers, partly because of other power, endurance and material parameters and requirements.
One recent example is the Italian-French Vega, with a projected development cost of approximately USD 360 million and a tentative launch price of USD

54. See: AST Report 1998 (3d Q), *supra* note 9 at B-1-2 ("Characteristics of cited vehicles").
55. See AST Report 1998 (2nd Q), *supra* note 12, at B-2.

20 million. The Vega will compete with the following small LEO launchers (price in USD millions):

- Athena 1: 14-16
- Athena 2: 19-21
- Pegasus XL: 12-14
- Taurus 1: 18-20
- Start 1: 5-10
- Rockot: 5-8
- Shavit: 12-18[56]

Of course the above cost, even for the heavy lift launchers, is far from insurmountable for both Western and Asian industrialized countries. But the question will then be two-fold: how much time and (high tech) energy will it take to build a new indigenous launcher and will it be worth the effort.

It is difficult to ascertain whether all present launch operators consistently make a profit in the business they are in. But more important from the newcomers' perspective is the fact that the 'incumbents' are there, that the U.S. government and, since the early to mid-1980s, the U.S. and European companies have been dominating the market, and that the above launch companies and their colleagues, individually and collectively, through various development and modernization plans and (joint) projects, seem determined to keep, or increase their grip on all segments of the market. Various forms of direct and indirect subsidization and support on the part of the governments concerned have helped to turn the established launch providers into formidable competitors, now and in the future, with the financial, technological and sales power to meet any newcomer head-on, in whatever segment or niche of the market the latter would wish to start doing business. Not a very attractive prospect!

And then, the long term development of the satellite launch market is not one that can be easily predicted or foreseen: by the time the launch vehicle is operational and the development money has been spent, a 'dip' in the market combined with an oversupply of competitors' proven launch vehicles may be the end of the new entrant's dream of capturing a part of the market that appeared promising many years earlier.

But a country may have other than commercial reasons to enter the launch market, either internal (high tech spin-off's (new industries), national economy, jobs etc.) or external (international cooperation, enhanced position in international, space-related organizations, regional dominance, prestige, etc). Or the commercial aspect may be only the by-product of what is essentially

56. See *ibid*.

the geopolitical or national development-inspired need for independent access to space.

The fact is that some countries, irrespective of the above practical barriers, want to 'join the club' anyhow. So they simply *buy* the launch vehicles, have somebody build a launch site, hire the engineers, technicians, managers and salesmen, and start the business of providing launch services for domestic and foreign clients? They do not. Because they can not.

*Regulatory impediments*

This is where other impediments come into the picture, namely those of a *regulatory* nature: barriers which have proven to be rather effective in preventing or discouraging the acquisition of these launch vehicles and the related technology by countries with space launch aspirations.

Not only the 'have-nots' are faced with barriers. The countries which possess a missile and/or launch industry and have the ability to provide launch services for domestic and international purposes, *i.e.* the 'haves', also have encountered difficulties in entering the market.

China and the (former) Soviet Union/Russia are prime examples of this category. For many years these countries, with of course the Soviet Union as the most successful and prominent performer since the dawn of spaceflight, launched domestic military and civil satellites and showed they had all the operational capabilities for making an impact on the international commercial launch market.
Of course they had certain handicaps of a practical nature, one of which being the secrecy with which their launch industries had been operating for many years (a fact which inspired little confidence on the part of their commercial satellite clients and the space insurance community).
Other problems were related to their non-market economy status and limited marketing expertise in this new and sophisticated business.
No handicaps or problems, however, that cannot be addressed and overcome.

Still, it took the Chinese until 1988 before they were able to conclude their first launch contract with a Western customer, and Russia followed in 1992. And, although in the mean time their presence in the commercial market has become a fact of which the satellite manufacturers and owners are well aware, their actual impact on the market, in the sense of actual launches performed and contracts signed, lags considerably behind their Western competitors.

As in the case of the launch 'have-nots', (other) regulatory barriers prove to be the main stumbling blocks for market entry and, additionally, for full access to the market.

As most of these barriers had (and have) their origin in *c.q.* are based on U.S. laws, policies and practices, particularly in the field of national security and foreign policy, these will be reviewed and analyzed in the following Chapters, and their impact on the international trade in launch services will be determined.

The U.S. government's attitude towards, and its role in the emergence of, the U.S. private launch industry is the most suitable starting point for what is essentially a critical assessment of the U.S. government's behaviour vis-à-vis its industry's foreign competitors (*in statu nascendi*).

CHAPTER 2

# United States law, policies and practices

## 2.1 The emergence of the US private launch industry

### *2.1.1 Law, policies and practices in the pre-space shuttle era (1961-1982)*

#### *2.1.1.1 Launch vehicle development in the 1960s: DOD, NASA and the private manufacturers*

President Eisenhower's military experience in World War II and his perception of the intentions of the Soviet Union in the post-war period made him a firm supporter of the development of intercontinental ballistic missiles (ICBM's) which could act as a deterrent to nuclear attack through its promise to deliver warheads to targets thousands of miles away. He also supported the development of reconnaissance satellites which would make the U.S. safe from surprise attacks.
Thus, in the years after his inauguration in 1952 the U.S. Air Force (USAF) developed the first ICBM, the Atlas (testfired in 1955 and operational in 1959). The Titan and -medium range- Thor missiles followed in the early sixties. At the Army's weapons development and missile center, Redstone Arsenal in Alabama, Wernher von Braun and his team of mostly German engineers developed a missile, based on World War II V2 technology, later called the Jupiter. And the Navy, in 1956, developed the Polaris, a solid-fueled IRBM for its submarines. Finally, the USAF was allowed to develop the Minuteman, a light, solid-fueled ICBM.
At the same time, the attractive concept of having reconnaissance satellites in low earth orbit led to a highly secret development program, consisting of the manufacture by Lockheed of a satellite armed with cameras, and of a two-stage rocket, known as the Agena.[1]

Separate from these military efforts, the US government approved a civilian project to study the upper atmosphere with a scientific satellite, to be launched

1. See Roger D. Launius, *NASA: A history of the U.S. civil space program*, USA (1994) hereinafter referred to as Launius, Chapter 1, *passim*.

by the non-military Viking rocket. Project 'Vanguard', as it was known, the U.S. contribution to the International Geophysical Year 1957/1958 of the International Council of Scientific Unions,[2] was meant to enhance national prestige, not by its scientific performance, but simply by its mere presence in orbit.

(An important additional goal for the U.S. government was the establishment of the precedent of free access to space, a prerequisite for having reconnaissance satellites in orbit without the risk of legal or military challenges on the part of the Soviet Union. To minimize the risk of such a challenge at the outset, it was important to have a non-threatening civil satellite in orbit first. The alternative, the Explorer proposal, submitted by the Army's Redstone Arsenal, would have involved an adapted ballistic missile launch vehicle, the Redstone or Jupiter. This was not acceptable).[3]

In the mean time, the Russians, with the assistance of their 'own' German V2 engineers, had also embarked upon the development of missiles. Unlike the Americans they concentrated their efforts immediately after the war on increasing the power and range of the rockets; this determination paid off and brought them ahead of their American competitors in the ICBM/long-range missile field.[4]

The two American projects (secret reconnaissance and public Vanguard) did not get off the ground, at least not before Sputnik I shook U.S. confidence in its technological superiority. There was a lack of focus, a lack of urgency and therefore a lack of money to really get things moving the way Eisenhower had planned it.
Sputnik I had a 'Pearl Harbor effect'[5] on American public opinion, not the least because of the apparent disparity of launch capabilities between the Soviet Union, which was able to launch nearly 200 pounds into orbit, and the U.S., planning to lift 3.5 pounds with the Vanguard program.[6] For people around the world, as one commentator observed, Sputnik epitomized the double nature of launchers: the same vehicle which had put a scientific satellite in orbit could, with some technical modifications and if associated with nuclear warheads, become the focus of a new and revulutionary weapon system.[7]

2. In 1952, the ICSU had decided to expand a polar research project to encompass a study of the upper atmosphere with the help of rockets with instrument packages attached; and in October 1954 the Council had adopted a resolution calling for the launch of artificial satellites during the IGY to help map the earth's surface.
3. See Launius, *supra* note 1, at 22-23.
4. See John Krige & Arturo Russo, *Europe in space 1960 - 1973*, ESA SP-1172, Netherlands (1994), hereinafter referred to as ESA SP-1172, at 6-8.
5. See Launius, *supra* note 1, at 25.
6. Sputnik II, launched on November 3, 1957, which carried Laika, a dog, into space, weighed even 1.120 pounds and stayed in orbit for almost 200 days, *ibid.*
7. See Lorenza Sebesta, *The availability of American launchers and Europe's decision 'to go-it-*

The good thing about the event was that it "created an illusion of a technological gap and provided the impetus for increased spending for aerospace endeavors, technical and scientific programs, and the chartering of new federal agencies to manage air and space research and development."[8] In other words, the crisis brought urgency, focus and money to the U.S. space effort. And it led to the creation of NASA as the agency that would coordinate U.S. civilian space activities.
An additional positive side effect was of a legal/political nature. The fact that Sputnik I (and II) had orbited the earth, overflying the territories of many sovereign nations without provoking a single protest, had, in the U.S. view, established the legal precedent for free access to and freedom of space which the U.S. administration had sought to obtain for its reconnaissance satellites.[9] The Soviet launch thus cleared the way for the previously rejected Army project, and in January 1958 a four-stage launch vehicle, the Juno 1, developed by the team of Wernher von Braun on the basis of a modified ballistic missile, placed Explorer1 in orbit. And Vanguard 1 followed less than 2 months later.

NASA's charter gave the agency both a research job and operational responsibilities. It would not only design and build launch vehicles and satellites, but it would also launch them, track them, acquire data from them, and interpret the data.[10] The first NASA 10-year plan was presented to Congress in 1960. It called for a greatly expanded program: manned flight, scientific satellites, lunar probes, and, for the launch of all these spacecraft, a family of launch vehicles, including very large ones to cater for the heavier payloads. In addition to the existing Redstone, Thor and Atlas vehicles, NASA plans included (further) development of the Scout booster for smaller payloads, Centaur (originally a Department of Defense project), an upper stage for lunar and planetary missions, and Saturn, also for bigger payloads. Where the Scout became a highly reliable small booster[11] it was particularly in the area of heavy lift vehicles that the U.S. felt the need to catch up with the Soviet Union.
The efforts of the NASA engineers in the early sixties brought modifications to existing missile derived boosters such as the Thor-Agena which could launch a 2,200 pound satellite into orbit, the Delta, a very successful family of launch vehicles for various medium-sized payloads, and the Titan, developed in the

*alone'*, ESA HSR-18, Netherlands (1996), hereinafter referred to as ESA HSR-18, at 8.

8. See Launius, *supra* note 1, at 25.

9. *Id.* at 27-28.

10. See Frank W. Anderson, *Orders of Magnitude - A history of NACA and NASA, 1915-1980*, (The NASA History Series, NASA SP-4403) USA (1981), hereinafter referred to as Orders of Magnitude, at 22.

11. It was first launched on July 1, 1960, and soon became a 'workhorse', which could place a 330 pound satellite into earth orbit; by the end of 1968 it had a launch success rate of 85%, see Launius, *supra* note 1, at 44.

mid-sixties as the heavy-lift launcher of choice. (The Saturn would be developed by the von Braun team exclusively for the Apollo project)
At the same time the reliability of the launchers needed to be improved: by December 1959, of the 37 satellite launches attempted, less than one- third had actually attained orbit. So NASA imposed new and rigorous standards on all of its products and got DOD, whose vehicles they used, to impose those same standards on all contractors and component manufacturers.[12]

By the end of the 1960s, the U.S. had developed several sufficiently reliable and proven launch vehicle families, capable of meeting basically all the launch needs of the Government, both military and civilian:
- Scout, built by LTV Aerospace, with the launch-program managed by the Navy,
- Atlas, built by General Dynamics, and managed by the Air Force,
- Titan, built by Martin Marietta, and also managed by the Air Force,
- Delta, built by McDonnell Douglas, and managed by NASA,
- Saturn 1B, built by Chrysler and McDonnell Douglas, and managed by NASA and
- Saturn V, purpose-built for the manned lunar missions by Boeing, Rockwell and McDonnell Douglas and also managed by NASA, but out of production by the time of the first lunar landing.

The launch process was simple: NASA and the U.S. Air Force/Department of Defense, after having obtained the necessary Congressional authorization and appropriation of the required amounts, would procure the launch vehicles, built according to their specifications, from one of the above launcher manufacturing companies.[13] The launch would be performed at government launch facilities by the government agency concerned, with assistance (arranged under separate contract) from the manufacturer.[14] Both the civil and military satellite telecommunications and reconnaissance needs through the years produced a steady stream of government purchases of launch vehicles.

Long term, future-oriented research and development of launchers was not encouraged at this time. Congressional budgetary approval procedures would result in yearly authorization and appropriation battles often complicated by such factors as lack of local interest in a specific program or other political or budgetary priorities. In the absence of certainty and predictability of 'market

12. See Orders of Magnitude, *supra* note 10, at 24.
13. See Allen D. Webber, *Launching the rocket industry in the United States: domestic regulation of private expendable launch vehicles*, 50(1) J. Air L. & Com. 1-67 (1984), hereinafter referred to as Webber 1984, at 1, note 2.
14. See Edward A. Frankle, *Commercial ELV services and the National Aeronautics and Space Administration: Concord or discord?*, Proceed. 30th Colloq. L. Outer Space 216-223 (1987) herinafter referred to as Frankle: Concord or discord, at 219.

demand' and lack of foreign competition, there was little inclination to invest in new technology.[15]
The roles were thus quite clear: the industry, as government contractor, delivered the hardware and the government used that hardware to produce the launch service both for its own needs and for those of its partners in cooperative projects, such as individual countries and international organizations such as Europe's Space Research Organization (ESRO).

One of the programs undertaken by the U.S. in this period, namely that of *communications satellites*, is of particular note because of the major role it played in policy discussions both within the U.S. and Europe and between them on (the U.S. reaction to) the need for Europe to have access to space for its own communications satellites.
In 1960 NASA launched the experimental Echo satellite, a plastic balloon coated with aluminium, which was used as a passive reflector of telephone signals. It was followed in 1962 by Telstar, the first satellite which relayed live broadcast of television images across the Atlantic. Its handicap of limited visibility to the groundstations (because of the low earth orbit used) was not shared by its successor, Syncom, launched by NASA in 1963 into geostationary orbit (36.000 km. high): with its fixed position vis-a-vis the earth it was permanently visible and thus useable by earth stations on at least one-third of the earth's surface.
This experimental phase was concluded with the launch, in April 1965, of Early Bird, later renamed Intelsat I, which would inaugurate commercial communications satellite services between the U.S. and Europe.
The U.S. government had foreseen the enormous potential of the commercial use of communications satellites, and had entrusted the task of developing an international satellite system to Communications Satellite Corporation (Comsat), created in 1962. Comsat was a private company, with members of the Board of Directors appointed by the President, regulated by the Federal Communications Commission (FCC) and supervised by the State Department. Together with the U.S. government, Comsat was instrumental in getting the International Telecommunications Satellite Consortium, *Intelsat*, established, based on 'interim agreements' signed in August 1964 by 13 states plus Vatican City.
With the shares (and the concomitant voting power) apportioned on the basis of projected use of the system, the U.S., through Comsat, obtained a dominant position in the new organization. Comsat's role as manager of the system (no other person or entity at the time had the required know-how or experience in this field), its majority share and *de facto* veto power further strengthened the U.S. position. All satellite technology used was of American origin. The main U.S. communications firms, such as ITT and AT & T and the large U.S

15. See *infra* para 2.1.1.2 and Chapter 4 for the (lack of) European competition.

aerospace companies were influential shareholders of Comsat. And the new satellites, Intelsat II and III, orbited in 1967 and 1969 respectively, were -almost by definition- U.S.-made and launched. It is not surprising that the European members of Intelsat, some of whom did cherish the small consolation of having groundstations on their territory, felt less than comfortable with such U.S. dominance in this technologically, strategically and commercially important field. However, the existing technology gap between Europe and the U.S. was of such magnitude that the Europeans, in the mid-sixties, could not offer any viable alternative either in the field of communications satellite (component) technology or launch facilities. And with no concerted action on the scale of the American military and civil space research and development, there was little chance for Europe to soon have substantial influence on policy, become a -more or less- equal partner of the U.S., or get a fair share of the contracts awarded by the Consortium, let alone become an independent actor in this 'high tech' field.[16]

That is why in the years following the establishment of the Consortium, during which the parties prepared themselves for the negotiations (in 1969) on definitive arrangements creating the Intelsat Organization, relations between the U.S. and Europe were less than cordial.

### *2.1.1.2 Early U.S. launch policy vis-à-vis Europe*

U.S.-European cooperation in space since the late fifties had consisted mainly of the U.S.Government/NASA offering space on board its satellites for European scientific experiments or providing launch services for European scientific payloads.

The U.S. strategy with respect to space cooperation with its European allies was based on the following 'pillar':

> "demonstrating and reaffirming US political leadership among its allies by engaging them in cooperative ventures in which the US served mainly as the provider of launching facilities ... Launching services were intended to demonstrate, at a low price, US benevolence and advance with regards to her European counterparts and, at the very least, were to symbolize the benefits of a technologically oriented democratic society" (*sic!*)[17]

Such ventures, undertaken on a project-by-project basis were of a strictly scientific nature and each nation had to fund its own activities; thus no 'giveaways' and no exchanges of funds.[18] To that end, bilateral agreements

16. See ESA SP-1172, *supra* note 4, at 55-57; also, on the technology gap and the US reaction thereto, Lorenza Sebesta, *United States - European cooperation in space during the sixties*, ESA HSR-14, Netherlands (1994), hereinafter referred to as ESA HSR-14, at 19-21.
17. See ESA HSR-14, *supra* note 16, at 7.
18. *Id.*, at 8.

were signed throughout the sixties with such countries as the United Kingdom, France, Italy, Germany and other European (and non-European) countries. They would, for instance, arrange for the inclusion of national experiments in NASA programs, or involve launch arrangements for national satellites. The first in the latter category was the British Ariel 1 satellite, launched on April 26, 1962 from Cape Canaveral by Thor-Delta launch vehicle. Canadian, British, French and Italian satellite launches would follow, all based on bilateral cooperation agreements with NASA.[19]

With the birth of the European Space Research Organization (ESRO) and of the European Launcher Development Organization (ELDO), both in 1964,[20] NASA had found European counterparts to deal with. In that same year a Memorandum of Understanding was signed concerning the launch by NASA of ESRO's first two satellites, (still) free of charge, in exchange for free access to all scientific data thus obtained.[21]

It was only in 1966, at the time of both intra-European discussions on the (further) development of an autonomous launch and independent space research capability and of internal debate in the U.S. on the advisability of assisting Europe in this endeavor, that the character of the above U.S.-European launch relationship changed from one of cooperation and free scientific exchange into one based on 'purchase of launch services'. In that year, NASA and ESRO signed an M.o.U. on *reimbursable* launchings, the first such agreement concluded by NASA in deviation of its 'no exchange of funds' policy.[22]

19. On September 29, 1962 the first Canadian satellite Alouette 1, was launched from Vandenberg Air Force Base by a Thor-Agena rocket, followed by, a.o., the second British Ariel launch on March 27, 1964 (by a Scout from Wallops Island, US East Coast), the Italian San Marco on December 15, 1964 (also by Scout from the same base), and a French scientific satellite on December 6, 1965 (by Scout from Vandenberg AF Base). In an interesting reversal of roles the French in 1963 accepted NASA experiments to be flown on French sounding rockets: the launchings took place in 1964 from a French base in the Algerian Sahara and involved two Dragon and two Centaure rockets supplied by CNES, the French Space Agency. See *ibid.* The following year, the French launched their own satellite, Asterix 1, thus becoming the third 'space country' after the Soviet Union and the USA.
20. See, for history of ESRO and ELDO, *infra* Chapter 4.
21. Para. 9 of the M.o.U. provided that "ESRO and NASA will exchange all scientific information resulting from this cooperative program and make the results freely available to the world scientific community." For the full text of the M.o.U, see ESA HSR-14, *supra* note 16, at 41-43.
22. *Memorandum of Understanding between the European Space Research Organisation and the National Aeronautics and Space Administration concerning the furnishing of satellite launching and associated services* of December 30, 1966, reproduced as ESRO/C/198, rev.1 of 6 January 1967 in ESA HSR-14, *supra* note 16, at 45-51; see also NASA News Release No 66-332 of January 4, 1967. NASA News Release 67-48 of March 8, 1967 refers to six previous launches of foreign satellites conducted by NASA under cooperative agreements with no exchange of funds. As noted in ESA HSR-14, at 13-14, this new 'buyer-seller' -relationship did not diminish NASA's insistence on 'automatic' full and free access to all

The M.o.U. provided that ESRO would furnish flight-ready scientific spacecraft and that NASA would provide the launch vehicle, range and launching facilities and other support. The M.o.U. provided further that ESRO would pay NASA for the launch vehicles and for all identifiable direct costs of equipment and services furnished by or through NASA, plus certain indirect costs agreed upon. Separate contracts, setting forth detailed arrangements and the responsibilities of the agencies involved, would be drawn up for each proposed launching.
The first such contract concerned the 1968 launch from Cape Kennedy, by Delta launch vehicle, of ESRO's HEOS-A scientific satellite for an estimated USD 4 million.[23]

The Soviet Union began to make overtures to Europe in the field of space research cooperation. These overtures were taken up by France, which, under President de Gaulle, had put a great deal of energy into an independent security policy, including the development of nuclear weapons and delivery systems.[24] Perhaps in response to this Soviet initiative the U.S. and a number of European countries, in the period 1965-1967, held discussions on the question of the space technology gap and the type of cooperation that could assist Europe in catching up with the Americans.
President Johnson personally supported this idea, as such cooperation would contribute to closer overall (including economic and security) ties between the U.S. and Europe.
The original plan was to limit this cooperation to the field of spacecraft development and space exploration, an approach perceived by the Europeans not as a help to foster space development, but as a way to "divert Europe from the essential economic benefits to be derived from space through the exploration of communications satellites."[25] This perception was not without foundation as the U.S. offer resulted from a rather restrictive policy, approved by the U.S. president in 1965, concerning assistance in the development of

data obtained by the satellites, a demand ESRO was not prepared to meet, *inter alia* to safeguard intellectual property right of the Organization and its researchers. As NASA was required to be able to answer any Congressional question with respect to the data "acquired by any satellite launched from United States' territory" a compromise was reached which obliged ESRO to provide NASA with the satellite data, "upon NASA's request and at NASA's expense", while use of such data would be subject to prior permission of ESRO and subject to its rules relating to intellectual property rights, see art. IV of the M.o.U., at 51. One can safely assume that the experience with these American demands strengthened the position of those ESRO members who sought to establish an independent European launch capability.

23. See NASA News Release 67-48 of March 8, 1967.
24. The French withdrawal from NATO in 1966 and its first nuclear ballistic missile tests in 1967 showed an independence of thinking which was worrysome to the U.S. government, see ESA HSR-18, *supra* note 7, at 10.
25. See ESA HSR-18, *supra* note 7, at 16.

foreign communications satellite capabilities. The three principles which formed the core of that policy were the following:

"The United States should refrain from providing direct assistance to other countries which would significantly promote, stimulate or encourage proliferation of communications satellite systems.
The United States should not consider requests for launch services or other assistance in the development of communications satellites ... for commercial purposes except for use in connection with the single global system established under the 1964 Agreements ...
All transactions involving technological assistance on satellites or launcher technology "should be conditioned upon express written assurances "by the foreign nation(s) that the technology and assistance obtained would be used only within framework of Intelsat and arrangements to which the US was participant and should not be transmitted to third countries prior to US authorization."[26]

For the above reasons, ESRO declined the above proposal (the project would eventually become the subject of U.S. - German cooperation).

European unhappiness with this hegemonistic approach taken by the U.S. coincided with realization on the U.S. side that it was in their strategic and economic interest to have more or less 'equal partners' in Europe. Also, the U.S. was concerned with the threat of national proliferation of civilian and (more difficult to detect) military (read: French) launchers if ELDO was not assisted with its launcher program and the rigid approach of the communications satellites policy was maintained. Additionally, the U.S. authorities were aware of a joint Franco-German communications satellite programme, Symphonie, conceived for the purpose of obtaining know-how (and a better negotiating position within Intelsat) in this field, and "to test, as it did, American willingness to launch European commercial satellites."[27]
There was in fact every reason for the U.S. to believe that continued 'obstructionism' on their part would lead to an uncontrolled development of competitive space capabilities (on top of exacerbating U.S. - European relations).[28]

26. *Policy concerning US assistance in the development of foreign communications satellite capabilities*, National Security Action Memorandum (NSAM) 338 of September 1965, *id.*
27. *Id.*
28. NASA administrator Webb expressed the view that "neither communication spacecraft development ..., ELDO launch vehicle development, nor the Guyana [European equatorial launch] range can any longer be delayed by US export restrictions. By the completion of the range in 1969-70, the European nations could, if they wish, be in a position to place in synchronous orbit an operable comsat spacecraft.", remarks quoted in ESA HSR-18, *supra* note 7, at 18. Thus, according to the American Ambassador in France, the US government would have more to gain in the role of a helpful partner vis-à-vis France and Europe than as a stern competitor, *id.* at 18-19.

The U.S. dilemma was, then, to assist Europe sufficiently so as not to antagonize and loose (control over) their 'ally', without being so efficient or generous that it would turn Europe into a serious (commercial) competitor in the field of the manufacture, launch and operation of communications satellites, to the possible detriment of the Intelsat/Comsat 'single global system'. Moreover, too little or too much help could also turn Europe, and France in particular, into an independent nuclear delivery system owner/operator, a serious non-proliferation worry of the U.S.
Hence a series of decisions and policies on the part of the U.S. with varying emphases depending on the fear of the day or the (lobbying) strengths of the Departments and industries concerned.

In 1966, a Presidential Directive called for positive support of, and assistance to, ELDO, subject to the condition that the launcher vehicles, components and technology provided by the U.S. should not be used:

"1. for improving communication satellite capability other than a. To permit participation in the National Defense Communication Satellite System; b. In accordance with the Intelsat agreements regulating (civilian) telecommunication satellite policy,
2. for improving nuclear missile delivery capability,
3. for transmittal to third countries."[29]

In accordance with this Directive, the U.S. offered both hardware (components and launchers) and know-how to ELDO, and also joint development of a new upper stage. Some useful and informative discussions between NASA and ELDO experts were the short term result.

A revised U.S. NSAM 338 saw the light in July 1967. The most important change was to be found in the spirit of the new Memorandum. Where originally the U.S. position was based on development and protection of one single global communications satellite system, the new text reflected American acceptance of the inevitability of the development of new regional systems, and attempted to guarantee an integration or at least an association of these new systems with Intelsat: if you can't beat them, have them join (and conform).[30]

Here, a crucial provision kept the parties apart for a considerable length of time. Draft article XIV of the agreement created the possibility in principle to set up a regional satellite system separate from Intelsat provided technical compatibility with the Intelsat space segment was ensured and significant

29. *US cooperation with the European Launcher Organization ELDO*, National Security Action Memorandum (NSAM) 354, ESA HSR-18, *supra* note 7, at 19-20.
30. An 'accommodative' attitude would also support the continuity of Intelsat at the 1969 negotiations; as a NASA paper put it, "The health of Intelsat is assured in part by the feeling of the major Intelsat partners that they are indeed partners and not puppets in an organization dominated by the US.", see ESA HSR-18, *supra* note 7, at 22.

economic harm to the latter system was avoided.It was up to the highest organ of the organization, the Assembly of Parties, to express its findings on that issue in the form of recommendations.
The U.S. position on the majority needed to have a satellite (system) approved by the Assembly would determine Europe's fate as to U.S. launcher availability for its satellites. Clarity thereon was not easily obtained. Where originally, in U.S. thinking, a two thirds vote against the satellite was required to defeat it (and Comsat in the new set up had lost its veto power), in 1971 the U.S. position was that two thirds of the votes was necesssary to get a satellite system *approved*.[31] The fact that the U.S. was prepared to give advance indications of its voting behaviour within Intelsat on specific, well-defined European system proposals, was hardly a consolation: its qualified support, depending on the number of countries in the geographical area covered by the proposed system, and thus on the competitive reach of the system, was another demonstration of the grip the U.S. had on - future - European space telecommunications through its launch monopoly.[32]
In 1971 the 77 Intelsat parties came to a final agreement on the governance of the new permanent organization. And in January 1972 President Nixon announced his decision to develop the space shuttle. His administration's inclination to please or appease the Europeans with a liberal launch policy was, for various reasons, limited. (One reason, apart from a change in political priorities of his administration, may have been the fact that the French had continued to vigorously develop and test the main elements of their 'force de frappe' and were not to be distracted from their goal of nuclear missile independence: the American non-proliferation goal of US-European space cooperation had apparently not been attained)

A new "United States Policy governing the provision of launch assistance", addressed to interested countries and international organizations, was promulgated on October 9, 1972. It confirmed the restrictive, Intelsat monopoly-oriented character of the U.S. views and basically told Europe to accept U.S. conditions or look for launch vehicles elsewhere:

31. See letter from Johnson, Under-Secretary of State, of Februari 5, 1971, reprinted in ESA HSR-18, *supra* note 7, Annexes. The US position had apparently hardened both because of pressure from Comsat and the aerospace industry which had benefitted greatly - in terms of contracts received from Intelsat - from the old Comsat-oriented voting-system. Moreover, a new Office of Telecommunication Policy reporting directly to the President had been very critical of "attempts by NASA and the State Department to endanger US monopoly in telecommunication satellites on the base of uncertain political returns,", *id.* at 25.
32. As Belgian minister Lefevre on behalf of the European countries concerned noted, with some bitterness, in his response to Johnson: "To sum up, we are obliged to note that, although the present state of the discussions offers some prospect of our launching our immediate projects within the framework of our collaboration in the post-Apollo programme, it does not enable us to embark on any medium or long-term programming of our space activities." *id.*, Annexes).

"With respect to satellites intended to provide international public telecommunications services: 1. [t]he United States will provide appropriate launch assistance for those satellite systems on which Intelsat makes a favorable recommendation in accordance with Article XIV of its definitive arrangements ..."[33]

Other aspects of the launch policy covered conditions with respect to the place of launch. Where a U.S launch site was envisaged, the arrangement would involve the acquisition of U.S. launch services on a cooperative or reimbursable basis; in the latter case European users would be charged on the same basis as comparable non-U.S. Government domestic users. And with respect to the priority and scheduling for launching European payloads, the U.S. would deal with these launchings "on the same basis as our own".
In the case of preference for the use of foreign launch sites, the arrangements called for the purchase of a U.S. launch vehicle only and the assurance on the part of the buyer that the launch vehicle would not be made available to third parties without prior agreement of the U.S. Launch assistance would in all cases be subject to U.S. laws, which included export control regulations.[34] Nothing in the text of the launch policy, although promulgated at a time when the space shuttle was only on the drawing board, prevented it from being equally applicable to the provision of shuttle launch services to foreign countries, though only with respect to launches from U.S. territory.

It must be assumed that the European space authorities were less than impressed by the text accompanying this launch assurance policy:

"In establishing today a global launch assurance policy, the President affirms the need for a dependable capability which would make it possible for nations to have access under equal conditions to the advantages which accrue through space applications" (emph. add.).[35]

The fact is that they saw the policy as reaffirming the *de facto* binding character of Intelsat (article XIV) recommendations, in conformity with the U.S. views on the matter. In the same vain, the launch of Symphonie could only be agreed upon (in 1974), subject to confirmation that the project would be of an experimental nature only. The possibility to transform it into an operational system was included in the agreement, but again subject to the above Intelsat-related conditions. The Symphonie-Directors had no choice but to grudgingly accept.[36] As we will see in Chapter 4 the above experience with

33. See, the White House Fact Sheet of above title and date, reproduced in ESA HSR-18, *supra* note 7, Annexes; also in US Dept of State Bull, Nov 6, 1972, at 533-534).
34. See *ibid.*
35. See *ibid.*
36. *Launching of French-German Symphonie Communications Satellites*, Agreement effected by exchange of notes, signed at Washington June 21 and 24, 1974; e.i.f. June 24, 1974, see *ibid.* (Annexes); the alternative, a launch provided by the Soviet Union, was in principle available but not within the planned timeframe, see *id.*, at 28.

U.S. launch policies created a definite need on the part of Europe 'to go-it-alone'.

### 2.1.1.3 *The decision to develop the space shuttle*

Nixon's decision, in 1972, to proceed with the development of the shuttle was preceded by 3 years of not only dramatic moon-landings but also political debate in both the administration and Congress about possible programs for the period after the completion of the Apollo program. Where both NASA and -posthumously- President Kennedy got well-deserved praise for this inspiring and highly successful venture, it was again NASA and the new president who, for different reasons, needed a new project of equally dramatic proportions. The geo-political situation was of course quite different from the one in which Kennedy could take his historical decision. The cold war plus the perceived threat of Soviet military-strategic dominance in space had been replaced by a much milder and less antagonistic atmosphere: after all, U.S. superiority in space exploration had been established, the crisis was over, the race had been won. How then to fire the imagination of people (and make them pay the bill)?

In 1963 the officials in the Kennedy administration had begun to consider possible programs to be undertaken by NASA after the completion of Apollo. Under his successor Johnson, NASA was asked to identify future objectives for the civilian space program. NASA's study, reported in January 1965, provided an overview of the capabilities it was developing and the uses to which these might be applied, but, in the absence of clear political support for any specific direction, did not (dare to) identify any single area of space development "which appears to require an overriding emphasis or a crash effort".[37]

When Nixon first took office in January 1969 he appointed a Space Task Group to study post-Apollo plans and make recommendations. Strongly influenced by NASA, the Group's report of September 1969 (the Eagle had landed in the meantime!) included a manned orbital space station and, to support the station and its subsequent additions, an efficient, low-cost and flexible 'airline-type' earth-to-orbit transportation system, the shuttle. A key element of the system was its reusability.[38]

Studies conducted by NASA in the mid-sixties had found that reusable space transport was technically feasible and could yield a substantial reduction in operations cost. And it would certainly be more cost effective than the use of large expendable vehicles like the Saturn. (Some NASA officials compared the

37. See Launius, *supra* note 1, at 197.
38. See, *id*.

methods of launching into orbit used on project Apollo to operating a railroad and throwing away the locomotive after every trip!).[39]

The administration's decision, for budgetary reasons, to terminate the Saturn V heavy lift booster production line in mid-1968 made the shuttle the only hope for continuation of human (American) presence in space.
And the shuttle - in NASA's plan - would be flexible enough to provide all orbital services required by users, including the transportation of scientific and applications satellites.

With the support of Nixon, NASA administrator Paine, in 1969, tried to get foreign partners interested in this Post-Apollo programme. Only Europe was interested, particularly in another part of the project, the space 'tug', a vehicle that was to transfer payloads from the shuttle's orbit into higher orbits. Development of the tug and cooperation in the development of the shuttle would provide Europe with interesting and useful know-how on propulsion and transport technology.[40] However both internal disagreement on the preferred European course and, partly as a consequence, complicated discussions with the Americans on the exact contents and cost of the participation and the extent of the transfer of know-how, made a firm agreement difficult to reach. In 1971, with the Nixon administration, the American attitude had changed from a cooperative into a 'go-it-alone' mood. They found the Europeans too demanding and the programme, which had been under attack, *inter alia* for budgetary reasons, had been reduced in size and scope. The above question of availability of launchers and/or transfer of launcher technology did not improve the cooperative atmosphere. Moreover Nixon had priorities other than strengthening space cooperation with Europe, *i.e.* a special relationship, including space cooperation, with the Soviet Union. In 1972, a State Department official informed the European space authorities that both the space shuttle and the 'tug' had been withdrawn as candidates for cooperation, and that "Europe's further involvement in the post-Apollo program was not of any commercial or technical importance to his government".[41]

A memo of NASA administrator Fletcher to President Nixon in November 1971 listed the following reasons for approving shuttle development:
- the U.S. cannot forego manned space flight
- the space shuttle is the only meaningful new manned space flight program that can be accomplished on a modest budget
- the space shuttle is a necessary next step for the practical use of space

39. See, *id.* at 107.
40. In fact, an internal European working group suggested that the tug become the"essential nucleus of European participation", see ESA SP-1172, *supra* note 4, at 88.
41. *Id.*, at 89; some of the unofficial reasons, apart from "European indecisiveness", were doubts that Europe's industry was up to the task, reluctance to transfer sensitive technology and US military interest in taking control over the tug, see *ibid.*

- the cost of today's shuttle is about one-half of what it was six months ago (*i.e.* USD 5.5 billion in stead of the original 10-15 billion)
- starting the shuttle now will have a significant positive effect on aerospace employment. Not starting would be a serious blow to both the morale and health of the [U.S.] Aerospace Industry.[42]

Which of the above justifications prompted Nixon to give the project his go-ahead is not certain. One author mentions his fascination with astronauts and the fact that the bulk of the space shuttle's contract work would go to his home state of California.[43] NASA historian Launius mentions a memo written by Casper Weinberger, then Deputy Director of the Office of Management and Budget, to the president, in which he described a reduction of the NASA budget as confirming a "belief gaining credence at home and abroad: [t]hat our best years are behind us, that we are ... voluntarily starting to give up our super power status, and our desire to maintain world superiority."[44] The above justifications, Weinberger's views and the desire to start a new aerospace program that would avoid unemployment in critical states in the 1972 election year "ultimately proved decisive", according to Launius. And, to the extent one subscribes to the guidelines as to the motivations of a president when deciding on matters of policy as provided by another author (*i.e.* any president's three major goals are reelection, good policy, and historical achievement),[45] the shuttle could certainly also satisfy the latter of the three presidential goals.

On January 5, 1972, President Nixon announced his decision "that the United States should proceed at once with the development of an entirely new type of space transportation system designed to help transform the space frontier of the 1970s into familiar territory, easily accessible for human endeavor in the 1980s and 90s ... It will revolutionize transportation into near space, by routinizing it."[46]

NASA's plan originally had been to build a fully reusable omni-purpose space truck *cum* laboratory capable of performing all possible space transportation tasks for the government and for commercial purposes. A large fleet of those shuttles would conduct an estimated 50-60 flights per year. As we saw, NASA estimated development costs at approximately USD 15 billion over 10 years.[47]

42. Launius, *supra* note 1, at 109-110.
43. See James A. Vedda, *Evolution of executive branch space policy making*, 12 (3) Space Policy 177-192 (1996) hereinafter referred to as Vedda, at 179.
44. Launius, *supra* note 1, at 109.
45. Paul C. Light, *The President's Agenda*, USA (1983), as quoted by Vedda, *supra* note 43, at 177.
46. See The White House, Statement by the President, 5 January 1972, reprinted in Launius, *supra* note 1, at 232.
47. See Vedda, *supra* note 43, at 181.

In the absence of an inspiring cause or national security threat however, the political mood was one of spending less on space and demanding more in return. An additional handicap was that the Defense Department, though having some military uses in mind, saw the shuttle more as a convenience than as an essential system.[48] Nevertheless, in order to get both the White House and Congressional approval to develop the shuttle, a DOD commitment to use the system for all its launches was essential. For that purpose the vehicle had to meet all possible DOD requirements, which made it heavier, more complicated and more costly.

Thus, NASA was forced to go back to the drawing board and, *nolens volens* assisted by a critical Office of Management and Budget, had to review a number of alternatives to its original design. The project finally chosen in 1972, consisting of a total of 5 partially reusable shuttles, had to be completed by the end of the seventies at a cost of not more than USD 5.5 billion.[49]
And, more important for our discussion, the shuttle had to pay its way by showing economic returns, "the first time the space agency had been subjected to cost-effectiveness criteria in one of its programs."[50]
That requirement could only be met by giving the shuttle a space transport monopoly at the expense of the existing expendable launch vehicle fleet.That monopoly, in turn, to be effective, had to include all military and intelligence payloads, calculated at about one-third of all future space traffic. The Air Force, at first, was adamant in its view that it would have to continue to develop and purchase its own expendable (Titan and Atlas) boosters, and would only contribute to the cost of the shuttle by building a launch complex at Vandenberg Air Force Base. In 1971 they finally agreed not to develop any new boosters, although they would continue to purchase existing designs.[51]
So NASA, in the end, was committed to both cut the cost of shuttle operation, use the shuttle for all governmental and commercial payloads, and eliminate the (use of the) entire fleet of U.S. expendable launch vehicles.

Although, for many years to come, nothing would change in practice (as it took a long time before the shuttle became operational), there is no doubt that, given the specialized technology, high cost and long lead times associated with the manufacture of (new) launch vehicles, this policy proved to be a serious and -in the long run- costly setback for the ELV industry's research and development efforts. After all, there is hardly shareholders value in investing

48. *Id.*, at 180.
49. *Id.*, at 181.
50. *Ibid.* This requirement also influenced the technical specifications; as Vedda observes "[i]f the objective was manned orbital flight with a reusable spacecraft, then the technical path was clear, but if the objective included low cost access to orbit, economic payback, and a high flight rate, then the technical approach was not so well defined." *id.*, at 180.
51. See Dennis R. Jenkins, *Space Shuttle - The history of developing the national space transportation system*, USA (1996) hereinafter referred to as Space Shuttle 1996, at 75.

in new technology if there are officially no future launch needs to be met and thus no profits to be made therewith.

In the years after the shuttle decision, the U.S. ELV and missile industry continued to produce large numbers of launch vehicles and missiles for both civil (NASA) and military (DOD) needs respectively, though - understandably - space shuttle related procurement by NASA would increase more impressively through the years: from 1973 to 1976 the latter figures would increase rapidly from USD 199 million (1973) and USD 475 million (1974) to USD 797 million in 1975 and approximately USD 1,2 billion in 1976.[52] The original shuttle development planning foresaw a phasing in of the shuttle (and a phasing out of the ELV's) in 1977 or 1978. As it turned out, technical and financial problems delayed the first launch until 1981, and it wasnot until July 1982 that the shuttle was declared operational.[53]
In the mean time, obviously, the U.S. government (NASA) could not discontinue the expendable option. NASA's launch vehicles in the 1970s therefore continued to be the Atlas and Delta, for the launch of commercial or scientific satellites into geostationary orbit, and the Scout for smaller payloads destined for lower earth orbits, whereas the Titan would remain the launch vehicle preferred by DOD for military payloads; and U.S. industry continued to keep their assembly lines running for their valued customers.[54]
But with his Presidential Directive of 1978, Carter had reconfirmed the role the shuttle was going to play in meeting the space transportation needs of the U.S.:

"The United States will develop, manage, and operate a fully operational Space Transportation System (STS) through NASA, in cooperation with the Department of Defense. The STS will service all authorized space users - domestic and foreign commercial and governmental - and will provide launch priority and necessary security to national

52. In the same years NASA's launch vehicle (ELV) procurement would, in USD millions, amount to 221, 178, 140 and 166 respectively, whereas DOD procured missiles for the following amounts: USD 3.023 million (1973), 2.981 (1974) and 2.889 (1975). Overall sales of space vehicle systems, incl. engines and propulsion units, by the US aerospace industry to US and foreign customers amounted to:
1973: USD 2.117 million (military 1.509, non-mil. 608), 1974: USD 2.402 (military 1.577, non-mil. 825), and 1975: 2.812 (military 1.766, non-mil. 1.046), see Aerospace Facts and Figures 1974/75 (23d ed.) and 1975/76 (24th ed.), Aerospace Industries Association of America Inc. AIA(A), Washington D.C., *passim*. It should be noted that both in 1974 (with a double-digit inflation percentage) and in 1975 (less inflation and a better economy) the above - latter - figures, if adjusted for inflation, saw an actual decrease in constant dollar sales in 1974 and at most a *status quo* in 1975, see Foreword President AIA in both issues.
53. On the occasion of the return to earth of Space Shuttle Columbia, on July 4, 1982 (the fourth flight of the shuttle), President Reagan declared the US Space Transportation System (STS) operational.
54. For NASA civil space programs executed in the 1970s, see Launius, *supra* note 1, at Ch. 9, *passim*.

security missions while recognizing the essentially open character of the civil space program."[55]

## 2.2 The commercialization of expendable launch vehicles in the 1980's

### *2.2.1 ELV regulation prior to the Commercial Space Launch Act*

When, on July 4, 1982, President Reagan finally declared the shuttle operational, he also announced an updated U.S. Space Policy. Apart from addressing all other aspects of U.S. civil and military space activities and advocating a strong private sector involvement and investment in U.S. space programs, it re-confirmed the status of the shuttle as the future "primary space launch system", and added a number of requirements for the shuttle system which would effectively end the dominance of the ELV's:

"-... The first priority of the STS program is to make the system fully operational and cost-effective in providing routine access to space ...
-United States Government spacecraft should be designed to take advantage of the unique capabilities of the STS. The completion of transition to the shuttle should occur as expeditiously as practical.
-NASA will assure the shuttle's utility to the civil users. In coordination with NASA, the DOD will assure the shuttle's utility to national defense and integrate national security missions into the shuttle system. Launch priority will be provided for national security missions.
-Expendable launch vehicle operations will be continued by the United States government until the capabilities of the STS are sufficient to meet its needs and obligations. Unique national security considerations may dictate developing special-purpose launch capabilities."[56]

Although the above text still left some time and opportunities for the established ELV manufacturers to sell their products,[57] competition with the space shuttle was already a fact, and the requirement for government spacecraft to be made fit for shuttle launch would seriously affect any future possibility

55. See *Civil and Further National Space Policy*, Presidential Directive/ NSC-42 of October 10, 1978, White House Press Release (Description of a Presidential Directive on national space policy), The White House, June 20, 1978, reprinted in S. Gorove, *United States Space Law, national & international regulation*, hereinafter referred to as Gorove US Space Law, at national regulation, I.A.4 (1989).The Fact Sheet of October 11, 1978 accompanying the above press release, added a.o. that "[o]ur space policy will reflect a balanced strategy of applications, science and technology development containing essential key elements that will: ... [t]ake advantage of the flexibility of the Space Shuttle to reduce the cost of operating in space over the next two decades to meet national needs." ...
56. National Space Policy, Presidential Directive/NSC-42, 18 Weekly Comp.Pres.Docs 894-898 (1982).
57. NASA funding for ELV's would cease at the end of fiscal year 1984.

for ELV's to be a viable alternative for shuttle launches in that highly lucrative and stable market. Hence a "fury of activity in the aerospace community", as one author describes their reaction, aimed at keeping the assembly line and the launch orders coming.[58] At the same time, and separate from the efforts of the established aerospace industry to maintain its position of launch vehicle provider to NASA and DOD, numerous smaller aerospace firms showed interest in establishing private commercial ELV operations by obtaining the right from these manufacturers to market their products to the satellite customers in lieu of NASA.[59]

This clear interest on the part of the U.S. private sector to venture into the risky business of selling ELV services (and developing new vehicles) had already led to applications on the part of some companies for government approval of intended private launches. One of these start up companies was Space Services Inc (SSI). The processing of its applications showed clearly that the government was not yet prepared for these private space launch activities. Federal regulation dealing with the matter was absent or at best scattered through the various regulatory agencies. Thus, when SSI, a Texas corporation run by ex-NASA astronaut 'Deke' Slayton, in 1981 sought approval for the test-launch - from its own launching facilities - of a liquid-fuelled Percheron rocket, it approached not only the Federal Aviation Administration (FAA), the State Department ( State), NASA and the Federal Communications Commission (FCC), but had to submit its plans to more than 15 other federal agencies as well (such as DOD, Air Force, Navy and Coast Guard, the Bureau of Alcohol, Tobacco and Firearms and the Internal Revenue Service to name a few).[60]

58. See Nathan C. Goldman, *Space Commerce - free enterprise on the high frontier*, USA (1985), hereinafter referred to as Goldman Space Commerce, at 41; the author refers to the announcement by the NASA Associate Administrator for Space Flight, General Abrahamson, in late 1982, to phase out the expendables, "because the refitting of a satellite for launch on an expendable was more expensive and time-consuming than waiting for the next available shuttle flight", as setting off this fury of activity.
59. See *id.*, at 44; also Grier C. Raclin, *Going to work in space: a survey of presently available launch systems* in: American enterprise, the law and the commercial use of space 30-72,USA (1986) hereinafter referred to as Raclin, at 53.
60. See Raclin, *supra* note 59, at note 91; for the regulatory approval of its second launch, the solid-fuel rocket 'Conestoga 1', SSI spent over 6 months of efforts and $250,000, see *ibid.* As SSI sought to import rockets from West Germany for use in calibrating its radar, it required a license for importation of firearms from the above Bureau! See E. Jason Steptoe, *United States government licensing of commercial space activities by private enterprise*, Proceed. 27th Coll.L.Outer Space 191-196 (1984) hereinafter referred to as Steptoe 1984, at 193. Also Webber 1984, *supra* note 13, quoting statements made in a Congressional hearing on the subject, "... various government agencies with relevant interests to protect have interjected a hodgepodge of uncoordinated licenses and legal requirements that make private launchings a procedural nightmare.", at 5.

The FAA's authority was based on the Federal Aviation Act of 1958 and its implementing regulations, the Federal Aviation Regulations (FAR's).[61] In 1981, the only FAR's found applicable were contained in Part 101, sub-part C, dealing with 'unmanned rockets', and adopted in 1963 to ensure that small rockets launched by hobbyists and scientists would not endanger air traffic.[62] Sub-part C did not apply to rockets operated within restricted areas, such as the government launch bases, where NASA or DOD would be the responsible agencies supervising the launch.[63]
The main provision making an FAA waiver necessary read as follows: "No person may operate an unmanned rocket ... (b) in controlled airspace ..."[64] A launch from U.S. territory would invariable involve entry into such air space, so ISS requested and obtained a waiver from this prohibition, though, in order to avoid additional regulatory complications, limited to a launch within U.S. territorial waters. The launch failed. ISS' second launch, of the 'Conestoga 1' rocket, took place one year later and involved similar administrative processes. It also received launch clearance from the FAA and the other agencies involved. The additional complication to be dealt with was the fact that the launch would involve a 'splash-down' in the international waters of the Gulf of Mexico thus turning it into an 'export' involving State Department licensing procedures.[65] With this latter - successful - launch, SSI would become the first American company launching a rocket into space.

Among the agencies playing a role in the licensing were, as indicated above, NASA, FCC and DOD.[66]
NASA disclaimed any regulatory authority for these private commercial space activities. However, as the only expert in this field they were asked by the FAA and the other agencies involved to review all aspects concerning the technical safety of the launches. In the Conestoga case this was the more appropriate as NASA provided the Minuteman rocket engine used by the Conestoga.[67]

61. See 49 USC paras 1341-1359 and 14 CFR parts 1-99 respectively.
62. Reprinted in Gorove US Space Law, *supra* note 55, at I.A.3. The FAA, when granting permission for the launch did not refer to any other regulations, see James R. Myers, *Federal government regulation of commercial operations using expendable launch vehicles*, 12 (1) J. Space L. 40-51 (1984), hereinafter referred to as Myers 1984, at 43-44. The author further notes that Part 101, sub-part C was not designed to regulate commercial sub-orbital and orbital rocket launches.
63. The FAA did not have jurisdiction over ELV's used by NASA or DOD because 'public aircraft' were exempted from its regulatory powers; the FAA also exempted the space shuttle from the coverage of the Act, see Webber 1984, *supra* note 13, at 9, 10).
64. Part 101.23; additionally, Part 101.25 specifies the information to be given to the nearest FAA Air Traffic Control Facility.
65. See Chapter 2.3.1. *infra*.
66. For a more detailed account of the administrative process SSI was subjected to, see Webber 1984, *supra* note 13.
67. See Myers 1984, *supra* note 62, at 46.

The FCC's federally mandated role in all communications issues made the agency responsible for frequency-licensing. ISS requested - and received - an experimental radio license granting the right to use frequencies for its tracking and control communications with the rocket.
DOD, through the U.S. Air Force, would monitor the national security aspects of private launches. In the ISS case they were also involved in the safety aspect of possible collisions with other orbiting satellites; for that purpose, NORAD/Space Command made the necessary calculations of available and used orbits before clearing the launch in that respect.[68]
In the absence of an agency with a clear mandate for licensing all aspects of private launches, companies had no choice but to go through the above cumbersome, labour-intensive and expensive multi-agency approval process, with all the concomitant uncertainties. And pressure grew within the government to have a more professional licensing process and a specific agency taking care of all licensing aspects. This made sense where the 1982 National Space Policy had clearly opted for a strong private sector involvement, which in turn required such governmental regulations and procedures as would actually promote the active participation of U.S. enterpreneurs in the exploitation of space. The above space policy directive had also created the *Senior Inter-agency Group on Space* (SIG-Space) to implement its policies and principles.[69] And SIG-Space, as one of its agenda items, addressed the issues of the phasing out of governmental ELV operations and of both an increasing private sector interest in continuing these ELV systems and the emergence of new enterprises, established with the express purpose of developing commercial space launch capabilities, all this in the light of the absence of adequate regulation of such private operations. The 4-month interagency study concluded that a viable commercial ELV industry would add to the general economic vitality of the U.S. and provide the U.S. with a more robust space launch capability. More specifically, the following economic benefits were identified:
- a commercial ELV industry would maintain a high technology industrial base
- it would provide jobs for thousands of workers (and increase federal and state tax revenues!)

68. *Id.* at 50.
69. SIG (Space) was chaired by the Assistant to the President for Security Affairs; other members included the Deputy Secretaries of Defense, Commerce and State, Director of the CIA, Chairman of the Joint Chiefs of Staff, Director of the Arms Control and Disarmament Agency, the NASA Administrator and others. Its task was to provide a forum to all federal agencies for their policy views, to review and advise on proposed changes to national space policy, and to provide for orderly and rapid referral of space issues to the President for decisions as necessary, see Remarks on the completion of the Fourth mission of the Space Shuttle Columbia, 18 Weekly Comp. Pres. Doc. 869-875 (1982) Note the strong representation of national security interests).

- "each commercial launch conducted in the U.S., *rather than by foreign competitors*, would strengthen our economy and improve our international balance of payments." (emph. add.)
- it would spawn numerous spinoffs and supporting activities and strenghten the U.S. position in a growing market.

In addition to these general economic benefits, the study saw the advantages for both NASA and DOD of having a domestic backup for the shuttle at essentially no extra cost for the government.
Not only would the private sector bear the cost of ELV production, but there would also be a market for U.S. government facilities and equipment that would otherwise be underutilized or no longer required. In summary, the report said, this partnership between the U.S. private sector and the government "will strengthen the U.S. space launch capability, develop a major new industry, contribute favorably to the U.S. economy and maintain U.S. leadership in space transportation."[70]

The result was a recommendation which found its way into a Presidential *Directive on Commercialization of Expendable Launch Vehicles*, of May 26 1983, initiating a (transition-) period of uneasy competition between the infant private commercial launch industry's ELV's and NASA's space shuttle. The U.S. government fully endorsed and would facilitate the commercialization of ELV's through various measures, such as minimal regulatory constraints, and the availability of government launch ranges, facilities and services at prices "consistent with the goal of encouraging viable commercial ELV launch activities". The U.S. government would continue to make the space shuttle available for all authorized users, domestic and foreign, commercial and governmental.[71] In other words, the government would henceforth support two competing U.S. systems, one of which (see above emphasis) was also supposed to take on Arianespace, the European competitor which, in 1983, though having performed a limited number of successful launches, was seen as qualified and determined to firmly establish itself in the international commercial launch market.[72] The Directive also established a 'working group on commercial launch operations' within SIG (Space), including the FAA and FCC, with the task to (a) streamline the procedures used in the interim to implement existing licensing authority (b)develop and coordinate the requirements and process for the licensing, supervision, and/or regulations applicable to routine commercial launch operations from commercial ranges, and (c) recommend the appropriate lead agency within the U.S. government to be responsible for commercial launch activities. (Until final selection of the

70. See *Commercialization of expendable launch vehicles*, NSDD 94, Announcement of United States government support for private sector commercial operations of expendable launch vehicles (May 16, 1983) 19 Weekly Comp. Pres. Doc. 712-714, (721-722) hereinafter referred to as ELV Commercialization Directive, at 714 ('Background').
71. See *id.*, at 712.
72. See *infra* Chapter 3.4.

latter, the State Department would serve as the focal point for all relevant requests and applications).[73] After, what some commentators call "extensive and intense lobbying by interest groups in the private sector, by the Congress, and by the Administration itself",[74] President Reagan, in November 1983, chose the Department of Transportation and not its main competitor the Department of Commerce as the lead agency.[75]

DOT Secretary Dole acted swiftly and, in the same month, the *Office of Commercial Space Transportation* (OCST or the Office) established within the Office of the Secretary, started to carry out its new responsibilities. It could immediately assist *Starstruck Inc.*, another private operator, in getting permission for the launch of its prototype Dolphin rocket from a Pacific Ocean platform. Though the same plethora of departments and agencies were involved, now OCST provided Starstruck with the single governmental contact point SSI did not have; as a result, the regulatory process for the former proved far less cumbersome than the latter had to endure.[76] In his State of the Union address of January 25, 1984, which was primarily devoted to the announcement of the space station project, President Reagan directed DOT to assist providers of ELV services in their dealings with the Federal Government[77] and one month later, by Executive Order (E.O.), he formalized this new role of DOT and gave specific directions as to the (licensing) functions the Department would perform:

73. See ELV Commercialization Directive, *supra* note 70, at 713.
74. See George S. Robinson & Pamela L. Meredith, *Domestic commercialization of space: the current political atmosphere* in: American enterprise, the law and the commercial use of space 1-29 USA (1986) hereinafter referred to as Robinson & Meredith, at 3. For a review of some of the candidates, such as Commerce, FAA, State, NASA and DOD, see Webber 1984, *supra* note 13, at 46-50.
75. See *DOT will be lead agency for expendable launch vehicles in space*, Press release DOT 98-83 of November 17, 1983. Secretary of Transport Dole was quoted as stating that "the objective [was] to try to create an environment as regulation-free as safely possible for private companies to supply the '[ELV's]' ... getting government out of the way of America's innovators and entrepreneurs ... We don't want the progress of this growth industry to be handicapped by the regulatory restraints that have restricted other transportation industries." Dole, in her last sentence, obviously referred to air transport which had suffered domestically, until deregulation in the mid-1970's, and continued to suffer internationally under excessive government interference.
76. See Michael S. Straubel, *The Commercial Space Launch Act: The regulation of private space transportation*, 52 J. Air L. & Com. 941-969 (1987), hereinafter referred to as Straubel 1987, at 947; also Raclin, *supra* note 59, at 60-61, where the author notes that OCST, in its coordinating role, worked with the agencies that reviewed Starstruck's request to set priorities, coordinated their activities, and expedited the licensing process. "For example, when Starstruck encountered difficulties with local officials who objected to Starstruck's proposed method of transporting its vehicle to the launch site, OCST worked with the Materials Transportation Board and the U.S. Coast Guard to alleviate the concerns of these officials."
77. See 20 Weekly Comp. Pres. Doc. 61.

"... The Secretary of Transportation shall ... perform the following functions:
(a) act as a focal point within the Federal government for private sector space launch contacts related to commercial ELV operations;
(b) promote and encourage commercial ELV operations in the same manner that other private United States commercial enterprises are promoted by United States agencies;
(c) provide leadership in the establishment, within affected departments and agencies, of procedures that expedite the processing of private sector requests to obtain licenses necessary for commercial ELV launches and the establishment and operation of commercial launch ranges;
(d) consult with other affected agencies to promote consistent application of ELV licensing requirements for the private sector and assure fair and equitable treatment for all private sector applicants;
(e) serve as a single point of contact for collection and dissemination of documentation related to commercial ELV licensing applications;
(f) make recommendations to affected agencies and, as appropriate, to the President, concerning administrative measures to streamline Federal government procedures for licensing of commercial ELV activities;
(g) identify Federal statutes, treaties, regulations and policies, which may have an adverse impact on ELV commercialization efforts and recommend appropriate changed to affected agencies and, as appropriaten to the President; and
(h) conduct appropriate planning regarding long-term effects of Federal activities related to ELV commercialization."[78]

The powers thus granted to the DOT Secretary did not diminish or abrogate any statutory or operational authority exercised by other Federal agencies. So the FCC remained responsible for radio frequency assignments, DOD for national security and the State Department for foreign policy aspects, and NASA and USAF for the use of their launch ranges, where appropriate. But the agencies concerned were ordered to assist the DOT in carrying out its above tasks by providing information on their own regulatory actions in this field, by eliminating unnecessary regulation, by efficiently administering the remaining essential regulations and procedures, and by expeditiously handling their side of the licensing process.[79] According to its first Director the primary goal of OCST was to establish an efficient regulatory framework which addressed public safety needs as well as foreign policy and national

78. See Sec. 2, *Commercial Expendable Launch Vehicle Activities*, Executive Order 12465 of February 24, 1984, 49 FR 721, herinafter referred to as ELV Executive Order. In his remarks on signing the executive order, President Reagan declared that "[u]ntil today, private industries interested in ELV's have had to deal with 17 Government agancies. From now on, they'll only get in touch with the [DOT], and the Department will clear away what Secretary Dole has called "the thicket of clearances, licenses, and regulations that keep industrial space vehicles tethered to their pads." With Elizabeth and her team in charge, private enterprises interested in space won't see red tape; they'll see blue sky." 20 Weekly Comp. Pres. Doc. 263 (Feb. 24, 1984), reprinted in Gorove US Space Law, *supra* note 55.
79. See Sec. 4 of the ELV Executive Order, *supra* note 78.

security safeguards, while at the same time providing predictability for the industry without stifling it.
In fact, in the view of that official, the problem was not so much the coordination of the other agencies involved, but the almost complete absence of government processes designed to address the wide range of issues and unique needs of private sector ELV launches.[80]

To assist the DOT in the performance of it new responsibilities, the above Executive Order also established an interagency working group chaired by the Secretary of DOT and composed of representatives from the Departments of State, Defense, and Commerce, and the Federal Communications Commission and NASA. Apart from that working group the Department itself, in 1984, established the Commercial Space Transportation Advisory Committee, *COMSTAC*, to provide information, advice and recommendations to the Secretary on matters relating to all aspects of the commercialization of ELV's.[81]
COMSTAC's membership reflected the scope of its activities: its up to 25 members were appointed after consultations with government agencies, industry and business organizations, the scientific community and public interest groups. In practice, executives from the private launch industry and the satellite manufacturers as well as representatives of the financial and insurance community would provide the much-needed high level expert advice, both in the full committee and in specific working groups established later, such as the Technology and Innovation Working Group and the International Competition Working Group.[82]

80. See Steptoe 1984, *supra* note 60 at 194. The above 'official' position of DOT (not to be overly worried about its coordinating task amidst the multitude of government agencies and thus not to aim for a DOT role as a single regulatory agency implementing a single set of all-encompassing regulations) met with criticism as this advisory or at most coordinating and facilitating role would not decrease interdepartmental jealousies and conflicts, and would stand in the way of an effective "one stop shopping" procedure as envisaged by the Secretary, see Webber 1984, *supra* note 13, at 52-53.
81. To that end, COMSTAC was authorized to: "A.Undertake such information gathering activities as necessary to define issues for consideration by the Committee, develop positions on those issues, and communicate the Committee's position thereon to the Secretary of Transportation. B. Evaluate economic, technological, and institutional developments relating to commercial space transportation and communicate to the Secretary recommendations on promising new ideas and approaches for Federal policies and programs. C. Serve as a forum for the discussion of problems involving the relationship between industry activities and government requirements. Seek, where possible, to resolve such problems without resort to formal Departmental intervention", *Establishment of Commercial Space Transportation Advisory Committee*, Department of Transportation, Office of the Secretary, Notice No. 84-5, 49 FR 14621 (Apr 12, 1984).
82. One of the first chairmen of Comstac, for instance, was Steven D Dorfman, President & CEO, Hughes Space & Communications Company.

### 2.2.2 *The responsibilities of DOT under the Commercial Space Launch Act of 1984*

By January 1983 the U.S. Congress, and more specifically the House of Representatives' Committee on Science and Technology and its Subcommittee on Space Science and Applications, had shown a keen interest in an orderly commercialization of ELV's. Draft legislation introduced in that month provided for the designation of Commerce as the lead agency with the responsibility to issue commercial launch licenses and to oversee and promote such operations. Both the private sector interest at the time (SSI!) and the apparent absence of a proper regulatory framework were matters that, Congress felt, had to be addressed.
Though the Committee was therefore happy with the Presidential directives as laid down in the E.O. of 1983, it saw this measure only as a beginning as, in its view, and following hearings, study and analysis, the simple administrative designation of a lead agency could prove inadequate since its responsibilities would not be underpinned by legislative authority. The result, it was felt, could inhibit decisionmaking and interagency coordination and allow the existing inefficient approaches to commercial launch approvals to persist. Put differently, to leave the future of this industry to Presidential policies was tantamount to creating only temporary regulatory certainties, an unacceptable oxymoron for an infant industry. Hence, the determined Congressional efforts in 1983 and 1984 to draft legislation which would "facilitate the establishment of a stable regulatory climate, reducing uncertainty and investment risk".[83] The result of this legislative work was the *Commercial Space Launch Act* of 1984, which made the Secretary of Transportation responsible for carrying out the Act, with the specific task to

> "... (1) encourage, facilitate, and promote commercial space launches by the private sector; and (2) consult with other agencies to provide consistent application of licensing requirements under this Act and to ensure fair and equitable treatment for all license applicants."[84]

It is important to note at the outset that the Committee, under the heading "Findings" in the Act, declared that the private launching services, which were the (only) subject of the Act, would *complement* the available government launch services, thereby accepting the primary role of the space shuttle. Also, the Committee found that the development of commercial launch services

83. See *Commercial Space Launch Act*, Report 98-816 (to accompany H.R. 3942), House Comm. On Science and Technology, 98th Cong., 2d Sess. (May 31, 1984), hereinafter referred to as House Launch Act Report.
84. See Commercial Space Launch Act, Pub. L. 98-575, 49 U.S.C. 2601-2623 (Oct 30, 1984), hereinafter referred to as CSLA or the Act (of 1984) at Sec.5 (2604(a). The Act was subsequently codified as 49 USC, Subtitle IX, Chapter 701 "Commercial Space Launch Activities".

would enable the U.S. to retain its competitive position internationally, a clear reference to both existing (Arianespace) and future (Russian, Chinese and Japanese) launch competitors and the role which ELV's in particular were supposed to play in this respect.[85]
Not surprisingly, Congress found that the provision of launch services by the private sector as such served U.S. national security and foreign policy interests: after all, it meant a further guarantee of 'assured access to space', for both military and civil space programs, with strategic gains in both fields vis-à-vis other countries.
Important for the interpretation and application of the Act and its ensuing regulations were the pro-industry, pro-deregulation concepts included in the final paragraphs of the findings:

"(6) provision of launch services by the private sector ... would be facilitated by stable, minimal, and appropriate regulatory guidelines that are fairly and expeditiously applied; and
(7) the [U.S.] should encourage private sector launches and associated services and, only to the extent necessary, regulate such launches and services in order to ensure compliance with international obligations of the [U.S.] and to provide for the national security, foreign policy, and public safety interests of the [U.S.]."[86]

The 'core' provisions of the Act are contained in Sec.6 (2605), which establishes the requirement of a DOT license for private space launch operations, *i.e.* a launch authorization and a - separate - payload 'approval' regime:

(a)(1) No person shall launch a launch vehicle or operate a launch site within the [U.S.] unless authorized by a license issued or transferred under this Act.
------
(b)(1) The holder of a launch license under this Act shall not launch a payload unless that payload complies with all requirements of Federal law that relate to the launch of a payload. The Secretary shall ascertain whether any license, authorization, or other permit required by Federal law for a payload which is to be launched has been obtained.
(2) If no payload license, authorization, or permit is required by any Federal law, the Secretary may take such action under this Act as the Secretary deems necessary to prevent the launch of a payload by a holder of a license under this Act if the Secretary determines that the launch of such payload would jeopardize the public health and safety, safety of property or any national security interest or foreign policy interest of the [U.S.].

85. The Committee in its Report, under the heading "[n]eed for legislation", anticipated "that world market demand for launch services will increase and that expansion of U.S. commercial launch services is desirable to enhance domestic economic activity and U.S. competitiveness in capturing the space launch market.", see House Launch Act Report, *supra* note 83, at 8.
86. See Sec.2 (2601) of the Act.

(c)(1) Except as provided in this Act, no person shall be required to obtain from any agency a licence, approval, waiver, or exemption for the launch of a launch vehicle or the operation of a launch site.
(2) Nothing in this Act shall affect the authority of the Federal Communications Commission under the Communications Act of 1934 (47 U.S.C.151 *et seq.*) or the authority of the Secretary of Commerce under the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4201 *et seq.*).

The distinction between *launch* authority, *i.e.* permission to operate the launch vehicle, which is the Secretary's exclusive authority, and a *payload* license or authority which, in most cases, will be a matter of other agencies concerned, was made because, in cases where a complete (*i.e.* including review of public interest, foreign policy and national security concerns) and effective regulatory process with respect to specific satellites already existed, a duplicative process exercised by DOT would be unnecessary and unjustified. Hence the above exceptions for communications and remote sensing satellites: an FCC or DOC-NOAA license would thus not be further reviewed by DOT, other than to assure the proper integration of the respective payload with the launch vehicle and its launch into orbit.[87] For all other satellites/payloads DOT, in the view of the Committee, would perform a function analogous to that performed by NASA in overseeing payloads carried on the space shuttle. This includes a procedure to ensure safety to the launch vehicle, and an evaluation, in consultation with the Department of State and DOD, of the mission purpose of a payload to ascertain foreign policy and national security implications respectively. The latter DOT task is specifically dealt with in the Act, in a provision which appears to leave the final determination in such matters to the expert departments concerned.[88]
National security or foreign policy considerations may also cause the DOT Secretary to suspend or revoke a license issued under the Act or to terminate, prohibit or suspend immediately an actual launch. Although the roles of State or DOD in respect of such decisions have not been addressed in the Act, it must be assumed that these actions would, in practice, be taken on the *initiative* of one of (or both) the departments concerned or following a Presidential decision.[89] A few known instances of such cases, which will be discussed in Chapter 3, support that assumption. They also show that the national security/foreign policy criteria applied to all stages of the decision making process, though not a new phenomenon (NASA and its space shuttle clients could not escape this test either), introduced an element of uncertainty and unpredictability, which private enterprise, working in a competitive

87. See House Launch Act Report, *supra* note 83, at 19.
88. See Sec. 20 (2619) of the Act.
89. See Sec.10 and 11 (2609 & 2610 resp.) of the Act. For the licensee or license applicant thus affected, Sec.12 (2611) provides for both administrative and judicial review.

environment, was particularly allergic to. And the ELV industry and its clients would make their views abundantly clear![90]

### *The OCST Licensing regulations*

A number of articles in the Act presuppose or explicitly refer to more specific regulations governing the various aspects of the licensing process, and detailing the right and obligations of the parties concerned.[91] Soon after the signing into law of the Act, DOT announced a licensing policy, which, pending the release of more definitive regulations, outlined the major components of the launch license required by the Act and described the Federal interagency process for evaluating license applications.The two were clearly interrelated, for, as DOT explained, its experience in assisting a launch applicant to obtain Federal approval for its first launch from a site in the Pacific Ocean (i.e. Starstruck Corporation's second launch) "amply demonstrated that the very nature of the consultative approach to licensing [i.e. relying on the existing expertise and specialized policy perspective of other Federal agencies] creates a compelling need for a carefully structured and effectively coordinated licensing process."[92] The above DOT Policy Statement, following the purpose and system of the Act, divided the licensing process into two distinct components: a *Mission Review* and a *Launch Safety Review,* and gave details on the aspects that would be addressed in each case, before mission approval and launch safety approval would be granted. These approvals formed the basis for the issuance of the *Launch License,* incorporating such conditions as adherence to applicable range safety requirements, airspace restrictions, third party liability insurance levels and federal inspection, verification and enforcement requirements. The DOT policy on interagency consultation in the same document outlined the Department's views on the way it would fulfill its statutory role as a focal point for launch licensing amongst all Federal agencies concerned. One of its main tasks, derived from the Act and

90. When discussion took place on the scope and contents of the implementing regulations (see *infra*), concern to that effect was expressed through COMSTAC. DOT, in its reaction, stressed that one of OCST's major goals had been to encourage and promote the industry through carefully considered policies and procedures designed to eliminate, wherever possible, regulatory uncertainties, and concluded: "[t]hus, the Office wishes to emphasize that it views the exercise of this authority as an extraordinary measure to be relied upon in truly emergency circumstances." See 14 CFR Ch.III *Commercial space transportation; licensing regulations*, 51 Fed. Reg. 6870 (Feb 26, 1986), hereinafter referred to as (OCST) Interim Regulations, Supplementary information, Section-by-section analysis, *ad* Part 405. The industry, although possibly to some extent reassured, would probably have preferred a joint statement of the three departments concerned.
91. See Sec. 7 (2606), 9 (2608) and 13 (2612) of the Act.
92. See *Commercial space transportation; licensing process for commercial space launch activities*, notice of policy and request for comments, DOT, Office of the Secretary, 50 Fed. Reg. 7714 (Feb. 25, 1985), hereinafter referred to as DOT Policy Statement.

highlighted by the Senate Committee on Commerce, Science and Transportation, was to review the requirements of existing applicable laws and determine, in consultation with the appropriate agencies,

"whether any requirement of Federal law that would otherwise apply to such activities is not necessary to protect public health and safety, the safety of property, and national security and foreign policy interests of the United States, and to eliminate, by regulation, such requirements as a requirement for a license under the Act."

In other words, it was to streamline the licensing process and to eliminate any duplicative or unnecessary requirements for the launch of a launch vehicle or the operation of a launch site. DOT promised in this connection to eliminate, wherever possible, the timeconsuming sequential reviews which characterized the experience of private launch applicants before passage of the Act, to specify, in consultation with each agency involved, the scope of that agency's review, to notify the applicant concerning the agencies to which the application had been forwarded, and to keep the applicant informed of the progress of the review[93] DOT did indeed live up to its promise: in early 1985, OCST referred a request of SSI for approval to launch a series of payloads (containing cremated human remains or "cremains") to DOD, State Department and NASA for mission review, with each agency being directed to address specific issues in its own review. OCST remained in control of the process and was SSI's only point of contact. In remarkable contrast to previous cases, SSI received a favourable response on its request from OCST in just 40 days.[94] The Act required the Secretary to issue regulations implementing the provisions of the Act. DOT regarded the above Policy as only the foundation for a more detailed regulatory structure to come, and promised further regulatory documents on areas of priority, such as launch license regulations (containing the more specific regulatory requirements), insurance regulations (detailing the Department's role in establishing third party liability insurance requirements) and national range use (informing the private launch operators on available government launch range facilities, including costs of service and special requirements, on the understanding that the regulation of the use of private launch sites - "unchartered waters in terms of both

93. See DOT Policy Statement, *supra* note 92, at paras. 5.A and B.

94. See Raclin, *supra* note 59, at 61-62. According to the author, DOD was asked to determine whether the launches would conflict with any existing [military] space program, the State Dept was instructed to evaluate the foreign policy implications, and NASA was asked to ensure that the proposed orbit would not interfere with any existing or proposed [civil] space program. The proposal, to launch 60 domestic and foreign payloads over a 10-year period, apparently did not raise any concerns on the part of the above agencies. But the State of Florida, home of the morticians whose idea it was, blocked the effort because, according to state law, a cemetery had to be connected by road to the municipal area it served!, see Lilian M. Trippett, *Legislative initiatives to encourage private activity*, 4 (1) J.L. & Tech 49-57 (1989) hereinafter referred to as Trippett, at 49.

Government and industry experience" - would be the subject of further evaluation).[95]

The (OCST) Interim Regulations which were promulgated in February1986 gave the promised detailed policies, procedures, standards and requirements for launch license applications.[96] Though formally still of a temporary character, these regulations and the policies and procedures articulated therein provided the necessary guidance to the launch industry for the years to come and were generally supported by all concerned.[97]
Some of these policies and procedures will be reviewed hereafter, in order to illustrate the regulatory environment in which the U.S. ELV industry had to work.
The Interim Regulations took from the Act and from the DOT Policy Statement the distinction between Mission review and approval and Safety review and approval.
The Mission Review focuses on such factors as the purpose and character of the proposed launch, the nature of the payload and the impact of the launch or payload on existing uses of space.This review is intended as the mechanism for addressing the U.S.' international obligations under, for instance, the Outer Space Treaty and the Space Liability Convention (see *infra*), as well as national security and foreign policy implications of a launch. This review would determine whether the payload interfered with other spacecraft or endangered other nations or (otherwise) would conflict with vital national interests. The review, by its nature, would involve close consultation with the Departments of State and Defense, and possibly NASA and other agencies, as appropriate. As indicated above, where another agency was in charge of licensing, such as the FCC for U.S. communications satellites and Commerce (NOAA) for U.S. remote sensing satellites, DOT would simply accept those licenses as satisfying the requirements of mission review pertaining to the payload.[98]

95. See DOT Policy Statement, *supra* note 92, at para. 6.
96. See (OCST) Interim Regulations, *supra* note 90.
97. See *Commercial space transportation*; licensing regulations, 14 CFR Ch. III, OCST, DOT (Docket No. 43810), Final rule (April 4, 1988), hereinafter referred to as the OCST Licensing Regulations, Supplementary information, 'Comments on the Interim Regulations'.
98. The Office received 22 comments on the DOT Policy Statement, 14 submitted by private individuals, three from launch companies, two from trade associations, one from a rocket motor manufacturer, one from a Federal agency and one from a trade newsletter. Most comments addressed the Mission Review, and more in particular the vagueness of the recurring phrase (in the Act) "national security interests and foreign policy interests", the possibility that an agency (NASA?) could misuse the interagency review process to protect its own commercial space activities, or that routine launches would (still) be subject to separate repetitive payload reviews. DOT's response was basically the same in each case: don't worry, the spirit of the Act is to have as little regulatory interference and as much predictability and certainty for private industry as possible, see (OCST) Interim Regulations, *supra* note 90, Supplementary information, ("comments on the policy statement").

Part 411.7(a) of the Interim Regulations reflects the pro-approval presumption already embodied in the Act and confirmed by Congress (*i.e.* private commercial launches are, as a general matter, consistent with U.S. national security and foreign policy interests):

"Mission approval will be granted absent clear evidence that some aspect of the proposed launch poses a threat to distinct U.S. national security or foreign policy interests, constitutes a hazard to public health and safety or safety of property, or is inconsistent with international obligations of the United States."

As indicated above, each Federal agency reviews its own payload, and OCST will not duplicate the substance of such reviews but only ascertain that it has indeed taken place. *Foreign* telecommunications or remote sensing satellites/payloads will be reviewed by OCST, in consultation with DOD and State. For foreign or domestic payloads *not* covered by any existing Federal regulatory regime OCST will perform a full review itself, in consultation with other appropriate Federal agencies.

*The (Launch) Safety Review* is a technical review which focuses only on an applicant's proposed safety operations. The Office noted that, both at the time of the announcement of the DOT Policy Statement (early 1985) and when the Interim Regulations were established (early 1986), the only published safety standards or requirements in force were those applicable to safety operations conducted at Federal (*i.e.* NASA and Air Force operated) launch ranges. (As the launch vehicle operator must obtain a *launch safety approval* from the range operator, OCST, in order to avoid confusion renamed its own review *Safety Review).* No such standards existed yet for private launch ranges. The Act, also for that reason, encouraged the use of established Federal launch ranges. It simplified the safety review to the extent that the safety requirements imposed by the range operator were supposed to cover all launch site related safety concerns OCST might have. To determine the level of safety in case of the use of a private launch site, the Office would request detailed information on such matters as site location, operating procedures, personnel and equipment, and rely heavily on the expertise available within NASA and USAF.[99]

99. See Part 411.5 and 415.11-19, Interim Regulations, *supra* note 90.

### *2.2.2.1 Liability and Insurance*

Traditionally, the State Department's foreign policy concerns would include the question of adherence to the bilateral and multilateral treaties to which the U.S. is a party. In the early stages of the space effort, as we saw in the first paragraph of this Chapter, this also involved such selection of experimental space projects as would support - or at least not endanger - the adoption of the concept of freedom of outer space, including the freedom of 'overflight', by the community of states, preferably through the U.N., and more in particular by the Soviet Union. The Outer Space Treaty of 1967, drafted and finalized by the (Legal Subcommittee of the) United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) now contains that basic concept.[100] The Treaty also provides for 'State responsibility' and 'State liability'.The first concept was a compromise between two conflicting politico-legal philosophies, the U.S. approach to space exploration as an activity that may also (or even primarily) be undertaken by private enterprise and the Soviet view that the use of space should not be perverted by capitalist practices and space activities should thus remain a State's prerogative only. With the establishment of Comsat Corporation in August 1962, U.S. private enterprise had 'entered' outer space, so for the U.S. the Soviet view was, also from a practical point of view, not an acceptable proposition. The compromise, *i.e.* private space activities are permitted, but subject to "authorization and continuing supervision by the appropriate State party to the Treaty", made the State *responsible* for the proper behaviour, *i.e.* behaviour in accordance with the provisions of the Treaty, of the individual or company concerned.[101]
By virtue of this provision, U.S. government supervision of ELV operations was called for: the Commercial Space Launch Act and its ensuing regulations give the DOT the power, in consultation with State, to ensure that the

100. See art. 1, "Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law ...", and art. 2, "Outer space ... is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.", Treaty on principles governing the activities of states in the exploration and use of outer space, including the moon and other celectial bodies, signed at Washington, London and Moscow on January 27, 1967, ratified by the U.S. May 24, 1967, proclaimed by the US President October 10, 1967, e.i.f. October 10, 1967, 18 UST 2410; TIAS 6347.

101. See full text of art.VI of the Outer Space Treaty: "States Parties to the Treaty shall bear international responsibility for for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to theTreaty. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne by the international organization and by the States Parties to the Treaty participating in such organization."

Government's obligations under the Outer Space Treaty are met.[102] Hence the Act's broad jurisdiction which requires a launch license of every person who launches a launch vehicle or operates a launch site within the U.S. and of every U.S. citizen launching or operating a launch site *outside* the U.S.[103]

Additionally, the Outer Space Treaty made a state that launches or procures the launching of an object into outer space and each state from whose territory or facility an object is launched internationally *liable* for damage caused therewith to another party or to its natural or juridical persons.[104] In other words a private ELV launch from U.S. territory, causing damage to another state or its nationals would make the U.S. liable.
The question of liability for space launch damage was addressed in more detail in a special Space Liability Convention, also drafted and finalized by UNCOPUOS, which became effective in 1972.[105] The core provision of that Convention, creating state liability (also) for *private* launch activities from a state's territory or facility, led the draftsmen of the Commercial Space Launch Act to introduce a provision requiring licensees under the Act to have liability insurance in an amount determined by the Secretary which would be sufficient to satisfy possible obligations of the U.S. under the Outer Space Treaty and the Space Liability Convention.[106]

102. This is not to say that, prior to the enactment of the CSLA, such "continuing supervision" was absent: as we saw above, various departments, including the State Department, felt authorized to review private launch operations and did so in practice. The CSLA streamlined the process and put this role into the hands of one department.

103. See Sec. 6 (2605); U.S. citizen is defined as follows: "(A) Any individual who is a citizen of the [U.S.]; (B) any corporation partnership, joint venture, association, or other entity organized or existing under the laws of the [U.S.] or any State; and (C) any corporation, partnership, joint venture, association, or other entity which is organized or exists under the laws of a foreign nation, if the controlling interest (as defined by the Secretary in regulations) in such entity is held by an individual or entity as described in subparagraph (A) or (B)", see Sec.4 (11) (2603)(11), redesignated (12) in 1988 by virtue of the Commercial Space Launch Act Amendments of 1988, Pub. L.100-657, Nov. 15, 1988, 102 Stat. 3900, hereinafter referred to as CSLA Amendments 1988, Sec 3(2), (3)).

104. Art. VII; the full text reads as follows: "Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the moon and other celestial bodies".

105. See Convention on international liability for damage caused by space objects, signed at Washington, London and Moscow March 29, 1972, ratified by the U.S. May 18, 1973, proclaimed by the US President November 21, 1973, e.i.f. October 9, 1973, 24 UST 2389; TIAS 7762.

106. See Sec. 16 (2615), which reads in full: "Each person who launches a launch vehicle or operates a launch site under a license issued or transferred under this Act shall have in effect liability insurance at least in such amount as is considered by the Secretary to be necessary for such launch or operation, considering the international obligations of the [US]. The Secretary shall prescribe such amount after consultation with the Attorney General and other

The DOT Launch Policy of 1985 translated the above provision into a condition included in any launch license issued which would determine the required level of third party liability insurance. An Insurance Regulation providing guidance on the Department's role in establishing such third party liability insurance requirements was to be developed and published shortly. DOT, in the same year, made some suggestions to that effect, *inter alia* on methods to assess the appropriate level of insurance, and requested comments thereon.[107] One of the methods DOT submitted was that the launch firm would purchase the maximum level of insurance commercially available at reasonable rates. The second method would set an appropriate level based upon an analysis of the risks of the launch. As one author observes, either method had its downside: the maximum level method would not necessarily produce an adequate coverage or one at a too high price, whereas the risk analysis method would be difficult to apply in case of new firms or new technology entering the market.[108] In this connection it is important to recall that the Space Liability Convention adopted the -'victim- oriented' - concept of absolute and unlimited launching state liability for damage caused to third parties on the ground or to aircraft in flight.[109] The potential exposure of the launching state, launch firm and insurance firm could therefore be of nightmarish proportions. The Government was understandably inclined to shift this burden to private enterprise by requesting the launch firm to purchase adequate commercial insurance naming apart from the purchaser also the U.S. Government as beneficiary of the policy. On the other hand, exposing the infant commercial ELV industry accustomed, in the role of government contractors, to government protection against such hazards to the cold wind of unlimited liability or sky-high insurance premiums could hardly be reconciled with the lofty ELV privatization/commercialization principles of both the President and Congress.

The space insurance industry's experience with launch activities until the mid-1980s was at the same time far from encouraging, partly because of the novelty

appropriate agencies." This provision should be distinguished from Sec. 15. (c) (2614.(c)) which deals with liability insurance in connection with the use of government property, *e.g.* a Government launch site, services and/or personnel: "The Secretary may establish requirements for liability insurance, hold harmless agreements, proof of financial responsibility, and such other assurances as may be needed to protect the [US] and its agencies and personnel from liability, loss, or injury as a result of a launch or operation of a launch site involving Government facilities or personnel".

107. On May 7, 1985, DOT issued the Advanced Notice of Proposed Rulemaking, ANPRM, *Commercial space transportation; third party liability insurance for commercial space launch activities*; requests for public comment, 50 Fed. Reg. 19280 (May 7, 1985).

108. See Raclin, *supra* note 59, at 60.

109. See, for a detailed study of the (background and meaning of the) Space Liability Convention, H. Peter van Fenema, *The 1972 Convention on international liability for damage caused by space objects*, LL.M. thesis (unpubl.), McGill University, Montreal (1973).

and therefore the unpredictability of the risks attached to launching, partly because of the very limited number of insured launches,[110] and thus also a thin spreading of the risks, and of course mainly because of the high failure rate itself. One satellite manufacturer's analysis put the total revenue in launch insurance for the period 1977-1985 at USD 450 million and the total of claims paid at USD 900 million, a so-called 'ratio' of 200%. For 1984-1985, the loss ratio was even 330%.[111] Though none of these launch failures resulted in claims from third parties, their occurrence had an understandable effect on both the level of insurance available and the premiums charged.
For commercial launches on the shuttle, *NASA* required its customers to purchase USD 500 million of third party liability insurance for any single payload (and a joint maximum of USD 750 million, paid for proportionally by all customers, in case of multiple payloads on one shuttle flight) and include the Government as named insured in the policy at no cost. In return, NASA *indemnified the user (i.e. covered the cost of damages) above that level.*[112]

110. In the insurance industry, large numbers of events are needed to increase the statistical validity of predictions. In space launches, the numbers were rather insignificant, thus making it very difficult to accurately measure risks per launch vehicle. One industry expert called for some 600 flights per type of launch vehicle. In reality, these numbers were substantially less: between 1960 and 1988, the Delta vehicle was used 182 times, of which only 48 times in the last 10 years (with changing technology and power through the years); in 1988, the Ariane had flown 24 times, 4 of which ended in failure. The risks connected with this small number of events was moreover shared by a very limited number of insurance companies, see *Insurance and the U.S. commercial space launch industry*, Report 100-112, Senate Committee on Commerce, Science, and Transportation, 100th Cong., 2d Sess. (July 1988) hereinafter referred to as Senate launch insurance report 1988, at 7-8.
111. See *id.* at 9-10. The ratio in 1982 was 120%; 1983 was a successful year for satellite launches, but 1984 a bad one: the underwriters' combined ratio went from 90% (i.e. a 10% profit) at the beginning of 1984 to 180% (i.e. a loss of 80%) by June 1984: During a 1984 shuttle launch two satellites (Indonesia's Palapa 2-B and Western Union's Westar VI) were not placed into correct orbits. Although they were later recovered during another space shuttle mission and sold to another user, the insurer had to pay a total of USD 182 million in claims. The failure of an Atlas-Centaur launch in June 1984 resulted in the loss of an Intelsat V satellite worth USD 102 million. Insurance premiums for a shuttle launch rose from 5-7% of the value of the satellite in 1983 to 15-20% in June 1984. And in 1985, five more satellites were destroyed as a result of launch failures, costing the insurers a further USD 370 million. The year 1986 was catastrophic: in January the space shuttle Challenger exploded, killing the seven member crew. And in the months thereafter a US Titan, a US Delta and an Ariane launch vehicle failed, all resulting in the loss of the payloads: the combined ratio reached 148% and "satellite underwriters lost total confidence in satellite launches", see *ibid.* Premiums for launch insurance, still 5% in 1979 reached 30% in 1986, *id.*, at 5.
112. An amendment to the NASA Act, effective October 1, 1979 added a new Sec. 308, entitled Insurance and indemnification, which read as follows: "(a) The Administration is authorized on such terms and to the extent it may deem appropriate to provide liability insurance for any user of a space vehicle to compensate all or a portion of claims by third parties for death, bodily injury, or loss of or damage to property resulting from activities carried on in connection with the launch, operations or recovery of a space vehicle ...

The U.S. private launch companies, for each license application, had to await the examination of their 'case' by DOT, which would determine the amount of risk to the public associated with the launch and the corresponding insurance requirements. Launch companies could then decide on the extent of the remaining exposure (on the basis of their own perception of the risks) and buy insurance above the level required by DOT, to protect their assets in the event of losses above the risk as defined by DOT. The problem for these companies was that, although the risk of a catastrophic accident was small, "one such accident could wipe out their company and thus they would be "betting the company" with each commercial launch".[113] In all these cases, it was entirely possible that the insurance required by DOT or the additional insurance found necessary by the company would simply not be available or too expensive, thus effectively grounding the vehicle.
Understandably, the private companies referred to the above NASA policy as a sensible approach to their problems. They also pointed at *Arianespace*, active in the commercial launch market on behalf of Europe since the Ariane maiden flight of December 1979. The French government, from the start, provided third party liability coverage for any claims over 400 million French francs (equivalent to about USD 70 million in the mid-1980s), a level based on NASA's third party liability insurance requirement for ELV launches in the 1970s.[114] The launch industry maintained that without a similar U.S. Government policy applying to ELV launches it would be difficult for them to compete with either the shuttle or the foreign launch provider.

All NASA's launch services agreements, whether involving the use of the space shuttle or an ELV, also contain a cross-waiver of liability, first developed to facilitate multi-client use of the shuttle and to simplify the allocation of risk. Each participant in the launch (project) agrees not to sue any other participant in the same launch for damage or loss of property that might occur. This provision effectively takes away the need for insurance against claims for damage caused by a party to the launch to any other party involved

(b) Under such regulations in conformity with this section as the Administrator shall prescribe taking into account the availability, cost and terms of liability insurance, any agreement between the Administration and a user of a space vehicle may provide that the [US] will indemnify the user against claims (including reasonable expenses of litigation or settlement) by third parties for death, bodily injury, or loss of or damage to property resulting from activities carried on in connection with the launch, operations or recovery of a space vehicle, but only to the extent that such claims are not compensated by liability insurance of the user ...", see National Aeronautics and Space Act of 1958, as amended, reprinted in *Space law and related documents: International space law documents, U.S. space law documents*, S. Print 101-98, Senate Committee on Comm., Science and Transp., 101st Cong., 2d Sess. (June 1990), hereinafter referred to as Space law and related docs 1990 at 445-471.

113. See Senate launch insurance report 1988, *supra* note 110, at 11.

114. The insurance level NASA required was USD 100 million, which at the time converted to 400 million francs: See *id.*, at 15).

in the same launch.That saves money, but it also reduces uncertainty. With the largest class of potential claims eliminated, each party may proceed unburdened by the concern that other involved parties may bring claims against it, not without importance, particularly for private companies whose Directors (or lawyers) might otherwise object to assumption of large but undefined and unlimited contingent liabilities, or, depending on the novelty of the activity might be faced with prohibitive insurance costs.[115]

*Liability/insurance and the use of government launch facilities*

One of the issues DOT addressed at the outset was the use by private launch operators of government launch facilities, such as Cape Canaveral or Vandenberg Air Force Base. The rules and procedures of both NASA and the USAF had been devised to regulate government launches and now needed adaptation to meet the requirements and problems connected with private use. So OCST and USAF in 1984 reviewed existing policies, procedures and processes affecting the cost and commercial use of the respective national ranges.[116]

The Act required the Secretary "to facilitate and encourage the acquisition (by lease, sale, transaction in lieu of sale, or otherwise) by the private sector of launch property of the [U.S.] which is excess or is otherwise not needed for public use and of launch services, including utilities, of the [U.S.] which are otherwise not needed for public use."[117]

A point, raised by the launch industry in this connection, was the less than accommodating way in which NASA and DOD in practice handled the industry's use of the government launch sites and facilities. Where the Act encouraged the use of such government facilities, the OCST Interim Regulations confirmed the authority of the agencies in charge of those facilities to set their own safety-related conditions:

"All launch licenses issued under these circumstances will be conditioned by the requirements that the applicant : (1) comply with all applicable safety requirements and procedures of the range or launch site in question and (2) inform the Office of and obtain approval for any planned or proposed deviations from or alternatives to such requirements or procedures."[118]

115. See Edward A. Frankle, NASA, Statement before the Subcommittee on Science, Technology, and Space, Senate Committee on Commerce, Science, and Transportation (Mar 5, 1998), hereinafter referred to as Frankle 1998, at 3 <http://www.hq.nasa.gov/office/legaff/frankle3-5.html>.
116. See Steptoe 1984, *supra* note 60, at 194-195.
117. See Sec 15 (a) (2614 (a).
118. See Sec. 411.5, Interim Regulations, *supra* note 90.

The agencies concerned, not particularly interested in pleasing the ELV industry (which had no alternatives anyhow), imposed detailed insurance requirements and far reaching obligations on the industry to indemnify the government for losses arising from the conduct of launch operations. By virtue of the above regulation, these requirements became part of the launch license conditions. It took a long time before even standard conditions were developed which gave some predictability as to the requirements imposed by the government launch operators. And when these were finally published they confirmed the harshness of the terms, at least in the perception of the users. The so-called *Air Force Model Agreement* of December 1986, though published after the Challenger disaster and the ensuing Presidential pro-ELV initiative (see chapter 2.2.4. hereafter), apart from reserving the right of the Government to preempt any or all launches from facilities covered by the agreement, still required the private users to assume all, *i.e.* unlimited, liability for all damages in connection with any activities related to the launch, including third party and government property damage, to indemnify the Government and hold it harmless for such liability and to obtain the necessary insurance for that purpose.[119] No guidance was given as to acceptable disparities between the required and the obtainable level of insurance, and, apparently, it proved difficult both for the industry and for DOT to come to terms with USAF on clear, fair and workable conditions in this field, a factor which seriously affected the investment community's enthousiasm to put its money into this promising infant industry. According to one author, "[t]he existence of the current Air Force model agreement ... frankly is scaring the living daylights out of ... the investment community."[120]

### 2.2.2.2 *The launch pricing (subsidization) issue*

One of the thornier issues to be addressed by OCST right from the start was its relation with NASA. One can imagine at least one of the reasons: where sofar, NASA had been responsible for all civilian launches, it now had a competitor whose mandate to promote the ELV industry not only brought regulatory influence in this field but also introduced free market concepts, including pricing considerations (and OCST/NASA negotiations on the matter). These were not only rather new to NASA but also posed a threat to its own

119. See *Expendable launch vehicle commercialization agreement*, art. III, 12 Annals Air & Space L. 467 (1987).

120. See Kim G. Yelton, *Evolution, organization and implementation of the Commercial Space Launch Act and Amendments of 1988*, 4 (1) J. L. & Tech 117-137 (1989) hereinafter referred to as Yelton, quoting a statement made during a Congressional hearing on the state of the US launch industry, at 131-132. Yelton adds:"The Air Force refused to set specific amounts of required insurance, to negotiate with the launch providers in connection therewith and to acknowledge the Transportation Secretary's role in this regard.", *ibid.*

job to make the shuttle the preferred omni-purpose space transport system (and to set its own prices accordingly).[121]

NASA's launch arrangements with potential customers since the late 1970s provided various alternatives to accommodate different types of use (rs). One arrangement, the *Joint Endeavor Agreement* (JEA) was a cooperative arrangement between NASA and U.S. citizens (individuals, corporations etc.) which allowed the latter *free* flight on board the shuttle for experiments and/or technology demonstrations of products which have a commercial potential. The company develops the test, NASA takes care of transportation, and gets all data resulting from the experiment and obtains the royalty-free license to use the product or invention in case the private party does not take care of its commercialization itself.[122]

For small payloads (not larger than 5 cubic feet or two hundred pounds) NASA offered the so-called 'Get-away Specials', *i.e.* launch services on a space available basis at reduced cost, for small-scale experiments of a scientific research and development basis; and, also on a space-available basis, the 'Hitchhiker' program providing expanded services for larger payloads of an experimental nature.[123]

NASA's main product, the shuttle orbiter's cargo bay, was sold to its commercial customers at a fixed price of USD 38 million in 1982 dollars through fiscal year 1985, USD 71 million for fiscal years 1986-1988, and at a price established through an auction process (but USD 74 million at a minimum) for the years thereafter. These fixed prices represented a reimbursement of part of the 'operational costs' of the flight and did not take into account either the development cost of the shuttle or the fixed costs such as the launch site or launch towers.[124] The Presidential Directive on Commercialization of ELV's of 1983 had contained the following observation on this point:

"Through FY 1988, the price of STS flight will be maintained in accordance with the currently established NASA pricing policies in order to provide market stability and assure

121. Interestingly, two commentators, rather dramatically describing the ensuing bureaucratic struggle between the two agencies as the David of the OCST facing the Goliath of space leadership and industry in the free world, see on the side of the Goliath of NASA (and thus confronting OCST) the U.S. aerospace industry, to wit General Dynamics and Martin Marietta, the private ELV owners/operators who "owed a good portion of their corporate economic stability and financial allegiance to NASA" and, as "large cost-plus aerospace contracters" apparently were not terribly lured by the promise of free market economics. See Robinson & Meredith, *supra* note 74, at 7, 8.
122. See Raclin, *supra* note 59, at 42-43.
123. See *id.*, at 40-41.
124. See *id.*, at 37. The author notes that the development cost of the shuttle program was in the order of USD 10-15 billion, whereas the fixed cost of maintaining the system had been estimated at USD 1 billion per year, see *ibid.*

fair competition. Beyond this period it is the U.S. Government's intent to establish a full cost recovery policy for commercial and foreign STS flight operations."[125]

It is clear that the above fixed amounts did not cover the full costs of the shuttle. In fact, Congressional budgetary experts, testifying at a 1986 Hearing, calculated that the full cost of a shuttle flight in 1989 (at 1982 dollars) would be USD 150 million. As this amount was based on an overly optimistic launch rate estimate of 24 flights per year, the figure faced criticism and was adjusted to USD 186 million in case 'only' 18 flights would take place.[126] The reality was that, though the launch rate increased, none of these years yielded a launch rate exceeding 10 flights per year (with 1985 being the best year ever with a launch rate of 9), of course also as a result of the Challenger accident in early 1986.[127]
Both DOT and the established ELV manufacturers and newcomers in the commercial launch market contended that, as long as this subsidization of the shuttle's costs continued with regard to ELV-compatible payloads, these private companies would not enter the market: the USD 71-74 million shuttle launch price translated to a cost of about USD 26-27 million for a Delta class payload, for which, if launched by the Delta ELV, the private company would have to charge at least around USD 40 million to break even. Put differently, as one newcomer did, it would require a shuttle price of USD 150 million for the ELV industry to be able to compete at all.[128]
Interestingly, the above USD 38 million launch price NASA quoted in the early 1980s came from an estimate made in 1977 by the Agency which was based on a launch rate of 572 (!) missions to be flown between 1980 and 1991. With costs consistently and considerably exceeding budgets and launch rate projections declining, NASA, in 1984, had to increase the price to stick to its own promises and prepare itself for the year 1988, chosen by Reagan as the year in which full cost recovery should have been attained. But one year later, NASA reviewed the effect of its price policy and came to the conclusion that it amounted to handing clients to Arianespace on a silver plate and losing market share in the international commercial market as a result. Where once the U.S. had a complete monopoly, in a few years time Arianespace, with 30 firm launch contracts concluded at the end of 1984 and approaching 40 in the course of 1985,[129] had taken about 50% of the market of international

125. See ELV Commercialization Directive *supra* note 70.
126. See Raclin, *supra* note 59, at 38.
127. Launch rates for the first 75 flights were as follows: 1981: 2, 1982: 3, 1983: 4, 1984: 5, 1985: 9, 1986: 2, 1987: 0, 1988: 2, 1989: 5, 1990: 6, 1991: 6, 1992: 8, 1993: 7, 1994: 7, 1995: 7, see Space Shuttle 1996 *supra* note 51, at 268, 286 and 292.
128. See Raclin, *supra* note 59, at 39.
129. Arianespace's sales activities since its start of operations showed the following pattern of success: (in firm launch contracts on Dec 31 of each year) 1981: 10; 1982: 16; 1983: 25; 1984: 30; 1985: 41:; 1986: 58, see *The world's first commercial space transportation company*, Arianespace brochure, France (1993).

communications satellite launchings. Hence, in 1985, NASA's request to lower its price to USD 70.4 million, which would make the shuttle more competitive, both internationally and - to the understandable displeasure of the ELV industry and DOT - also domestically. And of course it meant that the concept of cost recovery had been replaced by market share considerations.

The ensuing heated debate between NASA and, in particular, the ELV lead agency DOT, showed the absurdity of trying to reconcile two conflicting policies, *i.e.* of encouraging the creation of a new private launch industry while maintaining and subsidizing the shuttle as the 'primary' launch system for fostering the many space interests and goals of the U.S., including the sale of launch services to domestic and foreign clients.
DOT (OCST) strongly and persistently argued for the shuttle to stick to shuttle-unique uses (needing human presence), and advocated much higher shuttle prices for commercial launches in order to remove this very effective entry barrier for the commercial ELV firms: instead of NASA's proposed USD 70.4 million launch fee, they suggested USD 129 million. That "would allow entry by the private sector, leading to greater competition, innovation, and lower prices for all launch systems, thereby stimulating demand for still more launches and a more 'robust' national launch capability".[130] NASA was definitely not amused, and fought back with all the power, experience, knowledge and assistance of allies the agency could mobilize.
Although DOT was new in the space business and policy 'arena' and its knowledge of the industry and the forces at work there was limited, it had an important ally in the form of Reagan's own politico-economic philosophy, that is, to withdraw the government from any activity that could be performed by the private sector. DOT basically advocated the transfer of a commercial activity, the operation of a commercial transportation system, from a government agency which had other primary tasks (research and development) to private enterprise, and found the Department of Commerce on its side. The latter Department, which had space commerce responsibilities of its own, also had a problematic relationship with NASA because of the latter's competing role in space commercialization and its resistance to a more private enterprise - driven space effort.

NASA's reaction to the views and actions of the above departments was to a large extent based on its long history of being the sole provider of access to space, its immense aerospace know-how, its highly successful cooperative programs with the scientific community and industry in furthering space exploration and creating commercial spin offs, and its deep mistrust in the

130. See Jack Scarborough, *The privatization of expendable launch vehicles: reconciliation of conflicting policy objectives*, 10 (2/3) Policy Studies Review 12-30 (1991) hereinafter referred to as Scarborough, at 17.

'fitness, willingness and ability' of the ELV industry (and DOT) to take over even a part of NASA's traditional transportation role.[131]
NASA had, since 1984 (!), an important space commercialization mission[132] which could only be accomplished with launch pricing acceptable to its U.S. users. And it could earn extra - much needed - income by selling excess capacity of shuttles, that would fly anyhow, at a discount to foreign users. Increasing the shuttle launch price would endanger both its domestic and foreign role and thus, to some extent, threaten NASA itself.
Moreover, NASA - not without merit - maintained, that new modes of transportation (rail, air) had always been subsidized. In this connection there was little difference between a NASA subsidy for shuttle launches and Department of Defense funding of ELV research and development, procurement contracts, the use of launch facilities at less than full cost and other benefits which the ELV industry had received, preparing it for the new role of launch provider.[133] The pricing issue was finally dealt with by President Reagan. In August 1985 he announced that the price for a shuttle launch would be set at USD 74 million. NASA had won.[134]
The decision was later formalized by Congress, which, formulated in some more detail what the shuttle pricing policy was supposed to accomplish:

"(1) the preservation of the role of the United States as a leader in space research, technology, and development;
(2) the efficient and cost effective use of the Space Transportation System;
(3) the achievenment of greatly increased commercial space activity; and
(4) the enhancement of the international competitive position of the United States."[135]

131. As Scarborough notes, NASA saw the ELV industry as "too risk averse, too conditioned to large cost-plus-fifteen-per cent contracts, to invest in what, for them, would be a marginal business ... If the market should fail or if they find they cannot compete, they simply can revert to being government contractors, which is what they prefer to be anyway.", see *id.*, at 21,
132. Sec. 102 of the NASA Act of 1958, entitled "Declaration of policy and purpose", was amended by the [NASA] Authorization Act 1985, Pub. L. 98-361 (July 16, 1984) Sec. 110 (a) (98 Stat. 426), which added the following paragraph (c): "The Congress declares that the general welfare of the [US] requires that [NASA] ... seek and encourage to the maximum extent possible the fullest commercial use of space.", see Space law and related docs 1990, *supra* note 112, 443-471, at 445. See also Frankle, Concord or discord?, *supra* note 14 at 216; the author quotes House Report 98-629, which states that "[t]he Committee wishes to emphasize that this language is intended to encourage NASA to agressively pursue all areas of potential commercialization.", *id.*, at note 5.
133. See *ibid.*
134. See *Shuttle pricing for foreign and commercial users* (NSDD 181 of July 30, 1985). Fact sheet (Aug 1, 1985), see Scarborough, *supra* note 130, at 23. Scarborough suggests, on the basis of interviews with officials involved in the pricing issue, that the President's decision was probably driven most by the threat to the shuttle posed by international competition, "grounded in a strong sense of pride in the shuttle as a symbol of national strength ... [The] decision ... was a victory for nationalism over economics.", see *id.*, at 23 and 27.
135. See *Shuttle pricing policy for commercial and foreign users*, NASA Authorization Act

The findings of Congress gave more insight in prevalent thinking on the role of the shuttle system. One thing had slightly changed: instead of being declared the only launch system or the preferred system for all purposes, the Space Transportation System was now found to be "the primary space launch system for both *United States national security and civil government missions*". (emph. add.) It followed from the text that, for commercial use, the shuttle was *not* the primary launch system. As the finding further read, "[STS] contributes to the expansion of the [U.S.] private sector investment and involvement in space and therefore should serve commercial users". This was a clear confirmation of the NASA approach to the issue which therefore maintained the regulatory uncertainty for the private launch industry.
The above shuttle pricing policy made clear that the problem, of how to turn the ELV industry's commercialization, which had received specific endorsement from Congress, into reality, had simply not been solved. Where two systems continued to receive verbal support, but the effects of their being competitors was not adddressed, and one of these, the shuttle had a *de facto* headstart, it had to be accepted that, for the time being, there would be no independant ELV industry marketing their products internationally or domestically.

It should be noted that during these interim years, because the space shuttle could not fulfill all its expectations, the manufacturers continued to produce launch vehicles for others, particularly the Air Force. The latter had decided to rely upon (present and new) Titans, produced by Martin Marietta, for the launch of, among others, weather satellites into polar orbits. But, as a result of the government's non-committal approach towards the ELV's, there were no private U.S. operators offering launch services to the satellite manufacturers and operators.
Though NASA, as a result of the shuttle decision, was definitely leaving the ELV business and offered all launchers and related hardware in its inventory to private enterprise, the number of serious 'takers' proved to be limited.
One such party, *Trans-Space Carriers, Inc.* (TCI), was interested in taking over and marketing the *Delta* launch vehicle and, in 1984, signed a preliminary contract with NASA to that effect. The conditions TCI had to fulfill, presumably to show its worth as a candidate launch provider, were (1) to enter into a production agreement with McDonnell Douglas which had closed its

(1986), Pub.L. 99-170 (99 Stat. 1012), Dec 5, 1985, 42 U.S.C. 2466, 66a-66c, Title II, Sec. 201-205, in Gorove US Space Law, *supra* note 55 at I.A.1 (d). The NASA Administrator had the authority to reduce the above base price in case he felt that the policy goals were not being achieved, but not without having enabled Congress to review his arguments for such a decision (Sec. 204(c)(1)); price reductions could not however bring the minimum price below the 'additive cost' (Sec. 204(c)(2)), *i.e.* the average direct and indirect costs to [NASA] of providing additional flights of the [STS] beyond the costs associated with those flights necessary to meet the space transportation needs of the [US] Government." (Sec.203(2).

production line, and (2) to sell three launches. (The latter would of course also be a pre-condition of MDD for re-opening the Delta production line.) TCI, a relatively unknown entity in the launch world, was unable to attract customers willing to construct or adapt satellites specifically for Delta launches. And its early experience with the effect of the Arianespace marketing and sales practices made it decide, in 1984, to ask the U.S. government to take measures against the European competitor (see later).
The *Atlas* launcher, also available for transfer to a private launch provider, found one candidate, its own manufacturer General Dynamics, who would some years later indeed start its own sales activities.
But, as the above regulatory and competitive conditions did not change, the period 1983-1986 saw no U.S. firms confronting their European counterpart in the international commercial launch market.

*The TCI complaint*

Thus, NASA and Arianespace remained the principal players in this field. Their comparable status as providers of subsidized services came to the fore when prospective launch services provider *TCI*, confronted with the difficulty of attracting domestic or foreign customers, launched a legal attack on Arianespace, alleging that the latter was subsidized by the Europeans and that it was dumping launch services in the U.S. market.[136]

136. TCI was incorporated in Maryland in September 1982, following the announcement of the US government that it planned to withdraw from the ELV business. It was formed specifically to provide launch services using the assets, technology and operational experience of NASA's Delta Launch Vehicle Program. In October 1983, TCI submitted a proposal to NASA to continue the management and operation of Delta as a commercial enterprise. (This included the acquisition of Delta assets such as spaceflight hardware and materials and the hiring by TCI of NASA personnel then working on the program) At the time of its complaint, TCI had signed an agreement with NASA whereby the necessary government facilities and equipment would be leased to, or purchased by, TCI, and the company had obtained exclusive marketing and production rights for future Delta launches. TCI would succeed to the launch authority after NASA had completed its manifested Delta launch program in October 1984. And management of the launch operations at Cape Canaveral and Vandenberg AFB would be transferred to TCI. All of the major Delta supply contractors such as McDonnell Douglas, Norton Thiokol, TRW, and Rockwell International (Rocketdyne Division), had, according to TCI, agreed to continue their supply roles for commercial Delta production as managed by TCI. The launch company was negotiating specific contracts with these suppliers, with NASA technical and management personnel and with the Air Force launch range service authorities for transition of their services to TCI. The Delta, designed to carry a single payload of between 2,000 and 5,000 pounds, was presented as "the free world's most successful spacecraft launch vehicle, having launched over 40% of all civil spacecraft", with an overall success rate since 1960 of 93.8%, and, since 1974 of over 97%. TCI promised to launch at about $11,000 per pound of payload launched into GTO in 1986, as compared to Shuttle, Ariane, Titan, and Atlas-Centaur which, only in a multiple payload configuration, would probably launch at $10,000 to $15,000 per pound. TCI felt therefore confident and eager to enter the market "if its ability

TCI's action took the form of a May 1984 petition before the Office of the United States Trade Representative (USTR). It was the first time that this influential U.S. Government agency, responsible for negotiating trade agreements, was involved with international competition in the commercial space launch market.[137] With its petition TCI sought Presidential action under Section 301 of the Trade Act of 1974 against all individually named ESA member states and their "space-related instrumentalities". Section 301 gives the USTR broad ranging powers to combat unfair trade practices by foreign Governments. More specifically, the Act gives USTR the power to impose sanctions against countries that have unfairly restricted U.S. trade, including trade in services.[138]

to compete for launch customers is not undermined by the unfair and discriminatory commercial practices by the named European governments in the emergence of the private launch services industry. " See Before the Office of the United States Trade Representative, Chairwoman, Section 301 Committee, *Petition seeking Presidential Action under Section 301 of the Trade Act of 1974*, as amended (19 U.S.C. Sec. 2411, *et seq.*) filed on behalf of the civil expendable launch vehicle services industry by Transpace Carriers, Inc. against the Governments of Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Sweden, Spain, Switzerland and the United Kingdom and their space-related instrumentalities (May 25, 1984).

137. The Office of the US Trade Representative was created by Congress in the Trade Expansion Act of 1962 and implemented by President Kennedy in Executive Order 11075 on January 15, 1963. Initially named the Office of the Special Trade Representative this Agency was authorized to negotiate all trade agreements programs under the Tariff Act of 1930 and the Trade Expansion Act of 1962. As part of the Trade Act of 1974, Congress established the Office as a Cabinet-level agency within the Executive Office of the Presidentand gave it other powers and responsibilities for coordinating trade policy. In 1980, the Office was renamed the Office of the United States Trade Representative (USTR). President Carter's Executive Order 12188 of January 4, 1980, authorized the USTR to set and administer overall trade policy. The USTR was also designated as the nation's chief trade negotiator and as the representative of the U.S. in the major international trade organizations. The head of USTR is a Cabinet-level official with the rank of ambassador. William E. Brock III was the Trade Representative at the time of the TCI case, see History of the USTR, <http://www.ustr.gov/history/index.htm> (Mar 11, 1998).

138. See Sec. 2411 "(a) Mandatory action (1) If the [USTR] determines ... that (A) the rights of the [US] under any trade agreement are being denied, or (B) an act, policy, or practice of a foreign country (i) violates, or is inconsistent with, the provisions of, or otherwise denies benefits to the [US] under any trade agreement, or (ii) is unjustifiable and burdens or restricts [US] commerce; the Trade Representative shall take action authorized in subsection (c) of this section, subject to the specific direction, if any, of the President regarding any such action, and shall take all other appropriate and feasible action within the power of the President that the President may direct the Trade Representative to take under this subsection, to enforce such rights or to obtain the elimination of such act, policy, or practice ... (3) Any action taken under paragraph (1) to eliminate an act, policy, or practice, shall be devised so as to effect goods or services of the foreign country in an amount that is equivalent in value to the burden or restriction being imposed by that country on [US] commerce.

(b) Discretionary action. If the Trade Representative determines ... that (1) an act, policy, or practice of a foreign country is unreasonable or discriminatory and burdens or restricts [US] commerce, and (2) action by the [US] is appropriate, the Trade Representative shall take all

According to TCI, it was particularly the French national space agency, Centre National d'Etudes Spatiales (CNES), which subsidized the activities of Arianespace through practices which included:

"- The two-tiered pricing of launch services offered by Arianespace. Member States of ESA have agreed to pay 25% to 33% per launch more than is charged to the export market for the same services.
- The provision of launch and range facilities and services and/or personnel at no charge, or unreasonably low cost, to Arianespace by the French national space agency, CNES. The cost of launch and range facilities and services represents approximately one-third of the total cost of a launch.
- The provision of CNES administrative, management and/or technical personnel to Arianespace either at no charge or at rates that are unreasonably low.
- The subsidization of mission insurance rates which Arianespace customers would otherwise pay."

Thus, TCI argued, Arianespace, as a beneficiary of such subsidy practices, had been able to offer launch services to U.S. companies and third country customers "at rates which are substantially less than those charged to Member States of ESA and substantially below those prices Arianespace would be able to charge in the absence of subsidization". This unfair competitive advantage had resulted in lost sales to the petitioner and price suppression, if not depression, of bid prices.
Consequently, TCI asked the President to seek the immediate discontinuance of the above practices and, pending such action, to retaliate by prohibiting the Arianespace U.S. sales company from advertising and marketing its services in the U.S. and by imposing economic sanctions against the goods and services of the Member States of ESA.
The USTR initiated an investigation on July 9, 1984 of ESA's and France's policies and practices with respect to Arianespace.
One year later, on July 22, 1985, the U.S. President announced his "determination under Section 301 of the Trade Act of 1974", which read as follows:

appropriate and feasibele action authorized under subsection (c) of this section, subject to the specific direction, if any, of the Presiden tregarding any such action, and all other appropriate and feasible action within the power of the President that the President may direct the Trade representative to take under this subsection, to obtain the elimination of that act, policy, or practice." Subsection (c) lists as authorized actions: to suspend, withdraw, or prevent the application of, benefits of trade agreement concessions to carry out a trade agreement with the foreign country concerned, impose duties or other import restrictions on the goods and fees or restrictions on the services of, such foreign country for such time as the Trade Representative considers appropriate, or enter into agreements with such countries committing the latter to end the practices, eliminate the restrictions or provide compensatory trade benefits".

"... Pursuant to Section 301 (a) of the Trade Act of 1974, as amended (19 U.S.C. 2411 (a)), I have determined that the practices of the Member States of the European Space Agency (ESA) and their instrumentalities with respect to the commercial satellite launching services of Arianespace S.A. are not unreasonable and a burden or restriction on U.S. commerce. While Arianespace does not operate under purely commercial conditions, this is in large measure a result of the history of the launch services industry, which is marked by almost exclusive government involvement. I have determined that these conditions do not require affirmative U.S. action as this time. But because of my decision to commercialize expendable launch services in the United States, and our policies with respect to manned launch services such as the shuttle (STS), it may become appropriate for the United States to approach other interested nations to reach an international understanding on guidelines for commercial satellite launch services at some point in the future."[139]

In the findings which formed the basis for the above determination, many of the factual allegations of TCI were said to be unsupported by evidence on the record. While other allegations were substantiated, the practices, in the view of the President/USTR, were not sufficiently different from U.S. practice in this field to be considered unreasonable under Section 301. The Presidential Determination looked at the various issues raised from the following three angles: *government inducements* to purchasers of Arianespace's services, direct and indirect *government assistance* to Arianespace, and *Arianespace's costs and pricing policies.*

*Cost and pricing*

This item addressed TCI's complaint that the ESA member states had to pay some 25% more for their (*i.e.* ESA payload) launches than foreigners. In that connection TCI quoted the pertinent statement of Arianespace's President at a Washington conference in 1982 to the effect that "European payloads are paying during the first three years of the STS pricing policy some 25% more than export sales to help us balance a bit this subsidy." In TCI's view this excuse ("we fight the subsidized shuttle") for a subsidy was not tenable, as the market segment in which Arianespace was operating was not so much the same as the shuttle's, but rather the one in which TCI was trying to make a living with its newly acquired Delta. So it was the U.S. private ELV industry which was targeted and hurt by this government-supported transfer price policy. As the Arianespace order book for launches as of May 21, 1984, showed that fully half of these launches were being carried out for participating European states, there was a virtual one-on-one subsidy for each non-European launch. "And, unlike TCI, Arianespace is virtually guaranteed a market, *i.e.*, the satellite launches made on behalf of participating European nations."

139. The President, *Determination under Section 301 of the Trade Act of 1974*, Memorandum for the United States Trade Representative of July 17, 1985, 50 Fed. Reg. 29631 (Jul 22, 1985).

The latter aspect, that of a - possibly - *protected home market*, received separate and more detailed attention on the part of USTR, who came to the following conclusion, worthy of being quoted in full because of the comparison between the U.S. and European 'home markets':

"ESA and its member states have agreed to give Arianespace a preference over other launch service providers with respect to payloads owned and operated by these government entities. Because of this preference and because almost all European communication satellites are operated by governments, rather than private firms, U.S. ELV's and the shuttle (STS) have limited opportunities to penetrate the European market. In contrast, much of the U.S. market, which is the major market in the world, is open because communications satellites are owned and operated by private sector firms.
However, U.S.G[overnment] payloads also are carried almost exclusively by U.S. launch service providers. Thus there is little difference in the respective treatment by ESA and the Unted States of government payloads. The major difference is in the structure of the market with European communication satellites being operated primarily by government entities."

(On the other hand, the so-called 'fly U.S.' policy, effective until today, reserves a much bigger government market for US launch providers than the European policy does for Arianespace, see Chapter 3.4.4 on this issue). The European pricing policy, and more in particular the cross-subsidization practices, was one that the USTR could not condemn: "[u]nder current pricing policies, Arianespace is not recovering its full costs, nor is it likely to do so in the near future.", USTR said, but, while acknowledging that ESA had agreed to long-term, fixed-price contracts with Arianespace and the latter consistently charged less to non-ESA customers, the U.S. investigator also remarked that "... it is not uncommon for firms to discount heavily in order to establish themselves in the market, especially when demand is low. Therefore, it appears that market forces, especially the current excess supply of launch capacity, are primarily responsible for current low launch prices."[140]

*Range services*
Though TCI had found reason to allege that launch range services were made available to Arianespace (virtually) free of charge USTR observed that in fact the latter company paid CNES a fee for the use of range services at Kourou, French Guyana, including personnel, but noted that this fee was arbitrary and

140. Arianespace disagreed with the above conclusion that is was not recovering its full costs; a senior official contended that Arianespace was recovering all costs except for a portion of launch range expenses, but including that for hardware and operations. Arianespace's lower operational costs (lower than Shuttle and US ELV's) resulted from the fact that the Ariane rocket was unmanned and expendable, used existing ELV technology, and placed orders for boosters at the rate of 6 or 7 per year thus benefitting from economies of scale, see Raclin, *supra* note 59, at 51, note 79.

did not cover the full range costs incurred by that launch company. However the commercial ELV's also received U.S. government range services and launch support on a direct cost, rather than full cost reimbursement basis (as the Commercial Space Launch Act prescribed: the 1988 amendment of the Act would define 'direct cost' as "the actual costs that can be unambiguously associated with a commercial launch effort, and would not be borne by the Unites States Government in the absence of a commercial launch effort."[141]

*Administrative personnel and services*
TCI complained that CNES personnel was made available to Arianespace under a Head Office Services Agreement to perform various administrative functions, such as legal and fiscal, personnel, management, quality assurance, etc., "on terms that do not comport with normal commercial practice." According to TCI, Arianespace would pay CNES 0.3% of its after-tax revenue, and since Arianespace reported no revenue in 1980, it made no payments to CNES in that period, and "it is likely that the cost to Arianespace for such services in 1981 to date continue to be unreasonably low."[142]
USTR did not agree with the petitioner: "While the fee is arbitrary, we have no reason to question CNES' assertion that the fee, in fact, covers actual wage costs plus fringe benefits. The amounts paid to date seem reasonable."

*Mission insurance*
TCI described its experience with the subsidization of insurance rates offered by Arianespace in a confidential exhibit. Whatever its contents, USTR, under the heading "Government Inducements" found no evidence of offsets or insurance being provided by ESA or its member states: "Member States of ESA do provide export financing for Arianespace's customers. However the terms of the financing are consistent with international agreements to which the United States is a party."

141. See Sec 15 (b)(1)/(2614)(b)(1) as amended, CSLA, *supra* note 84. The text of the unamended part of the provision reads: "In the case of any acquisition of launch services, including utilities, the amount of such payment shall be an amount equal to the direct costs (including salaries of [US] civilian and contractor personnel) incurred by the [US] as a result of the acquisition of such launch services."
142. The first European launch under Arianespace's responsibility took place in 1981. In the years preceding the TCI case the following launches took place: four "qualification flights": Dec 12, 1979, May 23, 1980, Jun 19, 1981, Dec 20, 1981; four flights in the "promotion series": Sep 9, 1982, Jun 16, 1983, Oct 18, 1983, Mar 4, 1984, and one "commercial flight", under official Arianespace responsibility, on May 23, 1984, See *Reaching for the skies: The Ariane family story and beyond*, ESA BR-42, Netherlands (1988) hereinafter referred to as Reaching for the skies, at 11.

Additionally, USTR investigated whether any (other) direct government assistance was given to Arianespace in the form of, for instance, loans and capital grants.
No evidence was found of either ESA or the individual member states providing soft loans or direct capital grants to Arianespace. Of course, the stockholders, some of whom were government-owned, *e.g.* Aerospatiale, put up equity capital, but USTR had no reason to suggest that these transactions were inconsistent with commercial practice. Arianespace also obtained some *hardware* from ESA at less than the cost of acquisition, but then NASA's agreement with TCI for the transfer of the Delta program also provided for transfer of certain flight hardware at less than the government's cost of acquisition.

Finally, one form of possible *indirect government assistance* was addressed, to wit, that governments through their ownership of major suppliers, who are at the same time also major stockholders of Arianespace, could artificially reduce Arianespace's operating costs. However, the investigation did not uncover evidence to suggest that Arianespace was obtaining significant assistance by reason of low-cost inputs from its suppliers.

The Presidential Determination finally observed that, since there were no international standards of reasonableness for launch services, they had no choice but to compare ESA practices to U.S. practice and to reasonable commercial practices. On that basis it concluded that the ESA practices were not sufficiently different from those of the U.S. to be actionable under Section 301. However, a word of caution was added to this conclusion:

> "This determination is not an endorsement of ESA practices.
> Our policies in this area are now undergoing revision, and in the future we may wish to reexamine ESA's practices and their effect on U.S.G. launch services.
> At that time it may be in our mutual interest to engage in international discussions aimed at establishing appropriate guidelines for the commercial launch industry."

The interesting aspect of these concluding remarks is not so much that the USTR, with the blessing of the President, kept its options open for the future; after all, in 1985, both the launch industry and the respective U.S. government policies were in a state of flux and Arianespace's competition hurt its U.S. counterparts. So, to keep open a basis for talks about "appropriate guidelines" concerning competitive practices was a prudent precaution. Remarkable is, however, the reference in the above quoted text to the effect of ESA's practices on "U.S.G[overnment]" launch services. *TCI* complained about European behaviour, not NASA. U.S. private ELV's were threatened, not the space shuttle.
As will be seen later, in Chapter 3.4.3, such discussions did take place eventually, triggered by the market entry of other, *i.e.* non-U.S., non-European, launch providers.

In that connection it should be noted that Arianespace's marketing strategy was considered very agressive by its American counterparts, because the company consistently underbid the subsidized shuttle and was thus successful in attracting customers who were (supposed to be) traditional users of the shuttle, such as Intelsat and several U.S. companies.[143] Ironically, as Arianespace's launch pricing was keyed to compete with the shuttle price, that company had as much reason to complain about the artificially low level thereof as the U.S. ELV companies. In fact, ESA's participation in the TCI investigation was made conditional on receiving information on the price structure of the shuttle; and on the basis of that information ESA vigorously objected to NASA's interpretation of "full cost recovery" and the ensuing clear element of subsidization present in congressionally approved shuttle pricing. No doubt, the strong views of the ESA member states on this matter, and their lobbying for higher shuttle prices, played an important role in USTR's final report on the subsidization of Arianespace, and would also influence those countries' position in their discussions with the U.S. on competition guidelines.

For the time being, however, U.S. government policies and practices, and the resulting regulatory and competitive conditions in the period 1983-1986, prevented the private U.S. launch firms from entering the international commercial launch market.

### 2.2.3 *The post-Challenger regulatory environment*

In the 'interim' period 1983-1986, the U.S. private ELV industry's competitive position remained unsatisfactory, both vis-a-vis the space shuttle and its foreign competitor Arianespace. And, although there appeared to be general recognition of the unfeasibility of having both the private industry and the shuttle cater to the same commercial market, the positions were frozen to the particular disadvantage of the ELV providers until the fatal date of January 28, 1986, when an explosion destroyed the space shuttle Challenger, killing its entire crew of seven, destroying its payload, and grounding the system for more than two and a half years.[144]

143. See Harry R. Marshall, *U.S. space programs: cooperation and competition from Europe*, Address April 17, 1985, Dept of State Bull.83-87 (Sep 1985), at 84-85. At the time of this address, Arianespace had already launched 2 Intelsat 5 satellites, and, a.o., a Brazilian and an Arab satellite; its order book reportedly totalled nearly USD 875 million, covering firm launches of 28 satellites, of which 6 ESA satellites, 10 other European satellites, 6 US satellites and 6 spacecraft from non-European, non-US sources, *ibid.*

144. The Challenger payload consisted of a NASA Tracking and Data Relay Satellite (TDRS-B) and the Spartan (Sptn-Halley) ultraviolet telescope to study comet Halley, see *Space Almanac*, Anthony R. Curtis ed., USA (1992) at 108. On Feb 3, 1986, Reagan announced the formation of a Presidential Commission to investigate the cause of the accident. The Commission was chaired by William Rogers, former Secretary of State under Pres. Nixon.

The accident not only crippled the military and intelligence community's launch programs, but also caused serious damage to the civilian (communications) satellite manufacturers and operators with shuttle launch contracts: all agreed launch dates had suddenly become uncertain at best (though NASA continued to assure its customers that their launches would remain on the launch manifest, nobody could tell when the system would be operational again). Moreover, the satellites were designed and built for the shuttle only and would need hard and software adaptation to make them fit for ELV launching, causing at least substantial delays and cost increases. Worse, the above policies of the government and its agencies, in stead of producing a healthy number of competitive companies with a range of products fit, willing and able to meet the demands of their eager customers, had resulted in a limited offer of ELV launch services, patently insufficient to take care of all civil and military launch needs.[145] Worse still, 1986 was a bad launch year, with a number of launch failures, increasing both the launch back log in general and, because of DOD's preemptive procurement of ELV's and launch facilities, costly delays for the private satellite industry in particular.[146] Finally, although Arianespace was in principle more than willing to take over the clients from its U.S. competitors, that company itself, on May 31, 1986, suffered a launch failure as well, causing the loss of an Intelsat V satellite, and would not launch again until close to one and a half year later.[147]

Other members included astronauts Neil Armstrong and Sally Ride (the first American woman in space, and crew member on two previous shuttle flights in 1983 and 1984), Robert Hotz, former Ed.-in-Chief, AW/ST, and several distinguished scientists and engineers including a Nobel laureate. The Commission finalized its work on June 6 1986 and issued a report of that date which contained a detailed analysis of the cause of the accident and provided NASA with nine major recommendations of a technical and organizational nature. Recommendation 8 read as follows: "NASA must establish a flight rate that is consistent with its resources. *The nation's reliance on a single launch system should be avoided in the future.*" (emph. add.), see Space Shuttle 1996, *supra* note 51, at 279-280. For more detailed information on the flight, the accident, the Commission's analysis and recommendations and NASA's follow-up, resulting in a thoroughly refurbished (and safer) shuttle Endeavour, launched in Sep. 1988, see *id.*, at 277-284).

145. In his article prepared shortly before the accident, Raclin quoted Under Secretary of the Air Force Aldridge as stating: "Were the Orbiter fleet to be grounded for just six months in the early 1990s, it would take the nation two years at the nearly impossible surge rate of thirty flights per year to catch up. Moreover, if an Orbiter were lost, we could never catch up.", see Raclin, *supra* note 59, at 66, note 158.

146. On April 16, 1986, a Titan 34D launch from Kennedy Space Center failed, resulting in the loss of launch capability for approximately 9 months for two launch pads, see Commercial Space Launch Act Amendments of 1988, H.R. Report 100-639, H.R. Committee on Science, Space, and Technology, 100th Cong., 2d Sess. (May 1988), H.R. 100-639, hereinafter referred to as H.R. CSLA Amendments Report, at 10. Additionally, on May 3, 1986 NASA had to destroy a Delta launcher, carrying a weather satellite, which had become uncontrollable. See Fought, *Legal aspects of the commercialization of space transportation systems*, 3 High Tech. L. J. 99-147 (1989), hereinafter referred to as Fought, at 100.

147. Both before and after that date some former shuttle customers contracted with Ariane space

Surprisingly it still took more than 6 months before the first political reaction and sign of change was given. Reason for this delay was the heated interdepartmental debate on post-Challenger launch policies which raged all through the first half of 1986, with DOT and DOC pitted against NASA. The former argued that the shuttle be removed totally from the commercial launch market to give the ELV industry a clear signal that there would be no more competition on the part of government agency NASA: the only way of getting the industry to produce desperately needed launch services at all. It was clear to many - even prior to the accident - that the needs of the military and scientific community were of such magnitude that the shuttle's unique capabilities should be reserved for, and would be fully used by, those missions alone and that for all other fast growing uses a full-fledged ELV system was indispensable.

NASA nevertheless had great difficulty accepting a departure from its traditional activities in the commercial launch market and put up a determined fight to be allowed to resume the whole range of launch tasks after the return of the shuttle. Partly as a result of the pressure of a number of highly frustrated, important shuttle-users with shuttle launch contracts but no prospect of any launch taking place soon, the private launch industry finally got what it wanted.

In August 1986, President Reagan announced a Directive which, apart from proclaiming the decision to build a fourth shuttle orbiter to replace the Challenger, for all practical purposes ended NASA's role in launching commercial and foreign satellites.[148] The decision, although simply reflecting the reality of a fully booked shuttle manifest, and not meant specifically to promote the ELV industry, was nevertheless hailed by DOT Secretary Dole as a "turning point in the space program" and one which created a "natural division of work", leaving NASA and the shuttle with building and operating the space station (announced in 1984), planetary exploration, experimenting with new business opportunities in materials processing and meeting defense needs, and saving a share of the international launch market for the U.S. through its private launch firms.[149]

for a switch to an Ariane launch of their payload, see *Ibid.*

148. *Fourth Orbiter and the space program*, statement by the President, August 15, 1986, 22 Weekly Comp.Pres. Docs 1103-1104 (1986), later formalized in U.S. Launch Strategy, National Security Decision Directive (NSDD) 254, Dec 27, 1986, enacted in [NASA] Authorization Act, FY 1991, Pub.L.101-611, Nov. 16, 1990, 104 Stat. 3190, Sec. 112:
"(1) It shall be the policy of the United States to use the Space Shuttle for purposes that
(i) require the presence of man,
(ii) require the unique capabilities of the Space Shuttle or
(iii) when other compelling circumstances exist.
(2) The term "compelling circumstances" includes, but is not limited to, occasions when the [NASA] Administrator determines, in consultation with the Secretary of Defense and the Secretary of State, that important national security or foreign policy interests would be served by a Shuttle launch."

149. See Scarborough, *supra* note 130, at 24.

At the time of the decision to off-load commercial satellites, reached without any prior consultation with the U.S. satellite communications industry, 44 companies held shuttle launch agreements with NASA.The President's new shuttle policy left the government with the problem of what to do with these commercial payloads. As a result of inter-agency deliberations, NASA, in October 1986, announced a new shuttle manifest of commercial payloads which was comprised solely of 20 payloads which met the criteria set forth in the Presidential policy: five of these had national security implications, twelve had foreign policy implications (*i.e.* satellites of foreign governments), and three were shuttle-unique. The remaining customers were told that, as the new manifest represented the shuttle launch schedule through calender year 1994, there would be no chance of a launch for years to come anyhow, and they were reminded of their right to terminate the launch agreement on that basis.[150] In fact, the government hoped that these disappointed customers would voluntarily seek launch opportunities elsewhere, *i.e.* either - and preferably - by the U.S. ELV providers or - if unavoidable - by the foreign competitors. The accident and the ensuing government actions thus created two groups of unhappy customers: one, remaining on the manifest, whose launches were seriously and indefinitely delayed, the other, removed from the manifest and therefore forced to immediately look elsewhere. At least one of the customers belonging to the second group tried in vain to get its satellite upgraded to 'national security' status, and some companies would sue the government for breach of contract.[151] Twenty-two satellites out of the above forty-four were under construction at the time the presidential directive was released. The damages to these companies in most cases exceeded USD 100 million on an individual basis, as a result of such expenses as non-usable shuttle-unique hardware, software, equipment and documentation, storage costs for unlaunched spacecraft, and more-than-doubling launch and insurance costs.[152] An even more serious impediment to overcoming the (damage of) delays for these companies was noted at Congressional hearings on the state of the U.S. launch industry in the autumn of 1987,[153] to wit, that, over a

150. See American Satellite Co. v. U.S., No.525-89C, 26 U.S. Cl. Ct. 146 (1992), reprinted in Gorove U.S. Space law, *supra* note 55, at I.A.5 (29).

151. American Satellite Co. did both, see *supra* note 150. Hughes Communications also went to Court on the matter, see Hughes Communications Galaxy, Inc. v. United States, 26 Cl.Ct. 123 (1992) reprinted in Gorove US Space law, *supra* note 55, at 1.A.25 (28). In both cases the Court would reject the claim. In the later (Hughes) case, the Court held that the Presidential decision to end commercial use of the shuttle ... to eliminate all purely commercial satellites from the manifest, was a sovereign act which prevented NASA from honoring its obligations under the launch contract so there was no breach of contract on the part of NASA. On appeal, the decision was reversed, and the government was held liable for breaching the launch contract, see 998 F. 2d 953 (Fed. Cir. 1993) and 34 Fed. Cl. 623 (1995).

152. See H.R. CSLA Amendments Report, *supra* note 146, at 7.

153. See *State of the commercial launch industry*, Hearings before the Subcommittee on Space Science and Applications, House Committee on Science, Space and Technology, 100th

year following the President's announcement of the new policy, no U.S. satellite manufacturer or operator had succeeded in obtaining a fixed cost or firm launch date for a launch with an American launch provider. The U.S. government, in its role of manager and controller of the launch ranges, was blamed for this cost and schedule uncertainty. As we have seen above, the priority given to government launches and the uncertainties created with respect to liability and insurance requirements (the latter primarily the result of the Air Force refusing to accept the authority of DOT to provide the necessary guidelines) effectively blocked the entry of private industry into the launch market; and President Reagan's Directive had not settled these issues.[154]
The hearings were initiated because of growing concern about the prospects for the shuttle's timely recovery and the negative impact of the 'no access to space' situation on both national security (aging 'spy' and other military or intelligence satellites needed urgent replacement) and the U.S. commercial communications satellite manufacturers (whose ability to sell satellites was severely handicapped by the unavailability of any means of transportation to their orbital positions). As one author remarked about the results of the hearings, "the message was mixed - on the one hand, the House Committee learned that the industry had stepped forward with significant financial investments and commitments, but, on the other, policy impediments were hindering industry's ability to compete ... The biggest problem looming to both providers and customers was the potential risk of liability."[155] In this connection mention was made of the onerous liability and indemnity conditions and the priority for government launches embodied in the AF model ELV commercialization agreement discussed above. It became apparent that as long as the U.S. government maintained this cost and scheduling uncertainty, there was little chance for the ELV industry to ever become an effective competitor of existing and prospective - subsidized and supported - foreign launch providers, such as Arianespace, but also the Soviet Union, China and Japan.

In testimony at the hearings before the Congressional Committee, the following major issues were identified as needing resolution if the U.S. was going to have a commercial launch industry to assure access to space for government and commercial users.[156]

Cong., 1st Sess. (Sep 1987).

154. In the meantime, in January 1987, the Air Force did conclude a procurement of medium launch vehicles for which proposals were required to include a commercial launch vehicle derivate. "The procurement was a significant and innovative effort in utilizing the government's buying power to incentivize the commercial launch industry.", See H.R. CSLA Amendments Report, *supra* note 146, at 3.

155. See Trippett, *supra* note 94, at 51.

156. For the following discussion, see, in greater detail, H.R. CSLA Amendments Report, *supra* note 146, at 4-8.

*Government role*: the government had obligations and responsibilities as
(1) regulator of the U.S. launch industry,
(2) owner and manager of launch ranges,
(3) signatory to the Space Liability Convention which potentially confers absolute liability on the U.S. for damage caused by private citizens' space activities,
(4) user of the commercial launch industry to assure access to space for government purposes,
(5) historically, the sole U.S. provider of launch services for government and commercial users.
These roles and ensuing responsibilities justified an active government partnership with the launch industry to make the latter commercially viable.

*Policy continuity:* where DOT, under the Commercial Space Launch Act, had principal responsibility for regulating the industry, it was important that it continued to actively consult with all departments and agencies concerned to keep the implementation of the Act's policies consistent (also in the face of perceived evolving roles of these various agencies concerned).

*Use of government ranges:* U.S. government launch ranges must be considered a national asset, not the property of an agency. The conditions for the use of these ranges were critical for the foreseeable future to the survivability of the launch industry. The latter needed predictability and reliability in cost and schedules. Commercial requirements must be considered a national priority on government launch ranges and conditions should reflect that policy to create confidence in the commercial launch industry.

*Foreign competition:* the U.S. industry entered a highly competitive international marketplace for launch services, with Arianespace, launching nearly 50% of the world satellite market in 1985, and China and the Soviet Union actively marketing (but not yet *selling*) their launch services to the West. Foreign government support came in many forms, such as two-tier pricing, charging less than full cost for launch facilities, services and insurance, preferential customs treatment, packaging (*i.e.* cross-subsidies among satellites, launch services and ground stations to entice potential customers to buy the whole package at lower total prices) and preferential treatment (by governments or regional organizations) of domestic or regional launch providers. Without a predictable level of U.S. government support and consistent policy provided in the legislation, the U.S. launch industry would not be competitive.

*Insurance requirements and risk uncertainty:* both Arianespace and NASA had taken a risk allocation approach, with a reasonable share of the risk (and insurance) assumed by the client and the remainder by the agencies concerned. The private launch industry, however, carried the total burden of the risk (of unlimited liability) which created great uncertainty and a serious threat to that industry. It was suggested that a risk sharing regime be introduced for the ELV industry similar to the shuttle precedent.

*Impact of the President's decision to remove commercial loads from the shuttle:* the U.S. satellite communications industry had relied on the availability of the shuttle. Its commitments should be recognized and, to the extent feasible, honored by the government to the extent these prior commitments could be applied to U.S. commercial launches. In other words, this highly important national industry needed special treatment to restore confidence in the government as a contractual party and to partly offset the damages incurred.

*Research and development:* foreign nations (European, Soviet, Chinese, Japanese) were actively supporting the development of new launch vehicle design capabilities that would challenge the competitiveness of the U.S. launch industry. Taking as an example NASA's successful role in aeronautical research and technology to the benefit of the U.S. aviation industry, Congress felt that a similar effort had to be made to foster advances in launch vehicle technology, in order for that industry to remain competitive.

During the long period of Congressional discussions, including two series of hearings, on the above issues, *i.e.* between August 1986 and April 1988, a number of other developments increased the momentum for change and, conversely, were influenced by those debates:

- President Reagan announced a new national space policy which also addressed the U.S. launch capabilities;
- The Air Force released a new model ELV commercialization agreement, and
- DOT-OCST published its final launch licensing regulations

Each of these development will be briefly reviewed hereafter. This paragraph will be concluded by a discussion of the CSLA Amendments of 1988.

*The new national space policy of February 1988*

In August 1987, President Reagan ordered an inter-agency review of U.S. government space policy, which included, *inter alia*, a thorough analysis of previous Presidential decisions and the implications of the space shuttle and ELV accidents. The resulting *Presidential Directive on National Space Policy* of January 5, 1988, released on February 11, 1988[157] divided U.S. space

157. *The President's space policy and commercial space initiative to begin the next century*, Fact sheet, The White House, Office of the Press Secretary, Feb 11, 1988, announcing and explaining the National Security Decision Directive, signed by the President on January 5,

activities in three separate and distinct sectors: two strongly interacting governmental sectors (civil, and national security), and a separate non-governmental commercial sector. (This was in fact the first time that the Administration clearly identified a separate and distinct commercial space sector.)
The Directive followed this distinction by detailing the government's policies under the following headings:
- civil space policy and civil space sector guidelines
- national security policy and national security space sector guidelines,
- inter-sector (national security and civil space) policies and guidelines.
- commercial space policy and commercial space sector guidelines.

Space transportation received prominent attention in the Directive. Clearly the major purpose of the governmental policies was to create assured access to space, sufficient to achieve all U.S. space goals, but more in particular, and as a matter of priority, to serve governmental goals. The Challenger trauma was primarily a governmental trauma, and the text and spirit of the Directive reflected that aspect. Thus, as an inter-sector policy, the following statement was made:

"United States space transportation systems must provide a balanced, robust and flexible capability with sufficient resiliency to allow continued operations despite failures in any single system. The goals of [U.S.] space transportation policy are: (1) to achieve and maintain safe and reliable access to, transportation in, and return from, space; (2) to exploit the unique attributes of manned and unmanned launch and recovery systems; (3) to encourage to the maximum extent feasible, the development and use of [U.S.] private sector space transportation capabilities without direct Federal subsidy; and (4) to reduce the costs of space transportation and related services."

The civil space sector guidelines, primarily directed at NASA, reconfirmed, under the "civil government space transportation" - heading, the governmental use of the STS space shuttle for shuttle-unique purposes and projects.
The national security space sector guidelines, primarily directed at DOD, paid particular attention to the spreading of risks and the maintainance of launch capabilities in all circumstances:

"Payloads will be distributed among [manned and unmanned] launch systems and launch sites to minimize the impact of loss of any single launch system or launch site on mission performance. *The DOD will procure unmanned launch vehicles or services* and maintain launch capability on both the East and West coasts ...
DOD will study concepts and technologies which would support future contingency launch capabilities." (emph. add.)

1988, hereinafter referred to as the 1988 National Space Policy (partially) reprinted in Space law and related docs, *supra* note 112 at 581-585.

Space transportation guidelines, addressing both national security and civil space needs and concerns falling under DOD and NASA responsibilities, confirmed that the government launch needs would be met by a mix of vehicles, consisting of the STS, unmanned launch vehicles (ULV's) and in-space transportation systems. For its own purposes, DOD was directed to assure, in coordination with NASA, the shuttle's utility to national defense and to integrate missions into the shuttle system. Coordination with NASA was necessary for this joint use as operational control of the shuttle and mission management would be in the hands of the agency of the mission concerned. This switching of responsibilities was already provided for in a NASA/DOD MoU on the matter.

The Directive confirmed that the commercial launch operations were an integral part of a "robust national space launch capability". Therefore, NASA, contrary to its own wishes,[158] was prohibited from maintaining an ELV fleet adjunct to the shuttle.
In fact, all civil government agencies were directed to use, as much as possible, the ELV services of the domestic commercial launch industry, or of DOD. As we saw in the above quoted, and emphasized, national security guideline, only DOD was required/permitted to have its own in-house launch vehicles. With them it would thus be able to offer launch services to other government agencies in competition with U.S. private industry.

The Directive also listed specific guidelines for the federal encouragement of commercial ULV's, *inter alia*:
- the use of government launch facilities was encouraged, but
- government priority use to meet "national security and critical mission requirements" was maintained, with the obligation to minimize the impact thereof on commercial operations,
- no subsidization, but (development and competition) 'encouraging' pricing of government facilities, equipment and services,
- NASA and DOD should provide access to their launch facilities on a reimbursable basis, and develop, in consultation with DOT, contractual arrangements covering such access by commercial launch firms; they should also provide technical advice and assistance to commercial launch firms on a reimbursable basis,
- pricing of the above services to be based on "direct cost" incurred by the government.

158. Shortly after the Challenger explosion, NASA had announced plans to - again - assemble its own 'in-house' ELV fleet, see Glenn H. Reynolds and Robert P. Merges, *Toward an industrial policy for outer space: Problems and prospects of the commercial launch industry*, 29 Jurimetrics J. 7-42 (Fall 1988), hereinafter referred to as Reynolds Merges, at 16.

A fifteen point Commercial Space Initiative which formed part of the new national space policy contained two provisions of major importance to the private industry, one which - again - directed Federal agencies to "procure existing and future required [ELV] services directly from the private sector to the fullest extent feasible", and another which finally addressed the insurance concerns of the U.S. commercial launch industry using Federal launch ranges, by promising administrative steps including:

"- *Limits on third party liability*: Consistent with the Administration's tort policy, the Administration will propose to Congress a $200,000 cap on noneconomic damage awards to individual third parties resulting from commercial launch accidents;
- Limits on property damage liability: The liability of commercial launch operators for damage to government propertyresulting from a commercial launch accident will be administratively limited to the level of insurance required by the [DOT].
If losses to the Government exceed this level, the Government will waive its right to recover for damages. If losses are less than this level, the Government will waive its right to recover for those damages caused by Government willful misconduct or reckless disregard."

Though Congress would later support the Administration's above approach on government property damage, it rejected the idea of tort reform by capping pain and suffering damages at USD 200,000, and would instead opt for a risk-sharing formula based upon the NASA model. Still, the President's initiative showed a willingness to protect the launch industry against unlimited liability, and with Congress opting for a similar approach, there was reason to be optimistic about the chances for the creation of a 'private-launch-firm friendly' regulatory environment.

Finally, the Directive contained an undoubtedly well-meaning, but curiously selective contribution towards the damage incurred by the off-loaded shuttle customers, in the form of so-called "vouchers for research payloads":

"NASA and [DOT] will explore providing to research payload owners manifested on the Shuttle a one time launch voucher that can be used to purchase an alternative U.S. commercial launch service."

Congress would not endorse this approach but instead opted for a different measure which compensated *all* shuttle customers, though to a more limited extent.

### *The revised USAF model ELV commercialization agreement of February 1988*

The AF model agreement was revised in early 1988. It showed a number of improvements, partly in letter, partly in spirit, to the advantage of the user,

though it still reflected the oligopoly position (together with NASA) of this governmental provider of the "property, facilities, goods and services".[159]
One could say that the revised agreement, in a number of ways, honoured the pro-commercial ELV language and spirit of the Act of 1984 and the prevailing Congressional views as expressed during the September 1987 hearings, and distanced itself from the 'just be happy you're allowed to use our launch site' attitude shown by its predecessor.
Thus, in contrast with the latter, it:
- specifically referred to the authority of the Commercial Space Launch Act,
- promised that "[t]he Government will make all reasonable efforts to minimize adverse impacts its actions may have on commercial operations and accord commercial users a high degree of stability in conducting their commercial launch business.", and
- promised that, where a government permission or authorization was required the Government wouldl act promptly and not impose unreasonable conditions.[160]

The provisions on the allocation of risks, liability and insurance were of course the crucial items.
As we saw above, the original model agreement obliged the user to obtain insurance protecting himself, the government and its (sub) contractors from any third party liability and (own and government) property damage liability, at amounts as required by the DOT Secretary. At the same time, the user was to indemnify the Government and hold it harmless against liability for claims by third persons, including employees of the user, for death, personal injury, damage to or loss of (user's or government or other) property, including liability for fines or costs arising out of any violation by the user of government regulations.
The original agreement did not address the question of how much of the user's exposure could in fact be insured and at what price, nor did it suggest, in case the actual claims exceeded the insured amount, who would pay.
The revised agreement created the concept of (third party and property damage) liability and insurance for a specific launch up to "the amount of the maximum available insurance", *i.e.*:

"The amount of insurance available in the world market at a reasonable premium and on terms considered commercially reasonable for the risks involved to fund the User's responsibilities under this Agreement, or a special provision of this Agreement."[161]

159. See Department of the Air Force, *Expendable launch vehicle commercialization, Model agreement*, revision one, February 1988, hereinafter referred to as USAF revised model agreement 1988 or revised agreement, reprinted in Space law and related docs 1990, *supra* note 112, at 547-563.
160. See artt. I and II respectively of the revised agreement, *supra* note 159.
161. See art IV b.3. of the revised agreement, *ibid*.

To the extent that Government damages and/or third party claims arising in connection with a specific launch exceed the amount as defined above, "questions of liability between parties and responsibility for paying claims will be left for resolution according to the applicable law of the U.S. (*e.g.* tort law, the Federal Tort Claims Act)". In other words, 'we'll cross that bridge when we come to it!'

It would be up to the Government to determine what the maximum available insurance for a specific launch would be and which price would be considered reasonable for that product. That decision would be final and not be subject to appeal. That provision in itself and the uncertainty about the possible outcome of such determinations did not bring about the desired feeling of stability on the part of the launch industry, though the fact that in the end it would most probably be the OCST setting the standards and Congress watching over the behaviour of all departments concerned, created at least some sense of comfort on the part of the industry.

Also in another way the revised agreement was somewhat kinder to the launch firms. The original provision on "support interruptions", *i.e.* that the launch ranges ("Centers") will act in good faith and negotiate to minimize scheduling and support conflicts, was supplemented by a new commitment which expressed the "government's intention to accord commercial users a high degree of stability in conducting their commercial launch business."[162] What remained was the ground rule in case of conflict (the established policy since 1983),[163] namely that the Government had priority in the use of government property and support services to meet national security interests or U.S. Government mission requirements. To discourage 'easy' claims in that field and address the consequences for the industry, the revised agreement added that the government decision to exert its first priority rights had to be made by the Center commander, and provided also:

"In the event the Government asserts its first priority right, the Government will make its best effort to coordinate with the User in advance (except in emergency situations when the Government must act immediately) so that the User may adjust its work schedules to minimize the impact of an interruption."[164]

Of course, the fact that the government retained its first priority right without even having to weigh the interests of and consequences for private enterprise was far from reassuring, particularly where another provision absolved the Government in advance from any liability for any costs, including but not

162. See art. XII of the revised agreement, *ibid.*
163. See ELV Commercialization Directive, *supra* note 70, at 712, reconfirmed in the 1988 National Space Policy, *supra* note 157.
164. See art. XII b.1. of the revised agreement, *ibid.*

limited to consequential damages incurred by third parties, the user, its contractors, or subcontractors as a result of such interruptions.
One should not forget, however, that this subordinate role of the commercial users followed to a large extent from the wording of the Commercial Space Launch Act itself, which, under the heading "Use of government property" provided:

"The Secretary shall take such actions as may be necessary to facilitate and encourage the acquisition ... by the private sector of launch property of the United States *which is excess or is otherwise not needed for public use* and of launch services, including utilities, of the United States *which are otherwise not needed for public use*." (emph. add.)

On the same basis, the department of the Air Force introduced an additional provision, which enabled the Government, without liability for any resulting costs, to terminate the agreement in its entirety on a thirty days notice in case

"[r]equirements are developed for critical, conflicting national security or other governmental launches or launch activities which cannot be reasonably satisfied by such means as schedule adjustment, and therefore preclude the Government from making available to the User, as excess capacity, all or substantial portions of the Government facilities and services otherwise provided for in this Agreement."[165]

The traumatic experience of the military and intelligence community with the breakdown of the space shuttle and the failures of the ELV 'back-ups' in the 1986 disaster year undoubtedly contributed to the 'me first' letter and spirit of the above clauses. Nevertheless, it conflicted sharply with the prevailing (Presidential and Congressional) mood, as the ensuing amendments to the Act would show.

### *The final DOT-OCST launch licensing regulations of April 1988*

The licensing regulations for commercial launch activities which OCST published on April 4, 1988[166] did not differ much from the interim regulations in force since early 1986. This was partly a result of the Department's close consultation, through COMSTAC, with the launch industry. Also the detailed attention paid to the numerous comments received by OCST on its Policy Statement which preceded the interim regulations and of OCST's growing experience with the launch industry positively affected the quality of the regulations. In addition, OCST observed, "much progress had been made since the interim regulations were published in developing the contractual arrangements covering access of commercial launch firms to

165. See art. XIV a.4. revised agreement, *ibid*.
166. See OCST Licensing Regulations, *supra* note 97.

government-developed launch technology and government-provided safety services."[167] OCST noted with satisfaction the President's Space Policy's "emphasis on commercial launch services as an integral element of the robust transportation capability essential for maintaining [U.S.] space leadership". Observing with concern the potential capacity problems at the national launch ranges caused by the demands of the three space sectors, OCST still tried, in consultation with NASA and DOD, to get a fair share of access to these facilities (on reasonable terms) for the private launch sector commensurate to the latter's new 'official' position. This included 'encouraging' pricing of the facilities and the establishment of "allocation of risk principles and insurance requirements that are appropriate for commercial launch activities conducted at national ranges."[168] Obviously, the revised USAF model ELV agreement had not settled all commercial issues satisfactorily.
The Department of Transportation at the same time remained firmly committed to the concept of deregulation, applied so successfully to domestic aviation and pursued with determination in international aviation relations.[169] And, like aviation, the space transportation industry was to be regulated primarily to guarantee safety of operations, and with as few other administrative burdens as possible.
Thus, the final regulations contained a number of clarifications and simplifications, but no material changes in philosophy or approach or provisions substantially changing the rights and obligations of the industry or others concerned. (Though the planned amendments to the Commercial Space Launch Act of 1984 were at the same time, in April 1988, the subject of Congressional fine tuning, the final licensing regulations could formally only be based on the CSLA as it stood).

Consequently, these licensing regulations:
- continued to apply to all U.S. commercial or non-commercial, manned or unmanned space launches, except launch activities of the U.S. government and amateur rocket activities: the latter, which number annually in the millions, are subject to state and local regulation and self-regulation by the sponsoring organizations concerned;
- maintained, for unmanned launches, the system of two reviews, the safety review and the mission review (commercial manned launches would eventually require different and/or additional reviews);

167. *Id.*, Supplementary information: background.
168. *Id.*, Supplementary information: national space launch infrastructure.
169. In 1978, the U.S. adopted a policy of deregulation of domestic air transport by phasing out government regulation and, *inter alia*, 'sunsetting' the Civil Aeronautics Board. At the same time, the idea of international deregulation and more free competition in the international air transport market was embraced, resulting in the conclusion of more liberal bilateral air transport agreements, see the Airline Deregulation Act of 1978, P.L. 95-504, 92 Stat. 1705 (Oct 24, 1978) and the International Air Transport Competition Act of 1979, P.L. 96-192 [S. 1300] (Feb 5, 1980).

- provided, in general terms, for the possibility of operating a commercial launch site, in a way comparable to the operation of a commercial airport, but without detailed (safety and other) provisions to that effect;
- provided for *mission* approval "unless some element of the proposed launch poses a threat to U.S. national security or foreign policy interests, constitutes a hazard to public health and safety or safety of property, or is inconsistent with international obligations of the [U.S.]" (Sec.411.7 (a))
- provided for *safety* approval, which, in case of the use of a Federal launch range, will ordinarily be given "once the applicant has been accepted by a range or site capable of handling the launch activity proposed." (Sec. 411.5 (b));
- introduced the obligation for the licensee to submit to the Office, in accordance with article IV of the 1975 *Convention on registration of objects launched into outer space*[170] specified information on the vehicle and object launched (Sec. 415.10);
- contained more detailed requirements with respect to the information to be submitted to the Office in support of the license application, particularly safety-related information when it concerned launches from non-Federal or non-OCST-licensed launch sites.[171]

### *Limitation of liability: the 1988 amendments to the CSLA*

The September 1987 hearings on the state of the commercial launch industry, and more in particular the testimony received at that occasion from representatives of the U.S. launch and satellite communications industry, created sufficient concern on the part of members of the House Subcommittee

170. Art. IV para. 1 of that Convention reads: "Each State of registry shall furnace to the Secretary-General of the United Nations, as soon as practicable, the following information concerning each space object carried on its registry:
(a) Name of Launching State or States;
(b) An appropriate designator of the space object or its registration number;
(c) Date and territory or location of launch;
(d) Basic orbital parameters, including: (i) Nodal period, (ii) Inclination, (iii) Apogee, (iv) Perigee;
(e) General function of the space object". See Convention on registration of objects launched into outer space, opened for signature at New York, Jan 14, 1975, U.S. ratification deposited Sep 15, 1976 (TIAS 8467) e.i.f. (for the U.S.) Sep 15, 1976; text in Space law and related docs 1990, *supra* note 112, at 73-80.

171. *Id.*, Appendix [to the licensing regulations] - commercial space launches: information required for applications.
The suggestion of the House Committee on Science and Technology, to introduce license application fees, was supported by OCST, but it took another three years to formalize this administrative detail: Sec. 413.5 (d), providing for the payment of a non-refundable fee of $2,500.00 upon submission of the application, was introduced through an amendment of the regulations, at 56 FR 41068 (Aug 19, 1991).

on Space to introduce legislation addressing the main impediments the industry was confronted with.[172]

The bill and the resulting Act amending the Commercial Space Launch Act of 1984 came into force on November 15, 1988. It adopted a risk-allocation model along the lines of the Shuttle and Ariane arrangements, and, in a number of other ways, improved and strenghtened the position of the commercial launch industry:

*Limitation of liability*

The bill set overall maximum liability amounts and insurance requirements for the launch industry of USD 500 million for third party damage and USD 100 million for government property damage. In that connection and for the purpose of establishing the individual requirements per licensee, the concept of "maximum probable loss" was used. Thus, each licensee had to obtain liability insurance or demonstrate financial responsibility (self insurance) in an amount sufficient to compensate the maximum probable loss as determined for each licensed launch activity by the DOT Secretary, up to an amount not exceeding the lesser of the above figure or the "maximum liability insurance available on the world market at a reasonable cost."[173]

The concept, first proposed by the aerospace industry in a January 1988 position paper, was based on the distinction between (a) the "probable

172. See *To facilitate commercial access to space, and for other purposes*, H.R.3765, 100th Cong., 1st Sess., Dec 15, 1987. The bill was discussed at a second series of the hearings in February 1988, after which a new version, incorporating the comments received from the Administration and the industry witnesses, was drafted (mark-up of April 14, 1988). On April 18, 1988, a clean bill, H.R. 4399, was introduced incorporating the amendments adopted by the Subcommittee. H.R. 4399 was thereupon approved by the full Committee on April 21, 1988, see H.R. CSLA Amendments Report, *supra* note 146. The Senate Committee on Commerce, Science and Transportation considered its own - largely identical - version of the bill, S.2395, on May 13, 1988, and, in the same month, reported favorably on the final draft, see S.Report 100-593, 100th Cong.,2d Sess. (1988), hereinafter referred to as Senate Amendments Report.

173. See Sec. 16. a(1)(A) of the Act as amended: "Each license issued or transferred under this Act shall require the licensee or transferee - (i) to obtain liability insurance, or (ii) to demonstrate financial responsibility, in an amount sufficient to compensate the maximum probable loss (as determined by the Secretary, after consultation with the Administrator of [NASA], the Secretary of the Air Force, and the heads of other appropriate agencies) from claims by a third party for death, bodily injury, or loss of or damage to property resulting from activities carried out under the license in connection with any particular launch. In no event shall a licensee or transferee be required to obtain insurance or demonstrate finacial responsibility under this subparagraph, with respect to the aggregate of such claims arising out of any particular launch, in an amount which exceeds (I) $500,000,000 or (II) the maximum liability insurance available on the world market at a reasonable cost, if such insurance is less than the amount in subclause (I)." An identical text governed the maximum probable loss from claims "against any person by the [US] for loss of or damage to property of the [US]" with a limit of $100,000,000, Sec. 16. a(1)(B).

maximum" loss and (b) the "maximum possible" loss. Where for the former insurance would, in the experience of the industry, in principle be available at reasonable cost, the latter, involving that extraordinary incident which rarely, if ever, occurs, but cannot be totally ruled out, was generally *un*insurable. Therefore, the industry had recommended that the NASA approach be followed to the effect that the commercial party which benefited from the launch would be responsible, through insurance coverage, for what was considered the probable maximum loss resulting from that launch, and the Government would assume the potential but extremely unlikely excess-of-insurance liability risk of the maximum possible loss.[174] Apart from the above, the bill also provided for the licensee to enter into "reciprocal waivers of claims" with its (sub) contractors, customers and (sub) contractors of customers, under which

> "each party to each such waiver agrees to be responsible for any property damage or loss it sustains or for any personal injury to, death of, or property damage or loss sustained by its own employees resulting from activities carried out under the license."[175]

And a further provision authorized the DOT Secretary, on behalf of the U.S. government, its agencies, personnel and (sub) contractors to also enter into reciprocal waivers of claims with the parties involved in the launch. Such an agreement would make each party responsible for the losses, damage or injuries it incurred, to the extent that claims exceeded the insurance for government property damage (of at most USD 100 million).

The bill required the respective insurance policies of the private parties concerned to protect the U.S. government and its agencies (by naming these authorities as co-insured) *at no cost to the U.S.* Thus, one could say, the *quid pro quo* was: the U.S. government was, together with the industry, protected through insurance against the financial consequences of maximum probable loss, and the industry was protected by the U.S. Government against any losses insofar as they exceeded those maximum insured amounts.
The original bill, approved by the House, provided for government liability for the excess above the insured amount without any limitation whatsoever. In view of the unlimited State liability for damage caused by space objects contained in the Space Liability Convention of 1972, this made perfect sense. Nevertheless, the administration, as we saw above, had different views on the matter and preferred legislation which would only place a cap on non-economic damages. To assume all liability above a certain amount in its view amounted

174. See *U.S. commercial space transportation risk allocation and insurance* - an AIAA position paper, January 1988, reprinted in 16 (1) J. Space L. 110-115 (1988).
175. See Sec. 16(a)(1)(C).

to a form of unwarranted government subsidization of the launch industry which could trigger requests for similar treatment from other industries.[176] Faced with the possibility of a veto of the whole bill because of this particular aspect, the Senate approved two amendment to the bill, one which limited the government's indemnification exposure to USD 1.5 billion per incident and another which would terminate the indemnification authority of the government five years after its enactment, *i.e.* on November 15, 1993.[177] The two amendments re-introduced, at least to some extent, elements of uncertainty into the indemnity regime. First, the total amount of damage to third parties 'insured' for the launch industry was thus established at USD 2 billion. This implied that compensation for any damage exceeding that amount would have to be paid by the industry again. Though the risk can be seen as rather theoretical, it is there, and cannot be totally ignored. Secondly, though the U.S. aerospace industry, encompassing both the satellite manufacturers and the launch industry, would probably be able to mount an effective counterattack to any Presidential or Congressional intent not to extend the above indemnification scheme, the provision introduced the explicit possibility for a change in the system - and thus uncertainty for the industry - in the period after November 1993. (Congress did extend the above termination date to January 1, 2000).[178] The legislation contained yet another element of uncertainty with respect to the payment of claims by the government: in any such case (where the government indemnification scheme will likely become effective), the President will have to submit a "compensation plan" to Congress, which will be acted upon by the Senate. Whether or not, and if so to what extent the Senate will support this compensation plan is difficult to predict. The Act as amended states,

> "[t]o the extent provided in advance in appropriations Acts or to the extent there is enacted additional legislative authority to provide for the payment of claims as submitted in the compensation plan outlined in paragraph (4), the Secretary shall provide for the payment by the [U.S.] of successful claims ... of a third party against the licensee ..."

and requires for a compensation plan, in paragraph 4, that it

176. See Trippett, *supra* note 94, at 53-54.
177. Sec. 16 (b)(1): the amount of $1.5 billion may be increased with additional sums necessary to reflect inflation occurring after January 1, 1989. Sec. 16 (b)(5) provides the following 'sunsetting' language with respect to government indemnification: "The provisions of paragraphs (1) through (4) shall apply only to each license issued or transferred under this Act for which a complete and valid application has been received by the Secretary prior to the date that is 5 years following the date of enactment of the [CSLA] Amendments of 1988".
178. By Publ. L. 102-588, Sec. 503 (NASA Authorization Act FY 1993) (Nov. 4, 1992). The subject provision was recodified at 49 USC Sec. 70113(f) (Title 49, 'Transportation', as revised by Publ. L. 103-272 (July 5, 1994).

"(i) outlines the aggregate dollar value of such claims; (ii) recommends sources of funding to pay for these claims; and (iii) includes any legislative language required to implement the compensation plan or plans if additional legislative authority is required."[179]

As one author remarked with respect to the effect of the above provisions, "the amended Act does not compel the Congress to comply with the undertaking to indemnify. As a result, any incident that triggers the possibility of indemnification must be considered at the time with no assurance now that it would actually be forthcoming."[180]

*Preemption*

The Amendments addressed a number of other concerns of the industry (and of DOT), one of which was the possibility for the government agency concerned to 'preempt' the commercial launches from the launch facilities. Although in the revised USAF model ELV commercialization agreement the 'absolute' right of preemption had been deleted, the government's priority in the use of its property and support services "to meet national security interests or U.S. government mission requirements" had been retained (without any liability on the part of the government for any consequential damages). The government's reaction to the shuttle accident had shown the serious consequences of these provisions for the launch industry and the shuttle clients. And these injured private parties had made their views heard at the hearings, resulting in a provision in the bill which tightened the criterion to be met to justify a preemption and contained 'stern' follow-up obligations for the agency concerned:

-the bill prohibited government preemption of agreed licensed commercial launches, "except in cases of imperative national need.";

-only the Secretary of Defense or the NASA Administrator could make such a determination of imperative national need, in consultation with the DOT Secretary, with no delegation possible;

-the same high officials were to report to Congress within 7 days after any such determination, with "an explanation of the circumstances justifying such determination and a schedule for ensuring the prompt launching of a preempted payload"[181]

The original bill introduced in the House also contained a provision which would have obliged the preempting agency to pay a predetermined amount of liquidated damages included in the license, in the event the preemption did not take place because of an imperative national need. This provision was later deleted. The proposal did however evidence the clear intention of Congress

179. See Sec. 16 (b)(1) and 16 (b)(4)(B) respectively

180. See Peter D. Nesgos, *Commercial space transportation: A new industry emerges*, 16 Annals Air & Space L. 393-421 (1991) hereinafter referred to as Peter Nesgos 1991, at 412.

181. See Sec. 7 of the 1988 Act, amending Sec. 15(b) of the CSLA, by adding new para. (4)(A).

that commercial customers "should not be faced persistently with second class status."[182]
The Amendment in its final version did provide the licensee preempted from access to a launch site or launch property with the guarantee that he would not have to pay to the U.S. "any amount for launch services solely attributable to the scheduled launch prevented by such preemption.", presumably meaning: no bills have to be paid by the launch provider for the services rendered by the agency concerned until and including the preemption.[183]

*Incentives to 'bumped' shuttle customers*
As discussed above, the House Committee felt very strongly about the 'nonchalant' way in which the 44 shuttle launch contracts had been dealt with by the government in the aftermath of the Challenger accident. To restore the confidence of the industry in the government as a *bona fide* contract partner, Congress agreed on a number of special measures for those 22 shuttle customers whose satellites were under construction at the time of the President's policy decision:
First, for the commercial launch of these so-called "eligible satellites" (by U.S. private launch provider) the requirement to take out insurance for government property damage was waived ; secondly, the customers concerned would not have to pay for the government (launch range etc.) support services provided in connection with the commercial launch of an eligible satellite.
The term "eligible satellite was defined" as

"... a satellite that-
(1) was under construction on August 15, 1986;
(2) was the subject of a launch services agreement or contract with [NASA], which as of August 15, 1986, was in effect and not yet carried out; and
(3) is licensed for launch under the Commercial Space Launch Act ..."[184]

The 'direct cost' of the above government launch support services were calculated by NASA and the Air Force to range between USD 1 and 3 million, depending on the type of launch vehicle used. The Congressional Budget Office (CBO) assumed that, of the 22 eligible satellites, some might never be launched and others would use foreign launch firms. (Gu)estimating that some 8 satellites would indeed be launched from government ranges, the CBO expected the federal government to lose receipt of roughly USD 10 million

182. See Trippett, *supra* note 94, at 53.
183. Yelton, *supra* note 120, has a different interpretation: "... the launch provider is not required to pay for any *additional* launch services.", at 135 (emph. add.).
184. See Sec. 6(a)-(c), CSLA Amendments 1988, *supra* note 103, amending Sec. 16, CSLA.

over the next two years, the price of its largely symbolic gesture vis-à-vis the shuttle customers.[185]

*Development of international guidelines on market access and competition*

The Congressional hearings had brought an acute awareness on the part of the legislators of the various ways in which foreign launch providers, incumbent and prospective, subsidized and assisted their launch industries. In that connection, both the European practices (see also the findings in the TCI case) and Soviet and Chinese appeals to sell launch services to the West were noted with concern. (In 1987-1988 both China and the Soviet Union had already offered their services to manufacturers and operators of U.S.-built satellites; the national security, foreign policy and commercial ramifications thereof would lead to intense internal (inter-agency) discussions and, in autumn 1988, to Congressional hearings on the matter. This will be discussed in the next Chapter).

The latter competitive threat to the U.S. launch industry revealed, in the view of the House Committee, a real need to develop a Western policy toward the use of non-western launch services. "Unless U.S. decisions are made in an international context, U.S. launch vehicle and satellite industries may lose opportunities involving western commercial satellite competition."[186]

Put differently, a U.S. launch policy vis-a-vis China and the Soviet Union could be rendered ineffective if Europe did not concur with and support that policy. And some international guidance on competitive launch practices was also called for. Hence the inclusion of a new Section in the Act which expressed the sense of the Congress that the U.S.

"should explore ways and means of developing a dialogue with appropriate foreign government representatives to seek the development of guidelines for access to launch services by satellite builders and users in a manner that assures the conduct of reasonable and fair international competition in commercial space activities."[187]

*The resulting regulatory environment*

The clear division of U.S. space activities, introduced by the U.S. president in 1988 and supported by Congress, into two main sectors, the governmental (civil, and national security) and the non-governmental commercial space sector, had thus led to distinct launch policies for each sector.

U.S. government launch needs would be met by the mix of vehicles available, *i.e.*, at the choice of the agency concerned, the shuttle (operated by NASA),

185. See H.R. CSLA Amendments Report, *supra* note 146, at 22.
186. See *id.*, at 17.
187. See Sec. 9 "Commercial space launch service competition" CSLA Amendments 1988.

government ELV's (owned and operated by DOD) or the private launchers (ELV's owned and operated by the U.S. private launch industry).
As all civil government agencies were directed to use the ELV services of the industry or of DOD as much as possible, the launch industry continued to compete with both NASA and DOD, *but only in the government payload market*. Congress, in 1990, went a step further by adopting legislation which required NASA "to purchase launch services for its primary payloads from commercial providers whenever such services are required in the course of its activities".[188] (The above provision, directed only at NASA, was expanded by the Commercial Space Act of 1998 (H.R. 1702), passed by Congress on October 9, 1998, to cover *Federal* (*i.e.* including DOD) acquisition of space transportation services. The relevant provisions will be reviewed in Chapter 3.4.4 *infra*.
The international and domestic commercial payload market remained out of bounds for these government agencies. The U.S. private launch industry had thus to contend only with its successful foreign competitor Arianespace.
The CSLA Amendments of 1988, providing for limited liability, for the use of government facilities and services on a "direct cost" basis, and for governmental restraint in preempting commercial launches, had, to a large extent, levelled the playing field. What remained was the clear headstart of Arianespace in the international commercial market built up in 5 years of agressive marketing in competition with the space shuttle.
What remained also was the right of the government not to grant, *c.q.* to revoke or suspend, a commercial launch license for reasons of national security or foreign policy. The combination of this right with existing satellite and missile (technology) export controls had major consequences for both the U.S. launch and the U.S. satellite manufacturing industry, and would play an important role in the competitive relations with all, but particularly the new, foreign launch providers.

## 2.3 Satellite and missile technology export controls: effects on launch market access

### Introduction

"... nonproliferation of weapons of mass destruction and missiles is central to our national security strategy. I think there is no higher priority on the President's agenda or that of the

188. See Launch Services purchase Act of 1990, Sec. 201-205, Pub.L. 101-611 (NASA Authorization Act 1991 (Nov 16, 1990). The congressional findings (Sec. 202) contain pro-competitive and pro-(US) private enterprise language including: "(3) the interests of the [U.S.] will be served if the commercial launch industry is competitive in the international market place; (4) commercial vehicles are effective means to challenge foreign competition; ... (8) predictable access to [NASA] launch markets would encourage continuing [US] private sector investment in space and related activities".

Secretary of State or the Secretary of Defense and others than to impede the flow of dangerous technologies around the world and to prevent the acquisition of nuclear, chemical, or biological weapons or missiles by more countries. That means both strenghtening the global regimes--the treaties and supplier regimes that constrain those technologies. Also it means detailed, day-by-day enforcement on the ground, and we're very active in both areas.[189]

The above statement, made in early 1998 by a senior State Department official, succinctly sums up the worries and corresponding responsibilities felt by the U.S. government since the end of the cold war. Similarly, the International Strategic Plan published by the Department in September 1997 lists the foreign policy goals of the U.S., mentioning first of all the goal to "[s]ecure peace ; deter agression; prevent, defuse, and manage crises; halt the proliferation of weapons of mass destruction; and advance arms control and disarmamant."[190] Hence, those countries which, for various reasons, are seen as posing a threat to U.S. security, should not be able to obtain any arms, whether the above weapons of mass destruction or advanced conventional weapons or the technology to make, or improve the effectiveness of, those weapons, including advanced computer hard and soft ware and encryption. Of course, the 'enemy' of today is not the same as yesterday's nor is the weapons' provider the same over the years.

In early 1998, Iraq, North Korea and Iran were identified by the State Department as countries trying to acquire weapons of mass destruction and their delivery systems and/or the technology to build these weapons and systems. India and Pakistan belonged to the same category. Russia and China were seen as countries of concern because of their role as producers and suppliers of such weapons (technology) to the above countries. According to the State Department:

"... very real concerns persist about the porosity of Russia's military-industrial infrastructure and the prospect for unauthorized transfers of materials, equipment, know-how, and technologies. The leakage of missile technology and expertise from Russia's industries to Iran has underscored this serious proliferation concern."[191]

189. John Holum, Acting Under Secretary for Arms Control and International Security Affairs, *Special briefing on trip to China* (Apr 9, 1998) <http://www.state.gov/www/policy_remarks/1998/980409_holum_china.html>, hereinafter referred to as Holum briefing, at 1.

190. See Phyllis E. Oakley, Ass. Secretary of State for Intelligence and Research, *Assessing current and projected threats to U.S. national security*, Testimony before the Senate Select Committee on Intelligence, 1-14 (Jan 28, 1998) <http://www.state.gov/www/policy_r.../1998/980128_oakley_security.html>, hereinafter referred to as Oakley testimony, at 1.

191. See *id.*, at 3.

The legal means used by the U.S. to prevent such unauthorized transfers involving the above countries, including re-exports of U.S. origin items from foreign destinations to third countries, are of a domestic and international character. U.S. laws originating from the cold war period and multilateral arrangements of the U.S. and its friends and allies, both regularly updated and adapted to changes in geopolitical and military/security circumstances, try to stem the flow of weapons around the world, with particular attention being paid to specific (categories of) countries and to specific uses, the so-called "end-users or end-uses of concern".
The effectiveness of the national export control regulations is enhanced by their being maintained as part of *multilateral* control arrangements. In turn, the multilateral arrangements create the need for (amendments to) national laws on the subject. Well-known arrangements in this connection are the *Nuclear Suppliers Group*[192], the *Australia Group* (chemical and biological weapons),[193] the *Coordinating Committee for multilateral export controls*

192. The Nuclear Suppliers Group (NSG) was formed on the initiative of the U.S., following the 1974 nuclear explosion by India. The primary purpose was to ensure that suppliers uniformly applied a comprehensive set of guidelines to ensure that nuclear cooperation did not contribute to proliferation, and to involve a key supplier and non-member of the Nuclear Nonproliferation Treaty, France. By early 1978, when its guidelines and control list were published, NSG membership had grown to 15 countries. The NSG did not meet throughout the 1980s, but resumed doing so in 1991, with annual meetings taking place since then leading to a strengthening of controls and a membership of 34 at the end of 1996. In 1992, spurred on by revelations about Iraq's illicit nuclear weapons program, the NSG adopted controls on nuclear-related dual-use goods, for example those with both nuclear and non-nuclear applications, that could make a major contribution to unsafeguarded nuclear activities or to nuclear explosive activities. NSG cooperates with the International Atomic Energy Agency, which publishes the former's guidelines, incl. "Guidelines for transfers of of nuclear-related dual-use equipment, material and related technology", see *Multilateral nuclear export control regimes*, ACDA fact sheet, <http://www.acda.gov/factshee/exptcon/nuexpcnt.htm > (Dec 17, 1996).
193. The Australia Group (AG) is an informal forum of states, chaired by Australia, whose goal is to discourage and impede chemical weapons (CW) and biological weapons (BW)(together CBW) proliferation by harmonizing national export controls on CW precursor chemicals, BW pathogens, and CBW dual-use production equipment, sharing information on CW proliferation developments, and seeking other ways to curb the use of CBW; these actions are complementary to provisions of the 1925 Geneva Protocol, the 1972 Biological and Toxins Weapons Convention, and the 1993 Chemical Weapons Convention. The Group was formed in 1984 as a result of CW use in the Iran-Iraq War. Membership in late 1996 came to 30 states: Argentina, Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, U.K. and U.S. The European Union also participates in the meetings. The Group has no charter or constitution and operates by consensus. The Group has established common export controls for chemical and biological weapons nonproliferation. For CW, members of the AG control 54 chemical precursors as well as specified CW-related production equipment. For BW, members have established export controls on certain micro-organisms, toxins and equipment that could be used in a BW program. The Group has issued an informal "warning list" of dual-use CW precursors, bulk

(Cocom) and its successor the *Wassenaar Arrangement* (conventional weapons and 'dual-use' goods and technologies) and the *Missile Technology Control Regime* (MTCR).
The application of these unilateral and multilateral regulations has had a continuing - in some ways unintended and undesirable - effect on the trade in launch services in cases where either the payload or the launch vehicle, or component thereof, happened to fall under any of the above regimes.
The discussion hereafter will focus in particular on the interaction between pertinent U.S. laws, policies and practices and the Cocom, Wassenaar and MTCR arrangements, and on their combined effect on the launch trade.

### *2.3.1 The export controls of the Department of State and Commerce*

#### *2.3.1.1 The International Traffic in Arms Regulations and the U.S. Munitions List*

The Arms Export Control Act of 1976 (AECA or the Act)[194] authorizes the U.S. President to control the export and import of so-called defense articles and defense services. The Act establishes the principle that licensing decisions with respect to these articles and services, also traditionally referred to as "munitions", are to be made "in furtherance of world peace and security and foreign policy of the United States". In other words, the respective licensing decisions should not be based primarily on commercial or business interests, but on foreign policy and national security grounds. The rationale for this approach is a simple one: thou shalt not arm thy (tomorrow's) enemy!

The statutory authority of the President to promulgate regulations in this respect was delegated to the Secretary of State[195] and on that basis, the Department of State issues the so-called *International Traffic in Arms Regulations (ITAR)*[196] which contain export licensing provisions and a

chemicals, and CW-related equipment. Members develop and share the warning list with their chemical industry and ask it to report on any suspicious transactions. Within the State Department, the Arms Control and Disarmament Agency (ACDA) participates in U.S. delegations to bilateral discussions, to the annual AG plenary meetings in Paris, and to periodic meetings of technical experts, as well as in the internal policy process of the U.S. government, see ACDA Annual Report 1995, Chapter 6 <http://www.acda.gov/reports/chap6.htm>.

194. See Sec. 38, Pub. L. 94-329, 90 Stat. 729 (Jun 30, 1976), 22 U.S.C. 2778.
195. See Executive Order No. 11,958, 42 Fed. Reg. 4,311 (1977).
196. ITAR, November 1989, based on Dept Reg 108.840, 49 FR 47684, Dec 6, 1984, Department of State Publication 9793, Bureau of Political-Military Affairs, 22 CFR 120-130 hereinafter referred to as ITAR 1989; amended in 1993, Part II, 58 (No. 139) FR 39279-39326 (Jul 22, 1993), hereinafter referred to as ITAR 1993; amended in 1996, 61 FR 48830 (Sep 17, 1996), hereinafter referred to as ITAR 1996. For the March 1999 ITAR amendments, see Ch. 4.1.2.4.

description of the defense articles and services concerned. Designations of defense articles and services are based primarily on whether an article or service is deemed to be *inherently military* in character or has a predominantly military application. The fact that an article or service may be used for both military and civilian purposes ("dual-use") does not in and of itself determine whether it is subject to the ITAR export controls.

*Designation*

Such designations are made by the Department of State with the concurrence of the Department of Defense. The items so designated constitute the United States Munitions List (USML).[197] If an article is placed on the Munitions List, its export is regulated *exclusively* by the Department of State. The above regulations are primarily administered by the Director of the *Office of Defense Trade Controls (ODTC),* formerly the Office of Munitions Control within the Bureau of Political-Military Affairs of the Department.[198]

197. See ITAR 1989 *supra* note 196 Part 121.

198. The Bureau of Political-Military (formerly Politico-Military) Affairs (PM), which reports to the Under Secretary for Arms Control and International Security Affairs, advises the Secretary and other Department principals on security and defense issues worldwide, including arms control negotiations, non-proliferation of weapons of mass destruction and the means to deliver them, regional security arrangements, programs for selected foreign security assistance, conventional arms sales, peaceful uses of nuclear energy and nuclear reactor safety, dual use and technology transfers, and international space issues involving military systems and controlled technologies. The Bureau is also responsible for licensing and regulating commercial exports of military equipment and services, see the U.S. Department of State: Structure and organization, released by the Bureau of Public Affairs, May 26, 1995 <http://www.state.gov/www/about_state/dosstruc.html (23-4-98)>
Prior to an internal reorganization of State in 1993, PM shared its responsibilities with other Bureaus within State such as the Economic Bureau and the Bureau of Oceans, Environment and Science, for nuclear, 'dual use' (see later) and other export controls. The reorganization brought all the above responsibilities together under PM, further increasing its export licensing work load (in 1993, it was already the major processor of such licenses within the government, with 50,000 'munitions' licenses per year versus 26,000 licenses at Commerce). The 1993 changes also reflected a reorientation in export control priorities for strategic trade, from the old NATO versus Warsaw Pact focus to the new emphasis on regional security and non- proliferation.
The State Dept wields considerable, and often decisive power over (international) space policy and space relations with foreign countries. As a result, clashes with other departments and agencies which also have responsibilities in the space field, such as DOT, Commerce, Defense and NASA, are not uncommon. The issue of (the application of) export controls is one on which Commerce and State have frequently disagreed, see 4 (3) Space News (Jan 1993) at 4, 8, 21, and *infra*. As a result thereof the latter Dept put gradually more emphasis -in spirit and procedure - on finding a better balance between its interest in the prevention of exports that might contribute to proliferation on the one hand and the promotion of legitimate exports that help US industry and the economy on the other hand. Commerce, traditionally, and notwithstanding its own tasks in the field of export controls, had a stronger focus on export promotion.

Again, the Department of State determines -but not without having consulted an inter- agency panel in which Defense plays a crucial role and, when it is a space item, also NASA - whether an article or item will be placed on the Munitions List or, as a somewhat lesser or more debatable risk to national security, should be put on the Department of Commerce's "dual-use" Commodity Control List or Commerce Control List (CCL), bringing the commodity concerned under the export control regulations of the latter Department and its Bureau of Export Administration (BXA). (See para. 2.3.1(ii) hereafter).

*Commodity jurisdiction*

If an exporter is in doubt about the character of his product and about the proper licensing authority he may request the Office of Defense Trade Controls to provide a determination on that product.[199] ODTC will, if necessary, consult with other agencies concerned (Defense and Commerce) and then make a jurisdictional determination. A company may use the same procedure to ask that an item or product be moved from State Department to Commerce Department jurisdiction.(Such removal of an item from the USML to the CCL is a matter for Congressional review!) ODTC regularly publishes overviews of commodity jurisdiction determinations to provide general guidance to industry.[200]

Defense *articles* on the Munitions List include: *rockets, launch vehicles, spacecraft, including manned and unmanned, active and passive satellites and non-military communication satellites*, space electronics, launching and guidance equipment and all components, parts, accessories, attachments and associated equipment specifically designed or modified for the above items.[201] (On the removal from the USML, and subsequent re-introduction into the List, of commercial communications satellites, see *infra*, Ch. 4.1.2.4).

Defense *services* are defined as:

a) the furnishing of assistance, including training, to foreign persons in the design, engineering, development, production, processing, manufacture, use, operation, overhaul, repair, maintenance, modification, or reconstruction of defense articles, whether in the United States or abroad; or
b) the furnishing to foreign persons of any technical data, whether in the United States or abroad.

199. See ITAR 1996 *supra* note 196 at Sec. 120.4.
200. See Defense Trade News, quarterly of the Bureau of Political-Military Affair, Dept of State, *passim*.
201. ITAR 1989, *supra* note 196 at Sec. 121.1.

"technical data" in this connection means *inter alia* classified information relating to defense articles and defense services and any information directly related to the design, engineering, development etc. of defense articles, including for example information in the form of instructions, computer software and documentation).[202]

Export, in ITAR terminology, means sending or taking defense articles or technical data outside of the United States in any manner, disclosing or transferring technical data to a foreign person, whether in the United States or abroad, the performance of a defense service on behalf of, or for the benefit of, a foreign person, whether in the United States or abroad, or "*transferring registration, control or ownership to a foreign person of any ... satellite covered by the United States Munitions List, whether in the United States or abroad*; ..." (emph. add.)[203]

The launch of a U.S. satellite *outside* the United States is therefore impossible without specific authorization from the Office of Defense Trade Controls in the form of an export licence. For that purpose, companies in the U.S. engaged in the business of either manufacturing or exporting defense articles or furnishing defense services are required to register with that Office. Such registration provides the Government with necessary information on who is involved in certain manufacturing and exporting activities and is generally a precondition to the issuance of any license or other ODTC approval.[204]

Prior to 1984, the year in which the Commercial Space Launch Act was passed, the Department of State, under the above definitions of *defense articles, defense services* and *export*, claimed that launches *from U.S. territory* also required an export license under the ITAR, provided the rocket left the (air space over the) three mile territorial waters. The primary reason for the State Department to apply the above regulations at the time, and for the other Departments to accept that role, had less to do with arms export control than with the Department's statutory responsibility for ensuring that the United States complied with its international obligations under the various treaties with respect to the exploration and use of outer space. Uncertainty, both on the part of the private launch industry and of the various governmental agencies concerned, about the rules to be applied and the agencies to be involved, also played a role.[205] Thus, the State Department employed the "export"

202. See ITAR 1989, *supra* note 196 at Sec. 120.8, 120.21).
203. See ITAR 1996 *supra* note 196 at Sec. 120.17; the 'ownership' criterion did not appear in the ITAR 1989.
204. ITAR 1989, *supra* note 196 at Sec. 122.1.
205. See Steptoe 1984, *supra* note 60, at 193: "No agency, however, appeared to have direct responsibility for licensing the actual launch. Consequently, a decision was made by members of a senior interagency group on space, operating under the aegis of the National Security Council, to rely upon the Department of State's authority under [Sec 38 of the

construction even though the Arms Export Control Act and the Munitions List were originally promulgated before rocket flight became a reality. The legality of requiring an export licence for private launches from a U.S. launch site was therefore questioned at the time (though a costly, lengthy challenge to the authority of State was not encouraged).[206]

The issue was resolved with the passing of the Commercial Space Launch Act in 1984, which made the D.O.T. the sole launch licensing authority within the federal government. In particular, Sec. 23 (a) of that Act (headed "Relationship to other law") provides: "A launch vehicle shall not by reason of the launching of such vehicle, be considered an export for purposes of any law controlling exports."
In December of the same year, the State Department revised its regulations to provide expressly that a *launch* in itself is not considered an export under the ITAR.[207]

The ITAR designate all launch vehicles, rockets and missiles and all spacecraft, including electronic equipment specifically designed or modified for spacecraft or spaceflight as "significant military equipment" (SME), *i.e.* articles for which special export controls are warranted because of their capacity for substantial military utility or capability. *Non-military communication satellites* are specifically excluded from this designation.

*Prohibited exports and sales to certain countries*
The Regulations single out a number of (categories of) countries for 'special' treatment. Thus,

AECA and the ITAR], as the umbrella authority under which the Federal Government would discharge its international and municipal legal obligations to authorize and supervise the proposed launch." DOT's Office of Commercial Space Transportation referred to the "uniqueness and urgency of the proposed launch" as the reason for SIG (space) to decide that ELV launches would be considered "exports" and thus be subject to ITAR. Utilization of ITAR was seen as an appropriate, though temporary, expedient for addressing most of the domestic and international issues raised by these launches. But OCST also noted that, as a regulatory apparatus for authorizing and supervising commercial launch activities, the ITAR proved to have significant limitations as none of the Federal agencies involved had developed either procedures for reviewing launch applications or criteria for granting approval. "As a result, the first private launch applicant was subjected to duplicative reviews and other complications that prolongued the licensing process", see DOT Policy Statement, *supra* note 92, at para. 3, Background.

206. On the various regulatory and political aspects of this question, see Chapter 2.2.1 and Myers 1984, *supra* note 62, at 47-48; Webber 1984, *supra* note 13, at 13-15; Straubel 1987, *supra* note 76, at 947.

207. See William B. Wirin, *U.S. restrictions on space commerce,* Proceed. 33d Colloq. L. Outer Space 120-132 (1990) hereinafter referred to as Wirin, at 121. ITAR 1996 *supra* note 196 Sec. 120.10 sub (e) now reads (in part): "A launch vehicle or payload shall not, by reason of the launching of such vehicle, be considered an export for purposes of this subcharter".

"it is the policy of the United States to deny licenses and other approvals with respect to defense articles and defense services destined for or originating in certain countries or areas. This policy also applies to exports to and imports from these countries or areas."

ITAR 1989 mentioned the following such countries, all belonging to the (then) Communist bloc: Albania, Bulgaria, Cuba, Czechoslovakia, East Germany, Estonia, Hungary, Kampuchea, Latvia, Lithuania, North Korea, Outer Mongolia, Poland, Romania, the Soviet Union and Vietnam. The above policy also applies to countries with respect to which the U.S. maintains an arms embargo, *e.g.* (in 1989) Angola, or "whenever an export would not otherwise be in furtherance of world peace and the security and foreign policy of the [U.S.]". Two other countries subjected to an arms embargo received special mention, namely South Africa, by virtue of a U.N. Security Council Resolution against apartheid, and Chile. Finally, the category of countries "that have repeatedly provided support for acts of international terrorism" was represented by Cuba, Iran, Libya, Syria, South Yemen and North Korea.[208] Though absent in ITAR 1989 from the above categories of countries, China, after the Tiananmen square incident, was also subjected to special export controls.

Depending on the developments within and relations with these countries, their names will disappear from this list, or new countries will be added as they become subject to the denial, suspension or revocation of licenses to export to them. For instance, in 1993 the State Department terminated the arms embargo against Angola, and the ITAR was amended accordingly. Similarly, in 1992, Liberia was included in the category of embargoed countries, resulting in a suspension of all Department of State export licenses, in compliance with a U.N. Security Council Resolution instituting a general complete embargo on all deliveries of weapons and military equipment to that country. The State Department, in 1993, clarified that the arms embargo imposed against South Africa in 1977 included the so-called "independent" homelands. And new export restrictions were imposed on Nigeria "to underscore the importance the [U.S.] attaches to an orderly and timely transition to unhindered elected civilian government, as well as to respect for human rights."[209] The end of the cold war also ended 'special treatment' for former Communist countries such as the Czech Republic, the Slovak Republic, Albania, Estonia, Latvia, Lithuania and Romania: as from early 1994, the State department would consider applications for the export of defense articles and services (USML items) to these governments on a case-by-case basis.[210] The

208. ITAR 1989, *supra* note 196, Sec. 126.1.

209. See 4 (3) Defense Trade News (1993) at 7(Angola), 3 (4) Defense Trade News (1992) at 6 (Liberia), (1-2) Defense Trade News (1993) at 5 (South Africa, and 7 (1) Defense Trade News (1996) at 2 (Nigeria). Such amendments of ITAR will be published in the Fed. Reg.

210. See 5 (2) Defense Trade News (1994) at 17. As of June 26, 1994, the list of countries which were subject to ITAR export proscriptions or restrictions still numbered 36, including

focus of attention/concern has thus moved from the traditional 'east bloc' countries to - roughly - the "terrorist countries", the countries subject to U.N. embargo, countries presenting human rights concerns, countries selling arms to areas of conflict, and to countries aiming at regional dominance. (The country pairs Iraq/ Iran and India/ Pakistan would, *inter alia*, belong to the latter category, but these countries individually are also listed under other categories).[211]

*Suspension or modification*
In the interest of the security and the foreign policy of the U.S., the Director of the Office of Defense Trade Controls "may order the temporary suspension or modification of any or all of the [above] regulations ..." And exceptions to the above provisions can be made by the above State Department official "[i]n a case of exceptional or undue hardship, *or when it is otherwise in the interest of the United States Government* ..."[212] (emph. add.)

The latter clause gives the Department and the President considerable discretion to deviate from the letter and intent of the ITAR and take export license decisions (partly) on other than national security grounds. As we will see later (in the respective chapters on the U.S.' launch trade relations with Russia and China) this frequently happened.

*Congressional notification process*
The Arms Export Control Act requires the President (who has delegated this task to the Secretary of State) to notify the Congress of certain export license applications at least 30 days prior to their approval. This provides Congress with an opportunity to review these specific transactions, and to enact a joint resolution or pass a law to prohibit the issuance of a license. If no such action has been taken by Congress, the Director of ODTC may issue the license on the 31st day. The Act delineates which cases require Congressional notification:
- all exports of defense articles or services with a value of USD 50 million or more; and
- all exports of Major Defense Equipment (MDE) with a value of USD 14 million or more.

The Act defines MDE as Significant Military Equipment (SME, *i.e.* articles for which special export controls are warranted because of their capacity for

Russia and a number of former Soviet republics, China, Mongolia, Iraq and the other above 'terrorist' states, Nigeria, South Africa and Zaire etc., see 5 (3) Defense Trade News (1994) at 12.

211. See ITAR 1996, *supra* note 196, Sec. 126.1 and 7 (1) Defense Trade News (1996) at 6-8.

212. *Ibid*, Sec. 126.2 and 3 respectively.

substantial military utility or capability) "having a one time research and development cost to the U.S. Government of $50 million or more, or a total U.S. Government procurement cost of $200 million or more."[213]
To the category of Significant Military Equipment belong all launch vehicle and missile systems, aircraft with missile launching equipment and all spacecraft and spacecraft equipment, except non-military communications satellites.[214]
As will be discussed later, in Chapter 3.1., this provision of the Act was applied in 1988 to the license application for the export of two U.S.-built telecommunications satellites to China, for launch on the Long March launch vehicle, which led to Congressional hearings on the matter.

*Debarment*
Violation of the (conditions of the) AECA may result in a fine and/or imprisonment and also in an exporter's "debarment", *i.e.* a prohibition from participating directly or indirectly in the export of defense articles, including technical data or in the furnishing of defense services for which a license or approval is required; the debarment is generally for a period of 3 years, and such a decision will be published in the Federal Register.[215]

213. See Sec. 36(c) and 47(6) AECA *jo.* Sec. 123.15 ITAR 1996; similar definitions of SME and MDE have also been included in ITAR 1996, in Sec. 120.7 and 120.8 respectively. "Special export controls" for SME include the need for Congressional approval, and, a.o., a special provision in agreements relating to the transfer of such SME which obliges the foreign consignee and end-user, and, if these are private parties, the foreign government to certify that the SME defense article will not be reexported to a third country without prior approval of State, see Sec.123.10 ITAR 1989. Even a proposal or presentation to a foreign person for the purpose of selling SME has to be notified to and approved by ODTC in advance, see *id.*, at Sec. 126.8).
214. See *id.*, at Sec. 121.1. All applications for so-called Technical Assistance Agreements (TAA) and Manufacturing License Agreements (MLA) involving the the manufacture of SME or MDE of a certain minimum value for or in a foreign country also have to be certified to Congress for review purposes, see Sec. 36(d) AECA and Sec. 124.11, ITAR 1996. An MLA is an "agreement (*e.g.*, contract) whereby a U.S. person grants a foreign person an authorization or a license to manufacture defense articles abroad and which involves or contemplates (a) the export of technical data ... of defense articles or the performance of defense services, or (b) the use by the foreign person of technical data or defense articles previously exported by the U.S. person." TAA is an "agreement (*e.g.*, contract) for the performance of defense services or the disclosure of technical data, as opposed to an agreement granting a right or license to manufacture defense articles.", Sec. 120.21 and 120.22 resp., ITAR 1996 *supra* note 196.
215. See Sec. 127.3 and 127.7, ITAR 1996; lists of debarred persons are also published in Defense Trade News, *passim*).

*Communications satellites*
The fact that all satellites were included in the USML, with the State Department controlling their export from the United States, put a national security and foreign policy 'brake' on the sale (and re-sale)[216] of U.S. satellites to foreign satellite operators, not only if launched by a U.S. firm from U.S. territory but also, and of particular relevance to our subject, if to be exported for launch by a foreign launch firm from the territory of a foreign country. The interdepartmental question and the concern of the industry in the course of the years was not so much whether the export of a non-military communications satellite should be subject to certain governmental controls, but whether these controls should remain in the hands of the State Department or rather be a matter for the Commerce Department.[217]
With the latter in the 'driver's seat', the industry increasingly felt that, though national security and foreign policy considerations would always continue to play a role in export licensing decisions, there would be a stronger pro-industry bias, at least mitigating (and possibly even neutralizing) the restraints and uncertainties caused by the State Department's foreign policy 'imprint'. The export controls of the Commerce Department do not apply to "arms" or "munitions" but to "*dual-use*" items, to some extent already a psychological difference both for the regulator and the regulated.

Finally, another provision of concern to U.S. exporters of space defense articles and services in the ITAR is entitled "Denial, revocation, suspension, or amendment of licenses and other approvals." It provides, in part, that "[a]ny application for an export license or other approval ... may be disapproved, and any license or other approval or exemption *may be revoked, suspended, or amended without prior notice whenever: (1) The Department of State deems such action to be in furtherance of world peace, the national security or the foreign policy of the United States, or is otherwise advisable;* ..."[218]
From the point of view of arms control, this clause may be justified and even reasonable. It is however hardly reconcilable with the U.S. exporters' understandable need for transparency and - particularly - predictability of the

216. Once in space, a satellite is still covered by the ITAR; the transfer of ownership, control or use of a satellite in orbit from one country to another requires a license, see 5 (1) Defense Trade News (1994) at 10.
217. In fact, as early as the late 1970s, the U.S. aerospace industry expressed its dissatisfaction with the situation that these satellites and the related technology, both available in Western Europe and Japan, were controlled by the State Department. At a Congressional hearing it was argued that a transfer to the controls of Commerce "would help American aerospace industry in the commercial exploitation of space technology in international markets.", see Valnora Leister, *Space technology: From national development to international cooperation*, unpubl. D.C.L. thesis, McGill University (Institute of Air and Space Law) (1982), hereinafter referred to as Leister, at 134.
218. See Sec. 126.7, ITAR 1989 *supra* note 196.

export licensing process, both in their relations with their international clients and vis-à-vis their international competitors.

### 2.3.1.2 *The Export Administration Regulations and the Commerce Control List*

In December 1774, the First Continental Congress declared the importation of British goods to be illegal. Twelve months later the Congress outlawed the export of goods to Great Britain, thus establishing the first American export controls. Since then, the U.S. has imposed export controls for a variety of reasons through legislation such as the Trading with the Enemy Act and the Export Control Act. The latter act of 1949 gave the Department of Commerce primary responsibility for administering and enforcing export controls on dual-use items. The term 'dual-use' is used by Commerce to distinguish products and technologies (that are controlled by that Department) that can be used both in sensitive (*e.g.* military or nuclear) and non-sensitive applications from products that are (a) weapons or military-related in use or design and subject to the controls of the Department of State or (b) subject to the nuclear-related controls of the Department of Energy or the Nuclear Regulatory Commission. In other words, dual-use items are commercial items which could have military applications. The Export Control Act for the first time formulated three reasons for the imposition of such export controls: national security, foreign policy and short supply. Its successor was the Export Administration Act (EAA or Export Act) of 1979 which was amended several times and lapsed on August 20, 1994. While its provisions and controls were thereafter maintained through an Executive Order, the EAA has been in the process of being rewritten and resubmitted to Congress ever since. The EAA and its implementing regulations, the Export Administrative Regulations (EAR or Commerce Regulations),[219] contain controls on exports from the U.S., and re-exports of U.S.-origin items from foreign destinations, on strategic commodities and technical data worldwide to prevent the diversion of such strategic items to *end-users* or *end-uses of concern*. The primary licensing agency within Commerce is the *Bureau of Export Administration* (BXA).

License requirements are dependent upon an item's technical characteristics, the destination, the end-use and the end-user, and other activities of the end-user. In other words, to quote a fact sheet of BXA, entitled "How do I know if I need to get a license from the Department of Commerce?" the following five facts have to be established to determine an exporter's obligations under the EAR: "What is the item you intend to export or re-export; where is it

219. EAA, 50 U.S.C. app. 2401 *et seq*; EAR, 15 C.F.R. Subchapter C.

going; who will receive it; what will they do with it; and, what other activities are they involved in?"[220]

A Country Chart in the EAR identifies those countries to which specific items cannot be exported without a license. As in the ITAR, specific countries or groups of countries may be subject to specific control criteria and conditions.

Thus, exports of strategically significant commodities and technology not designated as defense articles or services on the Munitions List are subject to the export controls of the EAA and the (implementing) Commerce Regulations. Because modern weapons depend on many advanced supporting technologies that have both civilian and military ('dual-use') applications, some commercial technology transfers raise U.S. national security concerns. Consequently, under the above Act, the Commerce Department is charged with issuing a license before any such dual-use technology or equipment can be exported from the United States to a potential adversary, and it must ensure that transfers of dual-use technology do not occur under the guise of civilian projects.[221]

The EAA of 1979 as amended sets out in its paragraph 2401 the following Congressional findings guiding - as far as the above security aspect of exports is concerned - the interpretation and application of the export controls laid down in the Act and in the Commerce Regulations based thereon:

"(5) Exports of goods or technology without regard to whether they make a significant contribution to the military potential of individual countries or combinations of countries may adversely affect the security of the United States.

(8) It is important that the administration of export controls imposed for national security purposes give special emphasis to the need to control exports of technology (and goods which contribute significantly to the transfer of such technology) which could make a significant contribution to the military potential of any country or combination of countries which would be detrimental to the national security of the United States.

(11) The acquisition of national security sensitive goods and technology by the Soviet Union and other countries the actions and policies of which run counter to the national security interests of the United States, has led to the significant enhancement of Soviet-bloc military-industrial capabilities. This enhancement poses a threat to to the security of the United States, its allies and other friendly nations, and places additional demands on the defense budget of the United States.

220. See Fact sheet - *Do I need an export license?* the US Dept of Commerce, Bureau of Export Administration <http://www.bxa.doc.gov/factsheets/facts 1.htm> (Apr 29, 1998).
221. See *US exports: strategic technology controls*, U.S. Department of State Dispatch (Jul. 29, 1991) at 551.

(12) Availability to controlled countries of goods and technology from foreign sources is a fundamental concern of the United States and should be eliminated through negotiations and other appropriate means whenever possible".

The EAR specify in great detail the licensing procedures, the "controlled commodities" as laid down in the so-called Commerce Control List (CCL), the countries (most) affected, divided into groups, and other administrative provisions. The "general policy" part of the EAR mentions the following purposes for these controls:

"(1) To protect the domestic economy from the excessive drain of scarce materials and to reduce the serious inflationary impact of foreign demand;

(2) To further significantly the *foreign policy* of the United States and to fulfill its international responsibilities;

(3) To exercise the necessary vigilance over exports from the standpoint of their significance to the national *security* of the United States".[222] (emph. add.)

*Groups of countries*

For export control purposes the Commerce Regulations provide for categories of countries or "Country Groups", to which each foreign country is assigned depending on the level or strictness of the controls the U.S. Government wishes to apply to the respective country. There are seven of these country groups designated by the symbols Q, S, T, V, W, Y, and Z, with, for instance, the "geographic area formerly known as the [USSR]", together with *inter alia* Laos and Albania in a country group to which strict controls apply (group Y).

China has been a special case, receiving increasingly better treatment (than the Soviet Union) through the years. In the 1960's it was classified under country group Z which prohibited all U.S. shipments to that country. As a result of President Nixon's 'normalization' overtures and the ensuing improvement of relations between the two countries, China, in 1972, was reclassified to group Y. In 1980, Carter saw reasons to further broaden export possibilities to China, and so did his successor Reagan one year later, establishing the so-called 'two-times' policy which allowed China to receive exports with twice the technical sophistication as exports to the Soviet Union.[223] It was also Reagan who, in 1983, placed China finally in the most liberal Country Group V, which it shares with most western countries until today, with the concomitant - more relaxed - controls (until the Tiananmen Square incident took place).

222. See para. 770.1, EAR *supra* note 219.
223. See Wirin, *supra* note 207.

To determine whether a particular commodity qualifies for export to a particular country of destination the exporter has to check the so-called Commerce Control List, which lists all commodities subject to the Department's export controls, and therefore also known as the "Commodity Control List" (CCL).
Roughly, a distinction can be made between commodities which do not raise foreign policy or security concerns no matter which country they are exported to, and which therefore qualify for a "general license", and all other commodities which, depending on the general category to which they belong (*e.g.* "telecommunications and cryptography" or "propulsion systems and transportation equipment"), the group of products (*e.g.* "software" or "technology"), particular type of control (*e.g.* "missile technology controls" or "nuclear non-proliferation controls") and the country group the commodity is destined for, require an individual so-called "validated license". Validated licenses require a formal application by the exporter of the commodity and a formal approval on the part of the Department of Commerce before the commodities can be exported.

*Revocation*
Sec. 770.3 (b) of the Regulations, entitled "Revocation of export licenses and other authorizations", contains a provision of similar concern to U.S. exporters of space related commodities on the CCL as the ITAR revocation provision does to probably the same exporters insofar as their space defense artcles and services fall under the USML:

"All export licenses and other authorizations to export or reexport are subject to revision, suspension, or revocation, in whole or in part, without notice. It may be necessary for the Office of Export Licensing to stop a shipment or an export transaction at any stage of its progress; *e.g.*, in order to prevent an unauthorized export or reexport ..."

*Communications satellites*
In November 1990, President Bush, by Executive Order, stated:

"I ... find that proliferation of chemical and biological weapons constitute an unusual and extraordinary threat to the national security and foreign policy of the United States and hereby declare a national emergency to deal with that threat."[224]

The E.O. ordered the State Department to lead multilateral efforts to conclude a global convention prohibiting the production and stockpiling of chemical weapons, ordered the Departments of State and Commerce to make a list of

224. Executive Order (E.O.) 12735 (Nov 16, 1990), reprinted by ACDA, <http://www.acda.gov/factshee/wmd/bw/execordr.htm> (May 11, 1998).

all goods, technologies and services that would assist a country in acquiring the capability to develop, produce, stockpile, *deliver*, or use chemical or biological weapons and whose export should therefore be forbidden, and ordered that sanctions be imposed on foreign persons and countries, including a prohibition on the sale of arms and dual-use goods and technologies, in case of their (contribution to the) development, production or use of chemical or biological weapons. (The sanctions against such foreign countries included the termination of landing rights of air carriers "controlled in fact" by the respective foreign government).[225]

At the same time, the president directed various other export control measures including the removal from the USML of all items contained in the Cocom dual-use list (the International Industrial List) (see hereafter) unless significant U.S. national security interests would be jeopardized. This order was meant to make the USML and the CCL more consistent with the above Cocom list, and to transfer those items to the CCL which, because of their dual-use character, should be controlled by Commerce rather than by State. A State Department official remarked, in March 1992, about this 'harmonization exercise' in testimony before the Subcommittee on space of the House Committee on science, space and technology: "our goal is to move all space items which are primarily commercial in nature off the [USML] onto Commerce's dual use list."[226]

To implement this part of the presidential directive, a technical working group was established, consisting of representatives from State, Commerce and Defense, and a number of other U.S. agencies. The analyses and proposals of the working group had a special political dimension in the period 1991-1992 because of the break-up of the Soviet Union and the resulting interest on the U.S. side in a redefinition of the rules and practices regarding space cooperation and trade in space goods and services (including the launch by Russia of U.S.-built satellites, which will be discussed later) between the U.S. and the Commonwealth of Independent States (CIS).

The result of the working group's recommendation was a final rule published in October 1992 by the State Department's Bureau of Politico-Military Affairs, which removed *certain* commercial communications satellites from the Munitions List to the Commerce Control List, contingent upon publication of a Commerce rule establishing national security controls on such satellites. Commerce published that rule on the same date in October 1992, adding these

225. See *id*, Sec. 5.

226. See Statement by Charles A. Duelfer, Director, Center for Defense Trade, Bureau of Politico-Military Affairs, US Dept of State, March 25, 1992, hereinafter referred to as Duelfer statement, in *Bilateral space cooperation with the former Soviet Union*, Hearing before the Subcommittee on space, House Committee on science, space, and technology, 102d Cong., 2d Sess. 59-75 (March 25, 1992) at 66; the expression "harmonization exercise" was used by a Commerce official at the same hearing, see *id*, at 78.

satellites to the CCL.[227] On December 28, 1992 the above State Bureau published another rule that proposed to remove all generic components, parts, accessoires, attachments and equipment associated with commercial communication satellites and passive remote sensing satellite ground stations from the USML to the CCL. Components that were specifically designed for satellites which remained on the USML would also remain under State Department control.

In other words, as a first step towards harmonizing and simplifying the two control regimes, a distinction was put into effect between military satellites and "certain non-military communications satellites which have capabilities that justify keeping them on the USML in the interest of U.S. national security", to be kept on the USML, and all other complete commercial communications satellites, including components and associated equipment, data and services, to be transferred to the CCL.[228] (In view of the partisan nature of U.S. politics it is relevant to note that the Clinton administration, having performed its own inter-agency study on the matter, approved the respective ITAR admendments, developed and proposed under president Bush, without change). The impression remains that only less sophisticated satellites were transferred to the export controls of Commerce. This predictably resulted in increased pressure from the industry for further de-controls to enable them to compete with their more sophisticated products on the world market (including the former Soviet Union), without direct (or indirect) State Department interference. The above State Department official remarked in conclusion:

"I would like to tell you that this [i.e. the transfer of certain commercial satellites to the Commerce list] will solve the question of the export of commercial satellites to the CIS. However, these same issues will be relevant when these commercial satellites are on the Commerce list. Therefore, we have placed a high priority on a review of this issue within the Administration."[229]

The U.S. aerospace industry's insistent call for change was supported by a number of compelling arguments. They compared the Administrations's

227. See *Commercial communication satellites; Revisions to the Commerce Control List*, 15 CFR Part 799, Dept of Commerce, Bureau of Export Administration, 58 FR 47322 (Sep 8, 1993) Background.
228. The amended USML, in its Category XV (Spacecraft systems and associated equipment), mentioned *inter alia* the following such satellite capabilities justifying continued State Department export controls: "... communications satellites ... (3) designed, modified or configured for intersatellite data relay links that do not involve a ground relay terminal ('cross-links') ... (5) employing any of the cryptographic items controlled [elsewhere in the USML] ... (9) having orbit transfer engines ('kick-motors') which remain permanently with the spacecraft and are capable of being restarted after achievement of mission orbit and providing acceleration greater than 1g." See Amendments to the ... (ITAR), 22 CFR Part 121, Dept of State, Bureau of Political-Military Affairs 58 FR 47636 (Sep 10, 1993).
229. See Duelfer statement *supra* note 226, at 75.

treatment of communication satellites with the way it dealt with other communications trade, such as fibre optics and telephone switching equipment which were controlled by the Commerce Department. They pointed out that characteristics once unique to military satellites were now routinely employed on commercial communications satellites. And they argued that the 30-year U.S. lead in selling commercial communications satellites was under challenge from Japan, Europe and Canada, each promoting the view that American manufacturers were unreliable because of the U.S. Government's restrictive export policies.[230]
The issue of export control reform in high technology would become the subject of Congressional scrutiny in 1993 with high profile statements of concern on the part of the U.S. industry, further increasing the pressure on the Administration.

In the mean time, the above Presidential concern, fueled by the sophistication of Iraqi missile capabilities due to rather careless U.S. and European exports of sensitive technologies to Iraq prior to the 1991 Gulf War, had led to new and stricter regulations promulgated by Commerce under the so-called *Enhanced Proliferation Control Initiative* (EPCI).[231]
These EPCI regulations were specifically aimed at stemming the spread of weapons of mass destruction, i.e. nuclear, chemical and biological weapons, and of the missiles used to deliver those weapons. For that purpose the EPCI regulations created the concept of projects and entities of concern. The most stringent forms of licensing, individual validated licenses, are required when an exporter "knows" or is informed by the Commerce Department's Bureau of Export Administration (BXA), that an item is either destined for such a project or for use by a country where a project of special concern is listed, regardless if it is destined for that specific project. This "knowing" standard imposed a much heavier burden on exporters than had been previously imposed in American export licensing.[232] To identify for U.S. businesses some of the organizations and companies that may be involved in prohibited weapons proliferation activities (so they know that exports even of normally uncontrolled goods and technology to these entities would create an unacceptable risk of use in or diversion to such activities) the EAR contains a list of so-called "entities of concern". This list puts exporters on notice that any products sold to these end-users may present concerns to the government and will require a license from BXA. This "Entity list" is revised and updated

230. See John D. Holum, Acting under secretary of state for arms control and international security affairs and Director ACDA, testimony before the House International Relation Committee and National Security Committee (Jun 18, 1998) <http:/www.acda.gov/speeches/holum/holtest.htm>, hereinafter referrred to as Holum testimony 1998.
231. See 56 FR 40,494-40,502 (1991).
232. Jack H. McCall, Jr, *The Missile Technology Control Regime and space launch vehicles: an update*, 20(2) J. Space L. 61-65 (1992) hereinafter referred to as McCall at 64.

on a periodic basis, by adding new or amended notifications and deleting notifications no longer in effect. The U.S. intelligence community undoubtedly plays a vital role in collecting the information necessary for that purpose. But the exporters also have a duty to determine the nature and activities of their potential customers and to report on anything that suggests that the customer concerned may be involved in proliferation-related activities. And penalties for violation of the Regulations may be stiff.[233]
To stay on the safe side, U.S. firms should also check BXA's "List of denied persons", which provides the names of all American and foreign persons (including companies, institutions and organizations) which, because of violations of the Commerce Regulations, are not allowed to participate in any transaction involving commodities subject to these Regulations and with whom U.S. firms are not allowed to do such business.[234]
Exporters frequently complained about the extent of the 'knowledge' they were required to have about the end-user and the end-use to avoid possible sanctions from the controlling agency. In fact, in 1997, the government admitted that "[w]e continue to grapple with revising the 'catch-all' controls that form part of the 1991 Enhanced Proliferation Control Initiative (EPCI). Exporters view the catch-all as too broad in scope and the knowledge standard as unclear."[235]

One of the phenomena the U.S. administration also has been grappling with for many years is the question of how to effectively deal with 'pariah states',

233. See The Entity List, Entities of proliferation concern listed in Supplement No. 4 to part 744 of the [EAR], updated Oct 1, 1997 <http://www.bxa.doc.gov/entities.htm> This supplement lists a number of Indian and Pakistani research centers and laboratories, but also a Russian research institute, Chinese laboratories and Ben Gurion University, Israel, "for computers between 2,000 and 7,000 Mtops." According to a senior official of the Commerce Department in early 1997, BXA's enforcement programs, focusing on specific end-users and end-uses, led to hundreds of investigations over the last four years that have led to the criminal prosecution of persons who illegally exported zirconium for Iraqi munitions, unlicensed equipment for India's missile program, brokerage services for Iraqi rocket fuel, and gas masks to suspected Aum Shinrikyo terrorists in Japan, see Update West 1997, speech William A. Reinsch (Undersecretary for export administration, Dept of Commerce (Feb 10, 1997), hereinafter referred to as Update west 1997, at 2 <http://www.bxa.doc.gov/supdate.htm>.
234. See U.S. Dept of Commerce, [BXA], Denied persons list currently in effect (Revised May 6, 1998) <http://www.bxa.doc.gov/2_denial.htm>.
235. See Update west 1997, *supra* note 233, at 4. The same government spokesman concluded: "Since the definition of 'knowledge' includes 'awareness of a high probability' that a proliferation-related use is involved, you need to screen, to pursue and resolve red flags, and to come to us for guidance or a license if you cannot satisfactorily resolve red flags", *ibid.* 'Red flags' are defined as "any abnormal circumstances that indicate that the export may be destined for an inappropriate end-use, end-user, or destination ... Commerce has developed lists of such 'red flags' which are not all-inclusive but are intended to illustrate the types of circumstances that should cause reasonable suspicion that a transaction will violate the EAR", see U.S. Dept of Commerce, [BXA], *Know your customer guidance* <http://www.bxa.doc.gov/Enforcement/knowcust.htm>.

and the attitude of Congress in this connection. In early 1997, a Commerce official put the dilemma as follows:

"Most of the time scholars have concluded sanctions have little effect, and they frequently hurt the imposer more than the recipient as other countries' exporters rush to fill the trade gap. Sanctions work best when they are broadly multilateral, when the target country is small and relatively defenseless, and, I would argue, when sanction-breaking activity is most likely to lead to media criticism and international embarrassment. Sanctions work least well when they are unilateral and are driven by home country politics rather than as part of a well thought-through multilateral strategy.
What is new is the increasingly assertive role of Congress in what I call the country-of-the-month-syndrome. Amendments have been offered for years, but until recently the moderate center used to prevail, and they were defeated."[236]

The role of Congress will be further illustrated in Chapter 3.1 discussing the U.S.-China launch relations and in Chapter 4. The observation that multilateral sanctions are more effective than unilateral ones reflects a longstanding policy of the U.S. to seek multilateral arrangements on export controls in view of the futility of unilaterally restricting the exports of specific commodities or technologies when these are readily available for export in other countries and the latter not only feel no obligation, legal, moral or other, to follow the U.S. example, but rather see a U.S. export restriction as a unique opportunity for their own exporting industries to make a sale unhindered by their American competitors. Hence U.S. inspired Cocom, hence Wassenaar, hence MTCR.

### *2.3.2 The role of CoCom and its successor, the Wassenaar Arrangement*

The Coordinating Committee for Multilateral Export Controls was established in 1949 following the separation, by the 'iron curtain', of Europe in a western and a Soviet-dominated eastern part. The western countries, including the U.S., felt the need to join forces and agree on the type of goods/equipment and technology that, because of their strategic importance, should not fall into the hands of the Soviets and their allies. A Senate hearing in 1983 elicited the following rationale for stronger controls, as proposed by the Reagan administration, on the transfer of technology from the West to the East:

"Current controls are based on the importance of advanced technology in military forces and its supporting industrial sectors and the existence ... of a technology gap between the [U.S.] and the Soviet Union. A technological gap in our favor is also a means of reducing the risk of technological surprise. ... a particular technological development could give the discoverer a decisive advantage. Consequently, one of the major means of preventing war is to avoid technological surprise ... an increasing one-way stream of U.S. technology is

236. See Update west 1997, *supra* note 233, at 5.

moving to the Soviet Union. Nearly all technological developments have direct or indirect military application."[237]

CoCom was created as a non-treaty organization, a forum, that (a) cooperatively restricted exports to certain, primarily communist, countries and (b) collectively determined the goods and technologies to be restricted and the controlled countries.
Its membership included the members of NATO, with the exception of Iceland, plus Australia and Japan.[238]
To perform its control functions, CoCom established and updated lists of embargoed products and technologies which provided the basis for the national control lists administered by each of the member governments.[239]

There were three such lists which were reviewed about every three years to take account of technology developments and other control-relevant factors:
- a list of military items and technologies,
- an atomic energy list, and
- a list covering commodities and technologies which can have both military and civil applications (dual-use), later better known as the "(International) Industrial List" ((I)IL).

A second traditional CoCom task was to act as the clearing house for individual requests submitted by the member governments to permit the shipment of specific embargoed items to the proscribed countries when the risk of diversion to military use was considered sufficiently small. (Proscribed destination for CoCom purposes in 1983 were the Soviet Union, the other Warsaw Pact countries, Albania, the People's Republic of China and some other (communist) countries in Asia, such as Vietnam).

237. See W. Schneider (Under Secretary for Security Assistance, Science and Technology), *Export control of high technology* (Mar 2, 1983), Dept of State Bull. 71-74 (Jun 1983) at 71.
238. The Commerce Regulations, as published in 1994, the year of CoCom's demise, listed the following 17 CoCom members: Australia, Belgium, Canada, Denmark, France, Germany, Greece, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Turkey, United Kingdom and the U.S. Apart from these, there were a number of so-called "cooperating countries", *i.e.* countries which cooperate fully with the CoCom members in restricting strategic exports to controlled countries in accordance with CoCom standards: Austria, Finland, Hong Kong, Ireland, New Zealand, Sweden and Switzerland, see Sec. 770.2, Commerce Regulations, Bureau of Export Administration, Dept. Of Commerce, 15CFR Ch. VII (1-1-94 Edition).
239. In the U.S., primarily the Export Administration Act of 1979 and also the Arms Export Control Act of 1976, see previous para. The U.K. implements its CoCom control obligations through the Export of Goods (Control) Order and Germany has its Aussenwirtschaftsgesetz, see Dennis J. Burnett and Marco Fuchs, *Amendment of CoCom rules and the commercialization of space*, Proceed. 33rd Colloq. L. Outer Space 11-17 (1990) hereinafter referred to as Burnett and Fuchs, at note 3. The Netherlands national equivalent is the "Uitvoerbesluit Strategische Goederen" of 1963.

A third major function of CoCom was to serve as a means of coordinating the administration and enforcement activities of the member governments.

In practice this meant that, after national export control authorities such as Commerce's BXA or State Department's ODTC, had decided to grant a license for the export to the Soviet Union of a controlled good or technology appearing on any of the above lists, this export permission would only become effective after CoCom had reviewed and unanimously approved it. For example, in 1989 a total of 1557 of such national requests for an exception to the Cocom export restrictions were submitted to the members. Generally, some 90% of these requests would receive approval.[240]
Obviously, this multilateral system could only work if all CoCom parties' national export regulations encompassed the same items as laid down in the above lists, and if a 'no license' decision of CoCom vis-à-vis one of its exporting members would be scrupulously adhered to by all other members; and, even more important, if all members shared the same non-proliferation worries, to the same extent and with respect to the same countries ... The latter requirement was probably only met during the first decade of the cold war when the concept of a *common* (communist) enemy was very much alive in the western world. But, where only one member insists on strict common controls towards its own (pet) adversary and other members perceive a lesser threat emanating from the country in question, adherance to the letter and spirit of the CoCom arrangement is much harder to achieve.

Most items on the U.S. Munitions List and the Commerce Control List were also included in the CoCom lists, and the CoCom lists found their way into the national export regulations of the member states, resulting in unilateral US export controls thus having the coveted multilateral 'blessing' (and support). Basically all space-related products and technologies, such as communications satellites, launch vehicles and technology, and computers fell under the controls of all CoCom members, and the sale of these 'strategic' goods to countries like the Soviet Union, China, the East-European countries, Vietnam and North Korea remained restricted until the overall political landscape and/or specific bilateral relations called for change.

Although the members of CoCom had no legal obligation to abide by commitments made, at least over the first three decades of its existence there had been only a few instances when a member nation exercised its sovereign right to deviate from CoCom decisions. Decisions were made on the basis of

240. See Letter Netherlands Deputy Minister Economic Affairs of Feb 26, 1990 to (Parliamentary) Permanent Foreign Trade Committee, on Cocom Executive Committee meeting, Paris, Feb 14-15, 1990, Staatscourant 1990-41 (Feb 27, 1990). Some goods on the IL do not have to be submitted to the Cocom partners; the export can be approved by the country concerned ("administrative exception"), *ibid.*

unanimity (which some saw as the basic reason for CoCom's durability). No change in the CoCom lists could be made, and no specific export of a controlled item could be approved if any of the members objected.

During both the 1960s and the 1970s the combination of national and international export control systems was in principle applied, but technology transfer issues, both in the U.S. and within CoCom, received relatively little attention in practice. The situation changed with the 1979 Soviet invasion of Afghanistan coupled with the growing realization that acquisition of advanced western technology was enhancing the military capabilities of the Soviet Union.[241]
As a consequence, export control in general and the prevention of the acquisition of advanced technology by the Warsaw Pact in particular became an early and very high priority of the 1981 Reagan administration.

In that connection, a review of CoCom's effectiveness was made. It revealed that, though in general the national controls coordinated through CoCom had been useful for restricting exports of items reviewed by the CoCom governments, and competition between western exporters in selling technology to the Warsaw Pact countries had been prevented, violations of CoCom controls had taken place, items had not been multilaterally controlled at the time of the sale, and Soviet 'technology piracy' had increased, resulting in militarily sensitive technology ending up in the hands of the Soviet bloc countries. Hence, a series of efforts was made on the part of the Reagan administration to considerably strengthen the effectiveness of the national enforcement activities and harmonize licensing procedures. A particular worry at the time was the the difficulty of controlling the export or re-export of commodities from non-CoCom countries to the Communist states, a problem which the U.S. addressed by requiring national licenses for *re*-exports of the U.S.-origin embargoed products from third countries, but a solution which few CoCom partners were willing to copy.
This renewed attention, on a high policy level, to the effectiveness of the national controls and corresponding vigorous efforts to 'bringing CoCom out of the doldrums' led not only to large increases in staff dealing with export controls within the Departments of Commerce, Defense and State, but also to

241. An example of the latter was the sale of $1.5 billion worth of U.S. and other western technology that allowed the Soviets to build the Kama River Truck Plant in the early 1970s. The factory produced large numbers of military trucks that were used in the Soviet invasion of Afghanistan and by Soviet military units in Eastern Europe opposite NATO forces. The sale was legal at the time and approved with the understanding that the technology would be put only to civilian use, see *U.S. export control policy*, address by the Senior representative for Strategic Technology Policy, Dept. of State (Wendt) before the Atlantic Council of the United States (Jun 14, 1988), American Foreign Policy (Dept. of State publ.), Doc. 47, 126-129 (Jun 1988), hereinafter referred to as Wendt address 1988, at 126.

a strengthening of CoCom's structure. As a consequence, in 1988, a State Department official could conclude:

"There is no question that the U.S. export control system is vastly superior to what it was in 1980. The CoCom system is far more effective ... We have certainly frustrated countless Soviet acquisition efforts across the world."[242]

Nevertheless, the sale by Japanese and Norwegian firms of machinery that provided a Soviet naval shipyard with the means to mass-produce quiet submarine propellers shocked the U.S. administration and its CoCom partners into a campaign to (further) revitalize CoCom. As a result, a high-level January 1988 meeting in Versailles agreed to rationalize the CoCom control list[243], strengthen cooperation with non-CoCom countries on technology transfer, harmonize and reinforce national controls and facilitate the flow of strategically significant goods and technologies among participating countries. The latter goal was of particular importance as it was meant to result in a license-free strategic trade zone among the CoCom countries with common export control standards with respect to the controlled goods and technologies vis-à-vis the outside world, *i.e.* primarily the Warsaw Pact countries. In June 1988, the State Department still took the view that nothing had happened that would justify a more liberal policy on exports of strategic goods and technology to these countries: "As we pursue greater contacts, greater scientific exchanges, and greater non-strategic trade with the Soviet bloc, we must, at the same time, protect the technology that underlies our security."[244]

Less than 2 years later, President Bush called upon the CoCom member states to adapt their export control regimes to the rapidly changing international political and military environment following *glasnost* and *perestroika* in the Soviet Union and the desintegration of the Warsaw Pact. A major year-long review of East-West export control policies within CoCom followed, and in May 1991 the parties agreed to implement a new system of export controls for dual use goods and technologies with significant military applications. Central to the new system was a thorough overhaul of the CoCom lists, not only because the strategic situation had changed but also in view of the rapid diffusion of some technologies, such as computer technology, that were making the existing control lists increasingly obsolete. A new "Core List" designed to cover only the most strategic, 'truly critical' dual-use goods and technologies, 50% shorter than the one it replaced *inter alia* because of a massive de-control of readily available off-the-shelf items, and the adoption of a 'common standard' of effective national control enforcement provisions

242. See *id.*, at 127.
243. *E.g.* by removing items from the list which, due to worldwide technological developments, have become less relevant for control purposes, such as many types of personal computers.
244. See Wendt address 1988, *supra* note 241, at 128.

were to constitute "a higher fence around fewer items". This new list, the International Industrial List (IIL), also provided wide-ranging favorable export licensing treatment for former Soviet bloc East European countries that were seen as representing a lesser strategic threat, namely Poland, Czechoslovakia and Hungary. These countries could henceforth be the recipient of all telecommunications equipment, except encryption devices, exported by individual CoCom countries without Cocom intervention. (As a necessary *quid pro quo*, the U.S required these countries to implement CoCom standard national control measures to ensure that the controlled goods and technologies they would be entitled to receive would not pass to unauthorized destinations and were used exclusively for civilian purposes.)[245] The Soviet Union, on the other hand, was only permitted to acquire telecommunications goods and technologies comparable to western standards of the early-to-middle-1980s. In fact, the selections made were very much dependent on the level of sophistication of Soviet capabilities the U.S. military and security establishment could feel comfortable with. Thus, the U.S. introduced a new measure of military criticality: the degree to which acquisition of a good or technology by the Soviets would result in the closing of a critical technological gap between Western and Soviet-based military systems.
(The example used in this connection was the night vision device which played a critical role in the coalition victory in Operation Desert Storm)[246]
An important criterion for de-control was "foreign availability", a test which was applied by the U.S. in the CoCom talks to anything from avionics to laser systems. In the words of the U.S. representative,

"[w]herever we found wide availability outside CoCom, we readily agreed to decontrol such commodities. Further, where we found Soviet capabilities equal to or better than previous control levels, we also sought decontrol. But, where dual-use goods or technologies are unique to CoCom suppliers, and are of gap-closing strategic significance, we pressed the allies to retain controls."[247]

It is important to note in this connection that, where in this multilateral forum the selected level of controls with respect to the Soviet Union was to a large extent determined by the U.S. Administration's perception of the military-strategic risks concerned, Congress targeted Soviet treatment of nations and religious groups within its sphere of influence and used the (possible relaxing

245. See Burnett and Fuchs, *supra* note 239, at 14.
246. See Statement by Press Secretary Fitzwater on multilateral export controls, May 24, 1991, 27 (21) Weekly Comp. Pres. Docs. (Administration of George Bush) (May 27, 1991); also on the above subject, *US export controls in a changing global environment*, Ambassador Allan Wendt, Senior representative for strategic technology policy (address before a National Academy of Sciences symposium, Jun 11, 1991), US Dept of State Dispatch 480-482 (Jul 1, 1991) hereinafter referred to as Wendt 1991, at 481.
247. See Wendt 1991, *supra* note 246, *ibid.*

of) export controls to exert pressure on that country to show a 'better behavior'. As one author noted:

"... the House of Representatives on June 6th [1990] voted 390 to 24 to block increased computer, telecommunications and hight technology sales to the U.S.S.R. The reason for this action was the Lithuanian issue [*i.e.* the Soviet's economic boycot against Lithuania] and to insure the continued emigration of Soviet Jews."[248]

Although the same author calls it "perplexing ... that space issues are held hostage to serve political goals", this was of course not a new phenomenon in U.S. political practice in general and in the interaction between the Administration and Congress in particular. The U.S. 'space relations' with China showed a similar pattern. (See Chapter 3.1)

Nevertheless, towards the end of 1991, Administration officials were already using a different approach when discussing the necessity of continued CoCom controls with respect to the Soviet Union. Not only did the new core list of dual use items constitute a "vast liberalization" of strategic trade restrictions as such, but the U.S. and its CoCom partners had also greatly liberalized in practice their treatment of requests for licenses of controlled items to the Soviet Union, because of the parties' commitment to supporting the Soviet Union's integration into the world economy and Soviet market reform. As a Commerce official assured the House of Representatives, "CoCom's remaining high technology restrictions will not impede the modernization and restructuring of the Soviet economy. CoCom restrictions are really very peripheral to the problems affecting Soviet economic progress ... [these] problems are caused by the lack of markets, not CoCom controls."[249]

In March 1992, the U.S. decided to establish diplomatic relations with Georgia (after having recognized Georgian independence in December 1991), and in the same month a White House announcement called for expanding and normalizing trade with the republics of what had been the Soviet Union, especially in areas of high technology. This involved both the decision to

248. See Wirin, *supra* note 207, at 6.

249. See *US export control policy adapts to a changing world*, Cristopher G. Hankin, Deputy Assistant Secretary for international trade controls, statement (Sep 24, 1991), US Dept of State Dispatch 752-754 (Oct 7, 1991) at 752. The statement also detailed the liberalization measures already taken by CoCom vis-à-vis the Soviet Union in such areas as the energy sector, the computer industry, transportation, manufacturing and telecommunications, and announced for the Baltic states an approach similar to the one used vis-a-vis Poland, Hungary and Czechoslovakia. Finally, controls on 'intra-CoCom trade' would be virtually eliminated by Jan 1, 1992 (concurrent with the expected time of implementation of the CoCom common standard) except for a short list of items contained in a common 'exclusion list'.

purchase sophisticated space-related goods from Russia and a commitment to further adapt CoCom controls to post-Soviet Union circumstances.[250]
The above developments culminated in a June 1992 decision by the CoCom member countries to establish a CoCom Cooperation Forum on Export Controls (CCF) and *to invite the republics of the former Soviet Union to participate*. The resulting historic meeting of November 1992 in Paris included representatives from all East European countries, the Baltic states and all but three of the former Soviet republics (and the CoCom member states of course) in attendance. For the first time the former adversaries jointly discussed both the liberalization of trade in sensitive goods and technologies between the countries participating in the forum and the establishment (with CoCom members' help) of harmonized national export control systems vis-à-vis non-participants. The final step towards a total revamping of CoCom's aims and, in fact, towards its dissolution was taken at the April 1993 Vancouver summit meeting of Presidents Clinton and Yeltsin. At that occasion, President Yeltsin expressed concern that CoCom, along with other cold war era restrictions, was harming reform and standing in the way of building a new strategic partnership with the West. In the joint statement with which the two presidents concluded their two-day meeting, they not only announced the establishment of a U.S.-Russian Commission on technological cooperation in the fields of energy and space (headed by Prime Minister Chernomyrdin and Vice President Gore), but also decided "to promote access to each other's markets ... removal of impediments to trade and investment ... [and] to work together to remove obstacles impeding Russia's access to the global market in high technology and related services."[251]
This outcome provided additional impetus to the CoCom countries' review of the arrangement's (possible) future purposes. The conclusion was clear:

"[t]he end of the Cold War, the disintegration of the Soviet Union, deep cuts in the arsenals of both sides, and the goal of assisting economic and political reform in Russia and the other New Independent States - rather than retarding their economic development - all led us and

250. See Statement by White House Press Secretary Fitzwater, Mar 24, 1992 (re Georgia) and Fact Sheet, White House, Off. of the Press Secretary, Mar 27, 1992, US Dept of State Dispatch 253 (Mar 30, 1992). The U.S. bought a Topaz space-nuclear reactor, Hall Thrusters (for efficient orbital transfers of satellites) and Plutonium-238, which would fuel generators supplying electricity on NASA deep-space missions (typically, the sale would be conditioned on a commitment by Russia not to use the proceeds to support its nuclear weapons production). Under its new export policy, the Administration would review license applications promptly, consider with a presumption of approval all export licenses for dual-use items to *civilian* end-users in the republics of the former Soviet Union, and deny such applications only if the export would jeopardize the security interests of the U.S. and its allies, see *ibid.*
251. See Joint statement at Vancouver by Clinton Yeltsin, White House Press Release, Apr 4, 1993, The White House Virtual Library <http://library.whitehouse.gov/cgi>.

our allies to the view that the CoCom arrangement had outlived its strategic rationale and could not be sustained."[252]

Rather than sweeping away the CoCom arrangement altogether, the parties found good reasons for an orderly transition to a new regime which could respond to new security threats. One argument supporting that approach was the fact that the Western cooperation within CoCom, *e.g.* in the elaboration of control lists, licensing standards etc., was worth preserving as a means for addressing these new threats.
A proposal, for a new, more broadly based mechanism with which the U.S approached its CoCom allies in mid-1993, outlined the following objectives:

"- To deal firmly and creatively with dangerous states - *e.g.*, Iraq, Iran, North Korea, and Libya - that are contributing to tensions in regions such as the Middle East;
- To further the process of engaging Russia and other New Independent States in establishing effective export control systems and combating the global proliferation of weapons and sensitive dual-use technology;
- To close gaps in the non-proliferation regimes and improve our ability to enhance regional stability by controlling conventional arms and sensitive dual-use sales on a multilateral basis for the first time; and
- To remove disadvantages placed on U.S. exporters by the lack of adequate multilateral coordination on sensitive transfers to terrorist states and on other threats."[253]

A high-level meeting of the 17 CoCom governments in The Hague later that same year endorsed the broad outlines of of the above proposal and agreed on a work program for phasing out CoCom and inaugurating a new arrangement, with a timetable to achieve both on March 31, 1994.
While indeed, at a meeting in The Hague on that specific date, CoCom's end was made official, the new regime would take much longer to become a reality. One can identify at least two reasons for this delay.
First, though Russia had expressed interest in participating in the new arrangement and being among the founding members, and the U.S. and its partners were eager to bring in Russia as an equal partner to make the regime effective, there were hesitations on Russia's *de facto* commitment to the (new) group's export control policies. A particular concern in this connection was Russia's continuing sales of arms to Iran, a country which had been categorized by the U.S. and a number of other former CoCom members as one of the "rogue" countries targeted by the new regime.[254]

252. See *Export controls and non-proliferation regimes in the post-cold war world*, Lynn E. Davis, Under Secretary for international security affairs, statement, House (Feb 24, 1994), 5 (11) US Dept of State Dispatch149-152 (Mar 14, 1994) hereinafter referred to as Davis statement, at 150.
253. See *ibid.*
254. See *ibid.*

The second reason: a White House statement one week after CoCom's 'sunset' identified the new post-cold war security threats which justified the creation of a successor to the deceased cold war regime as follows:

"... dangers to peace and stability in new regions of the world, particularly the Middle East and South Asia, and also threats posed by rogue countries such as Iran, Iraq, Libya, and North Korea. So the two major goals of the new regime will be to work together to deny trade in dangerous arms and sensitive technologies to those regions and to those states."[255]

The problem was to get an agreement, within an increasingly large group of potential arms suppliers and sellers of sensitive goods and technologies, on the specific regions and countries which should be denied such arms, goods and technologies under the new regime. For, it was one thing for the parties to come to a gentlemen's agreement on provisionally continuing national controls of these items (on the basis of the established CoCom lists), albeit on a global instead of East-West basis, but it was something completely different - and difficult to get agreement on - to jointly identify the regions and countries of special concern, to which, in a new regime, the national export restrictions of all participating countries should apply.
During CoCom times, the national lists of proscribed countries of the U.S. were both different and longer than those of some other CoCom members. Now, a new multilateral system based on a selection of countries, let alone on veto power as in CoCom, was increasingly difficult to accomplish.
At one stage, though the U.S. had also Sudan, Syria and Cuba on its national lists, the parties appeared to be close to an agreement on jointly denying conventional weapons to only four 'blacklisted' countries: Iran, Iraq, Libya and North Korea.
At the same time some countries refused to have specific weapons on the list, or were unhappy about the relevant procedures, which included a transparent *reporting system* on sales made. (For a long time the U.S. proposals contained a requirement of *pre-notification* of intended exports of a limited number of highly sensitive technologies and products, which a number of European countries and Japan saw and rejected as a potentially competition-distorting, if not foul play inviting 'tell your competitors what sales you try to make' obligation. In an arms sales market which had shrunk considerably since the end of the cold war, the international arms manufacturers' battle for market share had considerably intensified already.)

But the most fundamentally contentious issue, splitting the party into two groups, was the overall scope of the arrangement: one group insisted on a system covering both conventional weapons and dual-use goods, the other, (not

255. See *Reforming export controls*, opening statement by Under Secretary for international affairs Lynn E. Davis, State Dept press briefing, April 7, 1994, 5 (15) US Dept of State Dispatch 204 (Apr 11, 1994).

surprisingly including major arms-exporting countries, in particular France), preferred the new regime to be limited to dual-use goods and technologies only.[256]
As long as Russia did not join there was little sense in even continuing the multilateral discussions. At various occasions, both before and after CoCom's demise, bilateral discussions between the U.S. and Russia took place on the above issues, but, for a long time, without result. Russia's hesitations to both open the books and accept restrictions on weapons sales, the proceeds of which this cash-starved country desperately needed, blocked progress of the talks. The U.S. was however determined to have Russia, and eventually also China, a major arms exporter, on board, though not at all cost: as a State Department official responsible for export controls stated in early 1995:

"... in September 1994 President Yeltsin made a public commitment to end future arm sales to Iran and fulfill only existing contracts ... *Russia*, as a major supplier, must be factored into the CoCom successor regime and any credible arms restraint arrangement ... Resolving this issue [of Yeltsin's pledge to end arms sales to Iran] will pave the way for Russia's participation in the new regime.
According to mutual agreement, new members must adhere to international non-proliferation norms, be committed to responsible arms and sensitive dual-use transfer policies, and have effective export controls. By these standards, *China* is not yet eligible to join the successor regime." (emph. add.)[257]

Finally, in September 1995 Russia was prepared to join the regime and the U.S. was prepared to accept that country's participation on the basis of the latter's commitment to cease selling weapons to Iran and institute adequate export controls. In December of the same year 28 countries, the former CoCom members plus Russia, the 4 Visegrad (East European) states, Ireland, Finland, Austria, Sweden, Switzerland and New Zealand, appropriately convened in the Peace Palace in The Hague, the Netherlands, and agreed on the establishment of the new arrangement.
And on July 12-13, 1996 in Vienna, the *Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-use Goods and Technologies* was officially established, with an - overly ambitious - implementation target date of November 1, 1996. (On that date parties aimed to have the new lists of dual-use items and munitions in place and functioning).

The primary goals and tasks of the Wassenaar Arrangement, also known as the New Forum, were summed up by the State Department as follows:

256. See "Nieuw Cocom, met Rusland, gaat wapenexport controleren" ("New CoCom, including Russia, will control export of weapons"), interview with Frans Engering, Director General Foreign Economic Relations, Netherlands Ministry of Economic Affairs, NRC Handelsblad (Jan 5, 1996) at 11.
257. See 6 (1) Defense Trade News (Oct 1995) at 12, 13.

"... to focus on preventing destabilizing buildups by encouraging *transparency*, holding consultations, and adopting common policies: and to deal firmly with countries of concern (Iran, Iraq, North Korea, and Libya) by restricting transfers of arms and sensitive dual-use technologies.
Members will share intelligence on threats and global trends; provide information on transfers of arms and sensitive dual-use articles to countries of concern; and define common approaches, including restraint policies when appropriate." (emph. add.)[258]

Unlike CoCom the Arrangement is not directed against any state or group of states and therefore does not mention specific 'blacklisted' countries. It is not supposed to stand in the way of bona fide civil transactions, nor will it interfere with the rights of states to acquire legitimate means with which to defend themselves pursuant to article 51 of the U.N. Charter. All in all, 33 countries co-founded the Arrangement and committed themselves to contribute to regional and international security by, *inter alia*, "enhancing cooperation to prevent the acquisition of armaments and sensitive dual-use items for military end-uses, if the situation in a region or the behaviour of a state is, or becomes, a cause for serious concern to the Participating States."[259]

Sharply different from the CoCom regime is the absence in 'Wassenaar' of a veto power for each of the members. This had provided - in principle - an effective tool for the mulilateralization of controls in the case of exports covered by Cocom. Wassenaar has given more responsibility to each individual member to behave responsibly and to legislate and enforce effective national controls. The multilateral aspect is taken care of in two ways:
*first*, a new list of controlled weapons and strategic commodities had to be unanimously agreed upon by all Wassenaar members;
*secondly*, all national export licenses for weapons and dual-use commodities have to be reported to the Secretariat in Vienna, for distribution among the member states.
The combination of these two requirements provides all participants with insight into the sensitive exports of all Wassenaar adherents and enables all concerned to *ex post facto* review and challenge any member's sensitive sales and export practices; this system of 'transparency' is also supposed to assist the participants in "developing common understandings of the risks associated

258. See 7 (1) Defense Trade News (May 1996) at 20. Wassenaar is the name of the town, close to The Hague, where preparatory discussions on the issue took place.
259. See The Wassenaar Arrangement on export controls for conventional arms and dual-use goods and technologies, factsheet ACDA (Jul 1996) <http://www.acda.gov/factshee/conwpn/wassenaa.htm> The factsheet lists the following participants, with Bulgaria and Ukraine among the new-comers: Argentina, Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, the Republic of Korea, Romania, the Russian Federation, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

with the transfers of these items",[260] which may be translated to "now that you (we all) know how the listed arms or goods you sold to a foreign country/company were used, you (we all) will think twice before making the same mistake again." Similarly, the participating states have also undertaken commitments to notify each other preferably within 30 days, but no later than 60 days, of an approval of a license that has been denied by another participating state for an essentially identical transaction during the preceding three years. Transparency should thus lead to mutual control of export behaviour and, hopefully, to overall responsible behaviour in accordance with the spirit of the Wassenaar Arrangement.
To that end, the contents of the Wassenaar list and the agreed reporting procedures have to be translated into national export regulations. The U.S did so on January 15, 1998.[261]

One question is of course whether this arrangement will do the job it is supposed to do, *i.e.* to contribute to regional and international security. As indicated above this will depend on the extent to which each participant feels the need to strike a balance between its national economy-driven sales efforts on the one hand and the international security-induced restraints (no sales of certain goods/technologies to certain countries or regions) on the other hand. A U.S. Commerce official, in early 1998 gave the following tentative appraisal of the Arrangement's prospects:

"The Wassenaar Arrangement's lack of strong central authority and its lack of explicit target countries, in contrast with CoCom, is a reflection of the times - the absence of a single large threat and lack of agreement over the nature and seriousness of the smaller threats. That weakness has complicated its development and made consensus among the expanded membership more difficult to achieve. Nevertheless, its inclusion of conventional weaponry is a major step forward, and I am confident that as its procedures and reporting requirements become routinized, discipline will grow."[262]

Another, and in fact the main, question is to what extent Cocom introduced or reinforced controls which affected the trade in launch services and whether Wassenaar will have similar consequences.

260. See *Implementation of the Wassenaar Arrangement List of Dual-Use Items; Revisions to the Commerce Control List and Reporting under the Wassenaar Arrangement*, Supplementary information, 63 FR 2452 (Jan 15, 1998) (to be codified at 15 CFR pts. 732, 740, 742, 743, 744, 746, 762, and 774.
261. For the amendments of the U.S. Commerce Regulations and the CCL, see *id.*; the Netherlands amended its corresponding regulations, Uitvoerbesluit Strategische Goederen 1963, by Besluit van 19 november 1997, houdende de 22e wijziging van het Uitvoerbesluit Strategische Goederen 1963, Staatsblad 1997-560 (Nov. 27, 1997).
262. See Opening address Under Secretary William A. Reinsch, [BXA], Dept of Commerce, Update West 98, Los Angeles (Feb 10, 1998) <http://www.bxa.doc.gov/press/98/updbills.htm> hereinafter referred to as Reinsch Update West 98.

An attempt to more fully answer that question will be made after the review of the (effects of the) Missile Technology Regime in the next sub-chapter.
As part answer the following is submitted. There is no doubt that CoCom, both in itself and as an extension of U.S. and other national export regulations, put brakes on the sale of high technology, including launch technology and satellites to communist countries. The veto power of the member states over national exports of these controlled items meant that these countries could not *buy* Western satellites or satellite components, either for own use or for resale to third countries and had therefore also no possibility to *launch* such satellites. If a European satellite manufacturer wanted to sell a satellite to the Soviet Union, it knew beforehand that the U.S. would probably veto such a deal. When in 1988, the U.S. administration was finally prepared to allow the Chinese to launch a U.S.-built satellite, it needed not only a Congressional consent but also CoCom members' unanimous approval of the satellite export license before the final go-ahead could be given. Moreover, as will be discussed later, these (multilateralized) export controls gave the U.S. government the negotiating leverage to conclude agreements with both China and Russia, which regulated launch market access of these latter countries.
The Wassenaar Arrangement's proclaimed aim will discourage export of high technology goods to countries of concern. Though not supported by individual participants' veto powers, this will effect sales of satellites, including computers and encryption devices on board to such countries or regions of concern, which in turn reduces the number of clients for the launch vehicle operators.

New entry into the international launch market, and thus the possibility of an increase in competition between launch vehicle operators worldwide, has been stymied by the U.S. launch/missile technology export regulations based on the Arms Export Control Act and the Export Administration Act. Both were multilateralized by the Missile Technology Control Regime of 1987.

### *2.3.3 The Missile Technology Control Regime*

One way of countering the risk of proliferation of weapons of mass destruction (WMD, *i.e.* nuclear, chemical and biological weapons), is to maintain vigilance over the transfer of missile equipment, material, and related technologies usable for systems capable of delivering WMD. National export licensing measures on these products and technologies make it harder for countries seeking to acquire and produce such systems to actually get what they want. But national controls, such as the U.S. ITAR, do not make much sense if such products and technologies are available from other countries which do not implement the same controls. Coordination of such national measures, or multilateralizing the controls, make these much more effective and prevent distortion of competition.

Thus, on April 16, 1987, seven Western countries, *i.e.* the U.S. and its G-7 partners, all major suppliers of missile technology sharing a growing concern with regard to the dangers of nuclear proliferation, agreed to jointly tighten restrictions on the transfer of equipment and technology used in military ballistic missiles, civilian sounding rockets and space launch vehicles to countries suspected of developing or planning to develop nuclear weapon launch systems. The seven nations concerned, the U.S., Canada, U.K., France, West-Germany, Italy and Japan, exchanged diplomatic notes and made statements confirming their adherence to a common international export policy, the *Missile Technology Control Regime*, and established a control mechanism, including an administrative framework, to give teeth to their commitment to prevent this technology from being used by - in practice particularly third world-countries to develop such "nuclear-capable missiles", or "systems (other than manned aircraft) capable of delivering weapons of mass destruction", according to the broader terminology introduced later.[263]

The MTCR has in the meantime grown to an informal and voluntary association of 32 countries which share the goals of non-proliferation of unmanned delivery systems for weapons of mass destruction, and which seek to coordinate national export licensing efforts aimed at preventing their proliferation.
The Regime rests on adherence to common export policy guidelines. These Guidelines apply to an integral common list of controlled items, the MTCR Equipment and Technology Annex. All decisions with respect to the Guidelines and the Annex are taken by consensus.

The MTCR does not take export licensing decisions as a group. Rather, individual partners are responsible for implementing the guidelines and annex in accordance with national legislation and practice.

263. *Agreement on Guidelines for the Transfer of Equipment and Technology Related to Missiles*, April 16, 1987, 26 I.L.M. 599 (1987), hereinafter referred to as MTCR or the Regime. The Regime consists of two parts, the "Guidelines for sensitive missile-relevant transfers" (the Guidelines) and the "Equipment and Technology Annex" (the Annex); the U.S. publication includes a summary of the - very detailed - annex (the Annex summary). For background information and (US) implementation measures, see *Missile Technology Control Regime,* Dept of State Press Briefing, April 16, 1987 (Extract), Doc. 31, American Foreign Policy 74-80 (1987), hereinafter referred to as MTCR State briefing. The MTCR members meet regularly to keep the Equipment and Technology Annex up-to-date and exchange views on the national application/implementation of the Regime. In 1993, a revised version of the Guidelines was adopted, which replaced the term "nuclear" (weapons) by "weapons of mass destruction (i.e. nuclear, chemical and biological weapons)", and tightened some of the criteria used.The new Guidelines became effective on Jan 7, 1993 and replaced with effect from that date the 1987 Regime, see *Missile Technology Control Regime Guidelines Revised*, Department Statement, Text of revisions, 4 (3) US Dept of State Dispatch 41-42 (1993) hereinafter referred to as MTCR revision.

Membership in the MTCR does not create an entitlement to obtain technology from another partner nor an obligation to supply such technology. In fact, the partners are expected, just as in such trade between partners and non-partners, to exercise appropriate accountability and restraint in inter-partner trade.
In making membership decisions (also by consensus), the following factors are taken into consideration:

"... whether a prospective new member would strengthen international non-proliferation efforts, demonstrates a sustained and sustainable commitment to non-proliferation, has a legally based, effective export control system that puts into effect the MTCR Guidelines and procedures, and administers and enforces such controls effectively."[264]

A country can choose to adhere to the guidelines without being obligated to join the group, and, through the years, often in preparation of full membership, a number of countries have indeed done so.

The aim of the MTCR is to restrict the proliferation of missiles, unmanned air vehicles and related technology for those systems capable of carrying a 500 kilogram payload at least 300 kilometers, as well as systems intended for the delivery of weapons of mass destruction.
The MTCR considers missiles to include: *ballistic missiles, space launch vehicles* and *sounding rockets*. Unmanned air vehicles (UAV's) include: cruise missiles, drones, UAV's and remotely piloted vehicles (RPV's).[265]
The national controls of transfers of the above and other items on the Annex (which all have been identified as contributing one way or the other to delivery systems for WMD) are implemented by evaluating applications of firms exporting these items taking into account the following factors:

" 3 ... A. Concerns about the proliferation of weapons of mass destruction;
B. The capabilities and objectives of the missile and space programs of the recipient state;
C. The significance of the transfer in terms of the potential development of delivery systems (other than manned aircraft) for weapons of mass destruction;
D. The assessment of the end-use of the transfers, including the relevant assurances of the recipient states referred to in sub-paragraphs 5.A and 5.B below;
E. The applicability of relevant multilateral agreements."
...
5. Where the transfer could contribute to a delivery system for weapons of mass destruction, the government will authorize transfers of items in the Annex only on receipt of appropriate assurances from the Government of the recipient state that:

264. See *ibid*.
265. See ACDA fact sheet *The Missile Technology Control Regime* (Sep 15, 1997) <http://www.acda.gov/factshee/exptcon/mtcr96.htm>.

A. The items will be used only for the purpose stated and that such use will not be modified nor the items modified or replicated without the prior consent of the United States Government;
B. Neither the items nor replicas nor derivates thereof will be retransferred without the consent of the United States Government."[266]

Some of the countries targeted by the Regime in 1987, such as India and Brazil, were already developing a commercial launch capability that could be turned to military uses, whereas Argentina and Pakistan were also believed to be developing launch vehicles.
Moreover, short-range missile systems and rockets, sold by both U.S.(!) and Soviet firms prior to 1987 to countries such as South Korea, Taiwan and Middle-East countries like Syria and Iraq, created a military hazard as such and were also a cause for concern. Some of these latter countries possessed sufficient know-how to develop more sophisticated and/or longer range versions of the weapons obtained.[267] Most of these so-called "projects of concern" were, in 1987, still in the design or development stage and would, in the view of the MTCR parties, be severely slowed or entirely crippled if foreign exporters did not assist them.[268]

This non-proliferation goal was to be attained by a system of export controls, applied to two categories of items, as specified in an annex: (1) complete rocket systems, including ballistic missiles, space launch vehicles and sounding rockets, capable of delivering at least a 500kg payload to a range of at least 300 km as well as the specially designed production facilities for these systems, and subsystems such as rocket stages, reentry vehicles and rocket engines; (2) components that could be used to build (sub) systems, such as, for example, missile computers and flight control systems.[269]

The category I items - the term 'item' covers both the equipment and the relevant technology - are the items 'of greatest sensitivity', creating a strong presumption to deny any transfers of the systems concerned. And the transfer of production facilities for the manufacture of category I items "will not be authorized until further notice". Or, to put it differently: category I is the *'denial list'*.
If a 'proliferator' cannot buy complete missile or launch vehicle factories or major missile components, it must assemble bits and pieces with much greater time and effort. That is where the category II list, the *'restraint list'*, comes in.

266. See MTCR revision *supra* note 263, Guidelines.
267. See AW/ST, April 20, 1987, at 28, 29 ("Seven nations curb nuclear weapon launch system exports").
268. See MTCR State briefing, *supra* note 263, at 76.
269. See MTCR, *supra* note 263, Guidelines, para. 2 and Annex summary.

As most of these latter items can also be used for purposes other than projects of concern, so-called 'dual use commodities', "restraint will be exercised in the consideration" of all transfers of such items and "all such transfers will be considered on a case-by-case basis", with particular attention being paid to the item's end use: if it is destined for a project of concern, the export application will generally be denied; if the transfer *could* contribute to a delivery system for weapons of mass destruction, assurances from the government of the recipient state are required, to the effect that:

"A. The items will be used only for the purpose stated and that such use will not be modified nor the items modified or replicated without the prior consent of the [government of the state of transfer];
B. Neither the items nor replicas nor derivates thereof will be retransferred without the consent of the [government of the state of transfer]."[270]

The MTCR is not a treaty, but establishes identical guidelines to be implemented by the members - all possessing a certain degree of sensitive missile (components) technology - in accordance with their national legislation. As outlined above, in the U.S., both the Export Administration Act and the Arms Export Control Act and their implementing regulations contained provisions controlling the export of the above items, including enforcement procedures and appropriate sanctions. Nevertheless, Congress was not impressed by these controls and, with fresh memories of the role of missiles (both on the Iraqi and on the 'allied' side) in the Gulf War, wished to strengthen the relevant provisions. Several bills were introduced - with widespread bipartisan support - in the 101st Congress with that intention, focusing in particular on additional *mandatory* sanctions against nations, companies and individuals who violated U.S. export regulations. The Bush administration was unhappy with that approach, which would take away the President's freedom of choice in reacting to inappropriate missile transfers.[271] Nevertheless, the end-product, the *Missile Technology Control Act of 1990*, which amended the above Acts, contained provisions which *require* the U.S. President to impose sanctions on U.S. and foreign persons who violate the export regulations with respect to the MTCR items and commodities as specified. Sanctions in both Acts include denial of U.S. export licenses and prohibitions on U.S. government contracts for two years or more, depending on the seriousness of the violation, with, understandably, violations involving category I systems (complete rockets or launch systems) belonging to the more serious ones.[272]

270. *Id.*, paras 1, 2, 3 and 5.
271. See *Non-proliferation regimes: A comparative analysis of policies to control the spread of nuclear, chemical and biological weapons and missiles*, by Zachary S. Davis, CRS Report for Congress (Apr 1, 1991), hereinafter referred to as CRS Report 1991, at 30.
272. The Missile Technology Control Act, hereinafter referred to as the MTC Act, became law as part of the National Defense Authorization Act, FY 1991, Pub. L. 101-510 (Nov. 5,

1990), Title XVII (Sec. 1701-1704) "Missile Technology Controls", 104 Stat. 1738-1750. The MTC Act implemented the MTCR guidelines and introduced sanctions on violations through amendments of the export license provisions of the Export Administration Act of 1979 (EAA) and the Arms Export Control Act of 1976 (AECA). More in particular, the lists of controlled goods contained in the implementing regulations, the CCL and the USML, were supplemented with the dual-use goods and technologies and other items contained in the MTCR Annex respectively. (This Annex is being reviewed regularly. The responsible agency in the US Administration is the Arms Control and Disarmament Agency (ACDA) within the State Dept. ACDA participates in US delegations to bilateral discussions, to the annual MTCR plenary meetings and to periodic meetings of technical experts, as well as in internal missile non-proliferation efforts. ACDA serves as the executive secretary to the interagency Missile Trade Analysis Group which is responsible for US interdiction efforts and missile sanctions review. ACDA members also participate in review of missile technology export licensing through the Missile Technology Export Control Group, and provide inputs to the review process of the MTCR Equipment and Technology Annex in the Missile Annex Review Committee, see ACDA Annual Report 1995 <http://www.acda.gov/reports/chap6.htm>, hereinafter referred to as ACDA Annual Report 1995, at Chapter 6.
The EAA as amended required an "individual validated license" for "(A) any export of goods or technology on the list [of the above MTCR items] to any country; and (B) any export of goods or technology that the exporter knows is destined for a project or facility for the design, development, or manufacture of a missile in a country that is not an MTCR adherent" (subsection l, para. 2). Licenses would *in general* be denied in para. 2 cases where the goods would end up in a missile developing or building facility in a non-MTCR country; and be denied if the ultimate destination was a facility in a country supporting "international acts of terrorism" (para. 3).
Both Acts, as amended by the MTC Act, provided new sanctions related to MTCR-related violations.
Thus, the MTC Act amended the EAA by inserting, under the heading "Missile proliferation control violations" a new Sec. 11B, which distinguished between (a) "violations by United States persons" and (b) "Transfers of missile equipment or technology by foreign persons" with specific trade sanctions per category as follows: if a foreign person exports MTCR items to a 'forbidden' destination, the President shall, in the case of a Cat. II item, "deny for a period of 2 years, licenses for the transfer to such foreign person of missile equipment or technology the export of which is controlled under this Act" (In other words, no US export to that country of *missile-related* dual use items) If the violation concerns the export of a Cat. I MTCR item, US exports to that country will be denied for *any* dual-use item covered by the Act, for a period of *minimal* 2 years. The President has the authority to waive the imposition of a sanction on a foreign person if he determines that such waiver "is essential to the national security of the [US]", but before doing so he will have to notify Congress and fully explain his reasons. (Para. 5) In case of similar violations by *US persons*, the latter will face corresponding sanctions, *i.e.* depending on the category of items involved in, and thus the seriousness of, the violation (MTCR Cat. I or II), they receive no licenses for exports of missile-related dual-use goods or *any* dual-use goods for a specific period of time, *i.e.* 2 years or *minimal* 2 years (Sec.11B. (a))
The AECA was amended by the insertion of Chapter 7, "Control of missiles and missile equipment or technology", containing roughly similar provisions/sanctions as the above amendments to the EAA, under the headings "Denial of the transfer of missile equipment or technology by United States persons" (Sec. 72), and "Transfers of missile equipment or technology by foreign persons" (Sec. 73).
The sanction which applies to a *US person* unlawfully trading in MTCR goods/technologies ("defense articles") on the USML as amended by the MTC Act, is, in case of trade in Cat II

In the years following the adoption of the MTCR guidelines, more and more nations joined the original seven, either by becoming a member or through declarations committing themselves to abide by the Regime; this non-proliferation policy is thus being implemented, at least in principle, by practically all major missile suppliers.[273]

items, a denial for 2 years of US Government contracts relating to missile equipment or technology, and licenses for the transfer of missile equipment or technology controlled under the AECA; in case of forbidden trade in the more sensitive Cat I missile equipment or technology, "the President shall deny to such [US] person for a period of not less than 2 years (i) all [US] Government contracts, and (ii) all export licenses and agreements for items on the [USML]." Cat. II violations by *foreign* persons result in a denial for 2 years of "(i) [US] Government contracts relating to missile equipment or technology; and (ii) licenses for the transfer to such foreign person of missile equipment or technology controlled under this Act." Cat. I violations have the stiffer penalty of a denial by the President, for a period of *not less than* 2 years of "(i) all [US] Government contracts with such foreign person; and (ii) licenses for the transfer to such foreign person of all items on the [USML]". An additional sanction is imposed in case the export/trade of the foreign person "has substantially contributed to the design, development, or production of missiles in a country that is not an MTCR adherent, then the President shall prohibit, for a period of not less than 2 years, the importation into the [US] of products produced by that foreign person" (Sec. 73. (a) (2)(A)-(C)). The President has, again, the authority to waive the imposition of these sanctions if such waiver is essential to the US national security (subject to notification to Congress).

273. Membership grew gradually. Near the end of 1989, the following additional countries had become members: Australia, Austria, Belgium, Denmark, Finland, Luxembourg, Netherlands, Norway, New Zealand, Spain, and Sweden, putting the total at 18. A RAND Corporation study published in 1993 mentioned the former Soviet Union, Switzerland, Israel and China as - additional - countries that had agreed to abide by the MTCR guidelines. The same study quoted a U.S. government official's statement of April 1992 before a Congressional committee to the effect that Poland, Hungary, Czechoslovakia, Romania, and Bulgaria had already adopted, or were in the process of adopting, controls comparable to those of the MTCR; this left only North Korea as the remaining major missile supplier outside MTCR, a lonely position which the author expected to be of a temporary nature only, see Brian G. Chow, *Emerging national space launch programs - economics and safeguards*, National Defense Research Institute, RAND, U.S.A. (1993) [hereinafter cited as RAND study] at 2. A Pentagon official, in August 1993, put total MTCR membership at 23, and voiced the expectation that Argentina and Hungary would join in the not too distant future, see 4 (32) Space News (Aug. 1993) at 1. A statement issued by MTCR after its Mar 8-11, 1993 plenary session in Canberra, welcomed Iceland as member number 23, agreed to invite applicant countries Argentina and Hungary to become Partners, and listed the following members: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the US, see 4 (14) US Dept of State Dispatch (1993) at 206. In November 1997 the number of participating countries had increased to a total of 29 (including but only after years of complicated US- (Soviet-) Russian talks, Russia): Argentina, Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Russia, South Africa, Spain, Sweden, Switzerland, Turkey, U.K. and the U.S, see *Commonly asked questions on the ... (MTCR)*, ACDA fact sheet

There is general agreement amongst experts and policy makers alike that it is virtually impossible to distinguish between peaceful space launch technology and offensive missile technology (and, in fact space launchers are simply surface-to-space ballistic missiles).[274] If that is a fact, then technical assistance to a nation's space launch program - either through direct sales of launchers, rocket engines and/or the relevant technology or through a bilateral cooperative launcher development programme - is as potentially 'proliferatory' as selling ballistic missiles (technology) to its military establishment.

Thus, although the MTCR states that "the Guidelines are not designed to impede national space programs or international cooperation in such programs as long as such programs could not contribute to nuclear weapons delivery systems", this is a matter of interpretation: a country enforcing the guidelines can conclude that its decision has made the world a safer place while the 'victim' country decries the same decision as one causing an unwarranted set-back to its peaceful space (launch) program.

An example of the latter category is *India*, a country with an advanced and consistently government- funded space program, both a -modest - seller of space goods in its own right and a buyer of U.S. satellite components. Inda has the technological know-how, the cost-consciousness and the ambition to obtain independent access to space for its own satellites.[275] To that end, since

<http://www.acda.gov/factshee/exptcon/fs.htm> (Nov 26, 1997). In a May 1998 "Reinforced Point of Contact (RPOC) Meeting", the MTCR partners reached consensus to admit the Czech Republic, Poland and Ukraine to membership in the MTCR, bringing total membership to 32, see Text of a letter from the President to the Speaker of the House of Representatives and the President of the Senate, The White House, Off. of the Press Secretary (Nov 12, 1998) <http\\www.pub.whitehouse.gov/urires/TzR?urn:pdi://oma.eop.gov.us/1998/11/16/9.text.1 > India, though both a missile and launcher manufacturer, has not joined yet.

274. At the Dept of State briefing on MTCR it was put as follows: "Space launch vehicles, for instance are virtually interchangeable with ballistic missiles. When President Kennedy was asked the difference between the Atlas rocket that put John Glenn into orbit and an Atlas rocket armed with a nuclear warhead and aimed at the Soviet Union, he replied with one word-'attitude'.", see MTCR State briefing, *supra* note 263, at 75.

275. India has built remote -sensing satellites and ground equipment, and telecommunications satellites. In 1992, Indian officials mentioned remote sensing data, propellant tanks and launcher propellant as - potential - export products, see 3 (17) Space News (May 1992) at 1, 21. In December 1994, Intelsat decided to lease more than half the transponder capacity of an Indian Insat 2E communications satellite to be launched in 1997 to cover its telecommunications needs in the Asia-Pacific region. Under the contract Intelsat would pay India $ 100 million over a 10-year period, see 6 (1) Space News (Jan 1995) at 16 . For a more extensive account of - the development of - India's space applications program, including launchers, see the series of articles on "Indian Space" in 3 (18) Space News (May 1992) at 14, 15, 3 (19) Space News (May 1992) at 14, and 3 (20) Space News (May 1992) at 11. India aimed, with its own rocket, to bring launch costs down to about one third of western launch prices, see 4 (28) Space News (Jul 1993) at 3. Whether the PSLV it has developed in the meantime now meets that requirement is a matter of debate; and whether its

1984, India has been developing its own launch vehicles, one of which is the Geosynchronous Satellite Launch Vehicle. For the so-called cryogenic upper stage, the Indian Space Research Organization (ISRO), in the late eighties, after talks with General Dynamics and Arianespace had failed, turned to the Russian space agency Glavkosmos and finally signed an agreement in November 1990 for the sale of two such engines to be delivered in 1994/1995, with future engines to be built by ISRO itself, based on the technology transferred by the Russians under the agreement.

The State Department considered the sale of this engine, which according to its arms control experts could be used to propel ballistic missiles, a violation of the MTCR guidelines and, by virtue of the Arms Export Control Act and the Export Administration Act, as amended by the Missile Technology Control Act, prohibited with effect from May 6, 1992 for two years all exports of U.S. made components to Glavkosmos and to the Indian organization.[276] The embargo was applied by both the State Department and the Department of Commerce. It also affected contracts already signed and would, according to ISRO officials, delay the manufacturing and launch schedule of its domestic communications satellites Insat 2C and 2D. ('delay', because the components would have to be obtained elsewhere in the world aerospace industry, and obviously from a country which did not abide by the MTCR rules, either as an outsider or as a member with a different interpretation of the law or the facts). ISRO rejected the U.S. government assertion that the Indian launch program was closely linked with military ballistic missile efforts, and maintained that there was a complete separation between civilian space launch and military missile efforts.[277]

GSLV will do so also remains to be seen. But low cost is not its highest priority: India's main goal with its space effort in the 1960's was to accelerate national development; and more recently, it was formulated along, *inter alia*, the following lines:
"sustain and grow autonomous national space capability by virtue of India's size, diversities and development needs; enable strategic and leading edge technology development; realize economic benefits and promote sustainable space industry", etc. That is why India builds both satellites and launch vehicles, see speech ISRO Chairman, IAF Melbourne Congress (Sep 28, 1998), hereinafter referred to as ISRO Melbourne speech.

276. The State Dept issued the following statement: "... The MTCR partners all have concluded that the Glavkosmos-ISRO deal is inconsistent with the MTCR guidelines. That is why they have urged that this deal not go through ... Since the facts are clear and since the parties to the transaction have declined to terminate these activities, the [US] has imposed sanctions in accordance with our law. The sanctions are: -a 2-year ban on all US-licensed exports to these entities (i.e., Glavkosmos and ISRO); a 2-year ban on all imports into the [US] from these entities; and a 2-year ban on US Government contracts with these entities ... We have explained to both governments that termination of the Glavkosmos-ISRO deal could permit us to consider a waiver of these sanctions.", see *Russian sale of rocket engine to India*, Statement by Department deputy spokesman (May 11, 1992), US Dept of State Dispatch (May 18, 1992) at 386. For the legal basis, see AECA and EAA as amended, *supra* note 272. See, for press report on the sanctions, 3 (19) Space News (May 1992) at 14 ("U.S. sanctions imposed; India deal with Russia still on"); for - further - background, see 3 (18) Space News (May 1992) at 1, 28 ("U.S. sanctions target Indian, Russian programs").

277. See above press reports. The ISRO chairman, in an interview after the imposition of the

The sale of the engine went through as planned, and India bought the components it needed from companies outside the United States. The U.S. measures, which were apparently not sufficiently supported by corresponding measures of the other MTCR members, drew strong reactions from American industry. At a Congressional hearing on "Export control reform in high technology" of August 1993, a representative of the American Electronics Association voiced, on behalf of 3000 American high technology companies involved in electronics, his frustration about the effects this imposition of unilateral controls had produced for U.S. industry:

"... the parties most hurt by this decision have been U.S. companies. After some fifteen months, exporters are still unable to export even such basic goods as pencils to I.S.R.O.
...
In the meantime, our European and Japanese competitors have had no difficulty filling the void ...
When customers such as I.S.R.O. are no longer able to obtain needed goods from U.S. industry, they turn elsewhere and often make permanent decisions not to 'buy America' ... Our government should quit playing the Pied Piper expecting others to quickly follow in line with us after we have imposed controls unilaterally."[278]

A similar case erupted in June 1993, when the State Department determined that the Russian firm KB Salyut was directly involved in the sale of liquid-fueled rocket engines to India. This time, the controversy was more complicated. What remained the same were the desparate financial needs of the Russian aerospace industries, which therefore were as eager as ever to sell any hardware and/or technology to any customer willing to pay in hard currency. On the U.S. side, the existing non-proliferation worries were joined by the concern that the Russian space industry, with all its advanced technology and expertise, if unassisted, would be successively sold, in bits and pieces, to the highest bidders amongst which were suspected to be particularly those countries whose technological advances the MTCR tried to curtail.
For that reason, the U.S. was trying to get Russian manpower, space technology and hardware involved in the Space Station program (with the welcome side-effect of a possible interesting reduction of the much-criticized astronomical cost of the project). For the same reason, negotiations were taking place on Russia's entry into the international commercial launch market

sanctions, expressed particular anger at the retro-active character of the ban, and rightfully pointed out that this aspect of the measure would undermine the credibility of the U.S. space (components) industry in international markets. The American companies affected by the sanction, Lockheed and Hughes, were reported to challenge the retroactiveness of the ban, which was only applied by the Commerce Department, see 3 (26) Space News (Jul 1992) at 9 ("Embargo threatens India's space program schedule").

278. See *Export Control Reform in High Technology*, hearing before the House Committee on Science, Space and Technology, 103rd Cong., 1st Sess. (Aug. 13, 1993) hereinafter referred to as High technology hearing, 123-131 (statement of Ms. Derrel de Passe) at 127-128.

in such a way that the Russian launch industry would be able to sell launch services without their U.S. counterparts being unduly damaged as a result. (See next Chapter)

An additional complication were the new links that had been forged among the Russian industries and also between Russian and U.S. companies: a ban, depending on its scope, could apply to all and effectively halt all space cooperation, whether on an intergovernmental or private level, between the U.S. and Russia.[279]

The compromise reached in July 1993 between Prime Minister Chernomyrdin and Vice President Gore saw India at the loosing end. It was agreed that the Russians could sell a number of rocket engines to ISRO, but would not be allowed to sell the technology that India needed to manufacture the engines independently. Russia at the same time agreed to henceforth abide by the MTCR guidelines. New sanctions were thus averted (the original sanctions against Glavkosmos and ISRO remained in place for the remainder of the two year period, *i.e.* until May 6, 1994), and the planned space cooperation between Russia (without participation of Glavkosmos!) and the U.S., as outlined above, was safeguarded, to the undisputable benefit of both, but to the - financial - relief of particularly the former and the 'security' relief of the latter.[280]

279. KB Salyut, which designs the Proton rocket, merged with Khrunichev Enterprise, Proton's manufacturer; the latter concluded an agreement with Lockheed to jointly market the Proton rocket outside Russia. NPO Energia, which builds the fourth stage of the Proton rocket, in July 1993, agreed with Rockwell to build a docking unit and provide technical services for a joint Mir and space shuttle mission; and United Technologies Pratt & Whitney concluded a marketing agreement with Energomash of Moscow which builds rocket engines, see 4 (27) Space News (Jul 1993) at 1, 20 ("U.S. may slap new sanctions on Russia").

280. Preceded by an understanding reached by the US and Russian presidents in Vancouver on Apr 3-4, 1993, Vice President Al Gore and Prime Minister Chernomyrdin, on Sep 2, 1993 concluded a number of related cooperation agreements. Most important in the context of this Chapter were a joint statement on space cooperation, particularly addressing Russia's participation in the international space station program (which promised work/money for the embattled Russian space industry), a bilateral launch trade agreement giving Russia access to the international launch services market (promising work/money for the Russian launch industry) and a M.o.U. on missile-related exports, in which Russia agreed to abide by the criteria and standards of MTCR. The Fact Sheet released by the office of the Vice President added somewhat cryptically: "We also reached an understanding on the disposition of Russia's cryogenic rocket engine contract with India. We expect a final arrangement on this issue to be reached by the beginning of next year", see Fact Sheets, *Joint statements on space cooperation, aeronautics and earth observation*, Office of the Vice President (Sep 2, 1993), Gorove US Space Law, *supra* note 55, at I.A.4 (a-2). See also Testimony of John H. Gibbons, Director, Office of Science and Technology Policy, before the House Subcommittee on Space Science and Applications (Oct 6, 1993) <http://www.whitehouse.gov/WH/EOP/OSTP/other/ts931006.html>. Before the deal was made, an editorial qualified the *quid pro quo*, along the lines of the U.S. State Department views on the matter, as follows: "If space cooperation and market access is the prize that

India's loss was not so much a matter of now lacking the hardware as such, but of being deprived of the technology and having lost two precious years in which they could have worked on the development of their own engine; which of course was exactly what the MTCR aims were all about.[281]
In October 1993, the Russians formally cancelled the engine contract altogether, citing legal provisions in the contract.[282] India, at the same time, continued to autonomously develop and test two other families of smaller launch vehicles, and it was generally expected that neither the mixed results of the latter, nor the above cancellation of the engine contract would lessen its drive to build an independent launch system.[283] (And in fact, on September 29, 1997, India reached a milestone with the first operational launch of its Polar Satellite Launch Vehicle. The payload was an Indian earth-imaging satellite, which underscored that country's increasing independence from

will get the Russians' attention on issues like the [MTCR], then the Clinton administration should use it to put the pressure on full force. A little heavy-handedness by the [U.S.] now could avert many potential crises for decades to come, if missile proliferation goes unchecked due to Russian greed", see 4 (27) Space News (Jul 1992) at 14 ("Commentary").

281. That result may have been overstated: according to Henry Sokolski, former deputy for nonproliferation policy in the Pentagon, in July 1993, Yeltsin promised Clinton to reconfigure Russia's contract with ISRO by Nov 1, 1993, so it would exclude any transfers of production technology. But between July and October Russia, according to Indian officials, transferred more than 4/5 of the sanctioned production technology and sent its 'drawings of the engine' in Sep 1993 that would enable India to produce the engines within a few years, see 9(21) Space News (May 1998) at 11.
U.R. Rao, the ISRO chairman, said in an interview in 1993 that "without the technology transfer this contract is not worth much ... The technology is the heart of this contract". According to the same official, India had agreed with Russia that the engine technology would not be transferred to third parties, and that it would be used exclusively for peaceful purposes, see 4 (28) Space News (Jul 1993) at 3 ("Russia backs away from India deal"). That latter commitment would not have satisfied the U.S. which considered India itself a country that should not be assisted in building up launch technology; in the American view, countries like India should be allowed their legitimate access to space through U.S. and other launch services at reasonable prices. In the same vain, Russia, as part of its fence-mending efforts vis-à-vis India, offered inexpensive launches of Indian communications satellites aboard Proton rockets "which would give India time to complete its new vehicle using Russian engines and eventually its own domestically built engines". See *ibid.* The launch price argument did play a role - though not a decisive one - in India's decision to build an indigenous launch vehicle, see *supra* note 275.

282. Information provided by an ISRO spokesman as quoted in 5 (11) Space News (Mar 1994) at 3.

283. *Ibid.* and see 4 (38) Space News (Sep-Oct 1993) at 1, 28 ("India's rocket effort falters"). Shortly after the date of expiry of the 1992 sanctions, in May 1994, India and Russia were reported to have signed a revised contract giving India four cryogenic engines, with an option for three more; at the same time India had begun its own engine development program. The Russian engines would be incorporated into India's own geostationary space launch vehicle to be ready for a first launch in 1996 of an Insat communications satellite built by ISRO. Under the terms of that latter agreement, the *technology* for the engines would not be transferred to India, see 5 (18) Space News (May 1994) at 3 and 5 (22) Space News (May/Jun 1994) at 2.

western space technology, at least as far as 'official' transfers are concerned).[284]
India's military scientists in the meantime continue the development and testing of 'real' ballistic missiles, for air defense purposes and to counter the threat posed by Chinese-made M-11 missiles deployed by Pakistan.[285] (As discussed in Chapter 3.1 on U.S. -China launch relations, the alleged M- 11 sales to Pakistan also brought about U.S. - imposed MTCR sanctions directed against China).

*Other countries subjected to MTCR controls*
A 1993 RAND Corporation study on emerging national space launch programs put India, Brazil and Israel in the same class of countries which have made substantial investments - in manpower and money - in both civil space launchers and ballistic missile programs. The report addresses the economic viability of the space launch program of one of these countries, Brazil, and concludes that the prospects for making profits from its space launch business are very poor. This conclusion extended to India and Israel as well, and applied *a fortiori* to the planned launch activities of a second group, whose programs were still in the early stage of development or planning, with investments significantly less than those in the first group: South Africa, Iraq, South Korea, Pakistan, Indonesia, Taiwan and Argentina.

The study argued convincingly that the poorer the economic prospects, the less uncomfortable the U.S. and other MTCR members would be in exercising export controls and in - thus - stemming the flow of launch technology to the countries concerned.[286]

Two countries belonging to the second group were believed to have cancelled the development of indigenous launchers as a consequence of MTCR-inspired launch technology export license refusals on the part of the U.S., *viz. Taiwan* in 1990, and *South Africa* in 1993, with in the latter case "[p]oor commercial prospects for the vehicle [having] speeded the cancellation."[287] A third country, *Argentina*, cancelled its 'Condor 2' ballistic missile program, also for

284. See 8 (47) Space News (1997) at 6. More recently, an ISRO official, without acknowledging the extent of the ensuring delays, observed that the MTCR affair had been blessing in disguise, because it forced India to develop its own launch technology, see Mukund Rao, Deputy Director, at IMF Melbourne Congress (convers. with the author). As for the issue of (non-)proliferation of launcher technology India made it one of the more important issues for 'space policy adjustments'. As recently stated by ISRO, "we take into account international concerns [*re* proliferation of launch vehicle technologies] and have national regulations taking care of those", see ISRO Melbourne speech, *supra* note 275.
285. See IHT (Jun 6, 1994) at 6 ("India test-fires missile, ignoring U.S. opposition").
286. See RAND study, *supra* note 273, at 4, 8.
287. See AW/ST (Oct 22, 1990) at 11 ("Taiwan scraps booster plans"); AW/ST (Jul 5, 1993) at 21 and 4 (32) Space News (Aug 1993) at 1 (*re* South Africa).

MTCR-related reasons, though planning to pursue 'peaceful use' of Condor technology.[288] Argentina became member of MTCR in 1994, and South Africa joined one year later.

As for the countries in the first group, the Rand Report noted that *Brazil*'s space launch program had experienced delays because of the non-availability of components due to MTCR and, without technical assistance, could be further delayed or even cancelled.[289] The latter (*i.e.* cancellation) did not materialize: Brazil became member of MTCR in 1995, and continued the development of its civil launcher, though with limited success: the *Veiculo Lancador de Satellites'* launch on November 2, 1997 failed at lift-off. The Brazilian space officials maintained their plans to build at least three more rockets of this type.[290] In 1995, also the *Russian Federation* - finally - joined the Regime, though, until today, the government's export controls are far from leak-proof, reportedly resulting in missile technology and expertise being sold by Russia's industries to Iran. The latter's considerable WMD capabilities, particularly extended-range missiles and chemical weapons, and its continuing efforts to enhance those capabilities are seen as a substantial threat to neighboring states and to U.S. installations in the region. The U.S. government therefore continues to press upon Russia to tighten its export regulations and enforcement. This pressure has apparently resulted in the Russian government

288. See RAND study, *supra* note 273, at 7, 8. See also McCall *supra* note 232, at 64: "One Argentine program involving several large European companies, Iraq and Egypt was finally halted in 1990, amid mounting diplomatic pressure, scheduling breakdowns, financial shortfalls and technical difficulties attributed in large part to the Regime's efforts". In his address to the 48th Session of the UNGA on Sep 27, 1993, President Clinton stated: "I am proposing as well new steps to thwart the proliferation of ballistic missiles. Recently, working with Russia, Argentina, Hungary and South Africa, we have made significant progress toward that goal. Now, we will seek to strengthen the principles of the [MTCR] by transforming it from an agreement on technology transfer among just 23 nations to a set of rules that can command universal adherence", see Address by the President to the 48th Session of the [UNGA], White House Press Release (Sep 27, 1993), The White House Virtual Library <http://library.whitehouse.gov/cgi...> Though the latter goal was rather ambitious, Argentina and Hungary joined in 1994, followed by Brazil, South Africa and, finally and of considerable importance, the Russian Federation in 1995, which at the end of that year brought total membership to 28, see ACDA Annual Report 1995, *supra* note 272, at Chapter 3 ("Controlling missiles and space weapons") Turkey is mentioned as the 29th member in various 1997 State Dept documents on the subject.

289. See RAND study, *supra* note 273, at 50. A Brazilian author, some years later, confirmed the effect of MTCR on the Brazilian space program and, more in particular, on the development of its national launch vehicle. In the same article the (then) Brazilian president is quoted stating, in 1988, at the occasion of the signing of a Protocol on space cooperation with China, that this cooperation "could brake those restrictions the developed nations had built against the advanced technologies transfer", see Jose Monserrat Filho, *Brazilian-Chinese space cooperation: an analysis of its legal performance*, Proceed. 39th Colloq. L. Outer Space 164-175 (1996).

290. See 8 (47) Space News (1997) at 22. Prior to joining MTCR, Brazil had enacted the required domestic missile/launcher export control legislation.

taking initial steps - and making commitments to take substantial additional steps - "to crack down on Russian entities supplying missile technology to Iran."[291]

*Israel's* special military and security relations with the U.S. make the former an unlikely candidate for being subjected to the strict application of the MTCR guidelines. As Israel's ballistic missile program is well-advanced and operational, and strategically acceptable to at least a number of MTCR members, additional missile technology will be accessable to Israel's military establishment. This makes the limiting of civil launch technology transfers under MTCR rules - for fear of this technology being used for the development of missiles - a bit frivolous to say the least. The RAND study concludes that the economic prospects for Israel's indigenous space launcher 'Shavit' are as poor as Brazil's, and there is little reason to believe that it will either be developed as an autonomous commercial launch system or be an attractive candidate for a joint venture with another MTCR member. (As a country that abides by the Regime itself, it would not be allowed to share its launcher technology with a non-member.) Nevertheless, development for domestic purposes continues (though with limited success: a January 1998 launch of the Shavit, carrying an Ofek 4 imaging satellite, failed due to a malfunction in the rocket's launch sequence)[292] and, as we saw in Chapter 1, a U.S. company is using Shavit design and technology to build a U.S. version for sale in the (U.S.) launch market.

*Japan's* activities as a launch nation were made possible by a cooperative agreement concluded in 1969, which enabled Japan to use (U.S. Delta-derived) N-1 and N-2 launch vehicles built in Japan under license from McDonnell Douglas. By virtue of the agreement, Japan was given access to this technology and equipment on condition that the launch vehicles would only be used for peaceful purposes, and could not be used to launch satellites for other countries without U.S. permission.[293]

291. See Oakley testimony, *supra* note 190, at 3. As the State official further observes, "[e]vents over the past years [i.e. 1997] have demonstrated the ability of would-be proliferators, notably Iran, to exploit Russia's missile development infrastructure. If allowed to continue, access to Russian technology and expertise will enable the Iranians to develop and field intermediate range ballistic missiles faster than if they were left to their own devices." In her testimony, the speaker noted the economic/financial circumstances which had a strong influence on Russia's behaviour: "... economic realities are such that Russia perceives the need to export arms in order to maintain its arms industry, and Moscow continues to try to expand sales to old and new customers alike", *id.*, at 8-9.

292. See 9 (6) Space News (1998) at 18.

293. See Marcia S. Smith, *Space Activities of the [U.S.], CIS, and other launching countries/organizations*: 1957-1993, CRS Report for Congress (Mar 29, 1994), hereinafter referred to as Smith, CRS Report 1957-1993, at 163. See also Masahiko Sato, *The Japanese legal framework: Third party liability resulting from NASDA launch activities*, IISL-98-IISL.2.05, IAF Melbourne Congress, *supra* Chapter 1, note 31.

Where the latter condition, in view of the year of the agreement's conclusion, was probably more foreign policy related than commercially-oriented, the former had a clear non-proliferation purpose. This was supported by a Diet resolution in the same year which prohibited Japan from pursuing space programs for other than peaceful purposes. A *bona fide* interpretation of both agreement and resolution would rule out the use of the Delta technology for missile-related purposes of Japan and/or export of that technology to countries with missile programs *in statu nascendi*. Its dependence on U.S. permission to launch foreign payloads, created the understandable wish to have an indigenous, 100% Japanese launcher. Hence the development of the H-class launch vehicle, the first version of which, the H-1, still contained U.S. components bringing it under the restrictions of the 1969 agreement. The H-2 which replaced its predecessor after February 1992 is entirely Japanese and makes the relevant part of the 1969 agreement - insofar as it still exists - obsolete. Its export control element had been taken over by MTCR of 1987, of which Japan was one of the founding members. This did not prevent the State Department, in 1996, from temporarily holding up the sale by the U.S. aerospace company Thiokol of (USML-listed) technology which Japan needed for the upgrade of its H-2 launch vehicle. Although brandished by the trade press at the time as a case of "proliferation paranoia"[294] (which it possibly was), it (also) served to confirm that MTCR does not create a right for members to obtain launch or missile technology from other members and that U.S. MTCR-related export control regulations subject such deliveries to a case-by-case review even when the recipient state is an MTCR friend and ally. In this connection it is worth quoting Clinton's 1993 non-proliferation policy on which this approach is based:

"The [U.S] will not support the development or acquisition of space launch vehicles in countries outside the MTCR. For MTCR member countries, we will not encourage new space launch vehicle programs which raise questions on both non-proliferation and economic viability grounds. The [U.S.] will, however, consider exports of MTCR-controlled items to MTCR member countries for peaceful space launch programs on a case-by-case basis."[295]

The above is standing U.S. policy, confirmed as such in *e.g.* the Annual Reports of the ACDA.[296]

294. See Space News Online (Sep 30, 1996) at 12 ("Proliferation paranoia") <http://www.spacenews.com/spacenews/smembers/sarch/sarch96/sn093085.htm>

295. See *Non-proliferation and export control policy*, Fact Sheet, White House, Office of the Press Secretary (Sep 27, 1993), 4 (40) US Dept of State Dispatch 676-677 (Oct 4, 1993) hereinafter referred to as 1993 non-proliferation policy, at 677. See also Chapter 2.3.4 *infra*.

296. See *e.g.* ACDA Annual Report 1995, *supra* note 272, at Chapter 3 ("Controlling missiles and space weapons"): "As a matter of policy, the U.S. does not encourage new space launch programs, and U.S. exports to foreign space programs are reviewed to ensure that they will not contribute to a missile program of proliferation concern."

It nevertheless remains remarkable that a trusted U.S. ally would receive treatment usually reserved for countries of more pressing proliferation concern.

A Congressional report of 1991, apart from confirming a number of 'successes' of the Regime, also mentioned that MTCR had made Germany tighten its export control law and investigate charges that its nationals had engaged in smuggling missile technology to developing countries. It noted further that Italy had taken legal action against alleged missile technology smugglers, and a number of other European countries, Japan and Australia had reviewed and tightened their export control systems. But the report also criticized the MTCR members for inconsistent and uneven application of their national export controls, cited companies and individuals in France, Germany, Israel, Italy, Japan, South Africa, the Soviet Union and the United States for having transferred entire systems, components, materials or technical information to other countries engaged in missile development, and brandished the Regime as not comprehensive or leakproof, not restricting all relevant missile technology and lacking verification and enforcement mechanisms. The 1991 report finally warned of the growing number of non-MTCR states producing ballistic missiles with indigenous technology, increasingly less dependent on imported materials and forging alliances with other developing nations seeking to develop or purchase their own missiles.[297]

The above developments in the membership of MTCR between 1991 and 1995 implied that, of the countries which remained outside and were at the same time considered significant potential suppliers of missile technology, China and North Korea were considered the most actively 'proliferatory', with Middle Eastern countries Iraq, Iran, Libya and Syria identified by the U.S. intelligence community as eager clients, and South Asian adversaries India and Pakistan equally determined to acquire the technologies necessary to keep a balance of threats.[298] The latter two countries were considered different in at least one way: where Pakistan was seen as an importer of missile-related goods and technology (mainly from China), India continued its development of indigenous ballistic missiles. At the same time India persisted in building its own *civil* launch capability, notwithstanding the MTCR controls, thus creating the interesting option for the U.S. and the other MTCR members to consider the latter activity as of lesser relevance for non-proliferation purposes (something India has always maintained) and therefore fit for a relaxing of controls, if not for cooperative ventures in the field of launching. On the other hand, it cannot be denied that a country's determination to develop or improve its missile capabilities make any outside-imposed creation of a 'Chinese wall' between that industry and its civil launch cousin largely illusory. (One has only to think

<http://www.acda.gov/reports/chap3.htm>.

297. See CRS Report 1991, *supra* note 271, at 28.

298. See Oakley testimony, *supra* note 190, at 10,5 resp.

about a carreer move of an experienced civil launch engineer to the military establishment, a domestic conference on launch technology or research contracts for a domestic university's space (propulsion) technology department). Even a weak bout of proliferation paranoia may therefore disqualify a country as importer of launch technology for the only reason that there is thought to be a military establishment interested in missile development.

Understandably, the countries affected strongly criticized the Regime as discriminatory, unnecessary and burdensome.
An early view from India - one of the more vocal members of the above group of emerging space powers - probably reflected the prevailing sentiment among its fellow-members when it comes to determining the effects of the MTCR export controls. After having defended the right of the developing countries to follow the developed states in using outer space for military purposes, it challenged as unacceptable the underlying premise of the Regime "that only certain countries have the wisdom and sagacety to handle complex weapon systems."[299] It then identified the two main negative effects of an MTCR embargo: (1) it makes the affected country even more determined to achieve self-reliance in the missile field, and strengthens the hands of the 'hawks' in this respect, and (2) it affects (world) trade in the civilian space market and gets in the way of meaningful economic cooperation in that sector.[300]
A reaction to the first point may be that the draftsmen of the Regime, far from being convinced that it would stop missile proliferation altogether, are content with making it as difficult as possible for a missile technology-hungry country to obtain the right material at the right time and at acceptable cost, and will react to 'hawkish' behaviour with even more determination to implement the embargo, forcing the country concerned to turn to non-MTCR salesmen for - possibly - less reliable goods at higher cost.[301]

299. See S. Chandrashekar, *Missile technology control and the third world - are there alternatives?,* 6 (4) Space Policy 278-284 (1990) at 279. In the same vain Boutros-Ghali, *International cooperation in space activities for enhancing security in the post-cold war era*, report of the Secretary-General, UN, Dept of Political Affairs, A/48/221 (undated): "In recent years some states have taken steps, both individually and multilaterally, to halt the proliferation of advanced military technologies, most notably through the [MTCR] and other supply-side controls. However, these measures raise international political problems because they are perceived by many countries of the world to be inequitable ... As with other elements of proliferation control and disarmament, any controls must be non-discriminatory and generally acceptable, if they are to be effective", at 9-10.

300. *Id* at 280.

301. See McCall *supra* note 232, which, apart from referring to the cancellation of Argentina's Condor 2 project, also mentions the ballistic missile programs of India ('Agni') and Brazil ('Avibras') as "[having] been effectively hindered by the regime", and Iraq's missile production efforts as having been thwarted in large part by MTCR-related pressure on exporting companies and countries, *id.* at 64, 65. And a State Dept official in 1989 stated: "The MTCR has had a substantial impact on some developing programs which rely heavily

As to the second point, there is no denying that the MTCR premise, that no meaningful and effective distinction can be made between military missile technology and civil launch technology, affects trade in space (launch) goods and services and makes cooperation in that field a complicated and highly uncertain affair. No matter how utterly peaceful a launch program may be, the dual-use conundrum turns it into a suspected activity, to be feared and resisted, particularly of course where the country concerned is also known or suspected to be of the missile-seeking type. The ironic result in the latter case may be that a country, confronted with the high cost, complexities and uncertainties of the build-up of both a civilian launch and a military missile capability, will, if for economic reasons forced to choose, for (regional) security and strategic reasons opt for maintaining the latter rather than the former program.

*Missiles-turned-launchers*

A related issue with a MTCR angle is the control of missiles converted into and used as civil launch vehicles.

An early example is Space Commerce Corporation of Houston, Texas, which on July 29, 1989, signed an M.o.U. with Technopribor, a Soviet Consortium set up to export previously classified technology related to the production of medium range SS-20 (nuclear capable) missiles. The two agreed to develop and market a new commercial launch vehicle based on this missile, the *Start* (not to be confused with the Strategic Arms Reduction Treaty for which the same acronym is used). Initial discussion within the U.S. government focused primarily on the *arms control* aspect, i.e. the possibility that the Soviet Union would (continue to) produce missile-type vehicles 'disguised' as civil Start launch vehicles and therefore not counted as real missiles for arms limitation purposes. (The 1987 INF (Intermediate-Range Nuclear Forces) Treaty requires the U.S and the Soviet Union to eliminate all intermediate-range missiles (IRM's), shorter-range missiles (SRM's), associated launchers, equipment, support facilities, and operating bases worldwide. The START Treaty of July 1991 has similar objectives: "... The joint venture would provide the Soviets with an 'escape clause' for the INF and START treaties since it would allow Moscow to keep producing missiles with potential military applications ... [and would] add enormously to the verification burden."[302]

on the import of foreign technology. For example, the Argentine/Egyptian/Iraqi Condor II missile is far behind schedule due, in part, to the MTCR.", see *The Bush Administration's Nonproliferation Policy,* Prepared statement by the Under Secretary of State for security assistance, science and technology (Bartholomew), May 18, 1989 (Extracts), Doc. 21, American Foreign Policy 65-68 (1989), hereinafter referred to as State Dept nonproliferation statement, at 67.

302. See M. Potter, *Swords into ploughshares: legal, policy implications of a commercial launch vehicle based on the SS-20 missile*, Proceed. 33d Colloq. L. Outer Space 48-57 (1990)

The issue of *high tech export control* would most likely arise if the launches were to take place outside U.S. territory and the payloads involved U.S. satellites or satellite components. A further distinction was rightfully made at the time between launches from CoCom member countries' territory on the one hand and other foreign territory, such as (then) Warsaw Pact countries' territory. Obviously, the latter launches would have been impossible because of applicable CoCom-wide upheld AECA and EAA export restrictions to these countries. For launches from a U.S. launch base, different permits would have been necessary, such as a DOT license for this new launch provider and *import* licenses under AECA/ITAR for each Start launch vehicle.

The production of new, inexpensive, missile-derived launch vehicles would also have missile proliferation aspects related to MTCR purposes. Where the transformation of missiles into civil launch vehicles as such may be considered a positive non-proliferation step, as it replaces a military application by a civil one, the 'downside' could be the possible transfer or sale of these launch vehicles to countries which do not possess either missile or launch technology and would thus become an additional proliferation hazard. This would be of particular relevance if the plans of the initiators were to materialize, *i.e.* "... to be able to launch from the customer's launch site, or from his driveway, if he wants to."[303] But the proponents argued that the partners would not be selling the rocket or the technology, but only the launch service, thus removing any possibility of the project becoming an MTCR issue. Obviously, from a non-proliferation policy point of view this was hardly a satisfactory assurance. The most appealing MTCR-related argument *in favour* of missile conversions such as the Start project would appear to be the following: the more conversions of missiles take place the more competition will result in the commercial launch market, both domestic and international, and the more competition there is, the lower the launch prices *and the lesser the need for have-nots to start their own launch industry and become potential proliferators themselves.* As Potter rightly observed:

> "If the U.S. encourages the Soviets to provide inexpensive launches on the World market this may take the incentive away from developing countries to produce indigenous launch capabilities. Once these countries succeed in developing their own launch capabilities they often are forced to sell missile technology to other developing countries in order to defer their initial development costs."[304]

The issue of *unfair competition* created special concerns which led to the U.S. administration's regulatory interventions. A distinction should be made here between *foreign* and *U.S.* missiles-turned-launcher. The former deepened

hereinafter referred to as Potter 33d Colloq., at 49.

303. *Id.*, at 53.

304. *Id.*, at 54.

existing worries of the U.S. launch companies about the effect of foreign non-market economies' pricing of (new) launch services on their business. As we saw above, the U.S. launch industry, in the late eighties and early nineties was considered by many, including the companies themselves, an 'infant' industry, engaged in a competitive struggle *inter alia* against Arianespace. A strong need was felt for protection against any newcomers, but particularly against low-cost launch services 'dumped' on the western markets by centrally planned economies. (This trade issue will be further explored in Chapter 3.)

But, given the existence of tools for protecting the U.S. companies through the application of the U.S. export control laws, it was, in the early nineties, particularly the prospect of competition created by *U.S.* missiles-turned-launchers against U.S. companies operating in the same (small launcher) market segment in which the newcomers would be active, which sollicited the more critical reactions, and which would give rise to policy statements on the part of the U.S. administration trying to assuage the incumbents' fears. The latter was triggered by the *Lodestar* project devised by Lockheed Missiles and Space Company and consisting of retired U.S. Navy Poseidon missiles to be refurbished and adapted to civil use, *e.g.* for the launch of small - initially only governmental - scientific satellites.[305]
The initiative brought strong reactions from Orbital Sciences Corporation (OSC), a U.S. company which was planning the operation of two families of small launchers and felt directly affected by the missile conversion plans of Lockheed. The difficult choice the Government faced was between permitting (unfair?) competition with the private launch industry but, in so doing, recouping part of the investments (paid for by the taxpayer) in the missiles so used, and "throwing away the assets" and not stand in the way of private industry recouping its own investments.

The U.S. Commercial Space Policy Guidelines approved by President Bush on February 12, 1991, though containing many statements which reflected a spirit of 'promote but don't interfere with the private sector', was not very helpful on this specific issue. One provision might well have been quoted by the launch industry threatened by the Poseidon venture:

"U.S. Government agencies may make available to the private sector those assets which have been determined to be excess to the requirements of the U.S. Government in accordance with U.S. law and applicable international treaty obligations. Due regard shall be given to the economic impact such transfer may have on the commercial space sector, promoting competition, and the long term public interest."[306]

305. See M. Potter, *Swords into ploughshares - Missiles as commercial launchers*, 7 (2) Space Policy 146-150 (1991) hereinafter referred to as Potter 1991, at 147.
306. See *U.S. Commercial Space Policy Guidelines*, The White House, Office of the Press Secretary (Feb 12, 1991) in Gorove, US Space Law, *supra* note 55, at 1.A.4 (a-1).

On the other hand, Lockheed could have quoted the same statement, referring to the pro-competitive language employed, to solicit support for its project.

The matter was specially addressed and clarified in Clinton's National Space Transportation Policy of 1994, which, in the spirit of a pro-commercial space transportation industry philosophy, limited the commercial use of U.S. excess ballistic missile assets with the following provisions:

"U.S. excess ballistic missile assets that will be eliminated under the START agreements shall either be retained for government use or be destroyed. These assets may be used within the U.S. Government [USG] in accordance with established DoD procedures, for any purpose except to launch payloads into orbit.
Requests from within the Department of Defense or from other [USG] agencies to use these assets for launching payloads into orbit will be considered by the DoD on a case-by-case basis and require approval by the Secretary of Defense.

Mindful of the policy's guidance that [USG] agencies shall purchase commercially available U.S. space transportation products and services to the fullest extent feasible, use of excess ballistic missile assets may be permitted for launching payloads into orbit when the following conditions are met:
(a) The payload supports the sponsoring agency's mission.
(b) The use of excess ballistic missile assets is consistent with international obligations, including the MTCR guidelines and the START agreements.
(c) The sponsoring agency must certify the use of excess ballistic missile assets results in a cost savings for the [USG] relative to the use of available commercial launch services that would also meet mission requirements, including performance, schedule, and risk."[307]

As one of the Presidential draftsmen explained to Congress,

"[t]hus engineering tests and suborbital flight experiments are allowed, but orbital flights which may compete with private sector providers would have to satisfy some tough criteria. We believe that these criteria are clear and reasonable and that they provide sufficient flexibility to protect government interests while continuing to encourage private sector investment in new space transportation systems. If converting ballistic missiles to space launch vehicles can be done in a manner that saves money to the government, this policy will still allow us to take advantage of those savings."[308]

307. See *National Space Transportation Policy*, Fact Sheet, The White House, Office of Science and Technology Policy (Aug 5, 1994). <http://www.whitehouse.gov/WH/EOP/OSTP/other/launchts.html>, hereinafter referred to as 1994 Space transportation policy.
308. See Statement of Dr. John H. Gibbons, Assistant to the President for Science and Technology, Director, Office of Science and Technology Policy on National Space Transportation Policy, before the Subcommittee on Space, House Committee on Science, Space and Technology (Sep 20, 1994).

OSC's original unhappiness with the above policy's potential for allowing competitive missiles-turned-launchers evaporated when, in 1997, it concluded a contract with USAF to convert as many as 24 Minuteman 2 missiles to launchers for government LEO launches.
The program, which is potentially worth more than USD 200 million to OSC, will turn the missiles into four-stage launchers, half Minuteman 2 half Pegasus XL. It has in the meantime been christened the Orbital-Suborbital Program (OSP) *Minotaur*, and will, in September 1999, on its first launch carry two small USAF research satellites, in conformity with the above 1994 policy. (The Air Force is reported to have about 350 sets of Minuteman engines in storage, which could be used for the program).[309]
The Minuteman/Minotaur program is so far the only example of a U.S. missile-conversion project following the adoption of the 1994 policy.
The Commercial Space Act of October 1998 (H.R. 1702), has formalized the provision of the above Policy. At the same time it created a measure of Congressional control by requiring the Federal agency, which seeks to use the excess ICBM as a space transportation vehicle, to transmit to a number of Congressional Committees a certification that the use of such missile:

"(A) would result in cost savings to the Federal Government when compared to the cost of acquiring space transportation services from United States commercial providers
(B) meets all mission requirements of the agency, including performance schedule, and risk requirements;
(C) is consistent with international obligations of the United States; and
(D) is approved by the Secretary of Defense or his designee."[310]

The legislation was presented as primarily cost-savings driven.[311]

As for the foreign missiles, although the above combination of national security, foreign policy and trade considerations made for such complicating factors as to appear to doom the above U.S.-Soviet *Start* initiative right from the beginning, the program not only survived (though without U.S.

309. See Space News Online (Sep 15, 1997) at 4 ("Minuteman deal expands Orbital;s launch capability") and Space News Online (Sep 7, 1998) at 14 ("Dod approval sought for Minuteman motors/new rocket would loft research satellite"), <http://www.spacenews.com/spacenews/members/sarch/sarch97/sno915rl.htm and .../sarch98/sno907ac.htm> respectively.

310. See Sec. 205 ("use of excess intercontinental ballistic missiles"), Commercial Space Act, *infra* Ch. 3, note 247.

311. As one of the sponsors said in a Senate Subcommittee meeting, "[this legislation] actually saves money by allowing the conversion of excess ballistic missiles into space transportation vehicles ... they are extremely expensive to store ... using these missiles as launch vehicles ... for small scientific and educational [Government] payloads ... is a legal and efficient way to dispose of an expensive asset", see statement of U.S. senator Bob Graham, "Commercial Space Act of 1997", Subcommittee on Science, Technology and Space, Senate Commerce, Science and Transportation Committee (Mar 5, 1998).

participation) with both a Start and a Start I rocket but was joined by the *Rockot* launch vehicle based on the Russian SS-19 ICBM. The latter launch vehicle is being marketed by DASA of Germany under the name *Eurockot*.[312] In February 1994, the Moscow-based Start-1 sales company *STC Complex* was reported to have concluded a launch contract with a South African state owned defense firm for the launch of its Greensat remote sensing satellite. One of the two U.S. competitors, Orbital Sciences, accused the Russian firm of engaging in predatory pricing, in violation of the U.S.-Russian launch trade agreement concluded in July 1993 (See Chapter 3.2 *infra*), but the issue became moot when the South African firm, later that year, decided to abandon this and other space projects for lack of international investors.[313]

In 1994, a START-inspired debate erupted on the subject between the U.S. and Russia and the Ukraine. The latter countries took the position that ICBM's and SLBM's used for space launch purposes were not accountable under the START I Treaty. The U.S. vigorously opposed this position which would have directly undercut the provisions of the Treaty. And in the fall of 1995 the parties, joined by Belarus and Kazachstan, recorded in a joint statement in the START Joint Compliance and Inspection Commission, that all space launch vehicles that use the first stage of an ICBM or SLBM are accountable as ICBM's and SLBM's of that type under the START I Treaty.[314]
As for the use by U.S. commercial companies of these new foreign launch services, the U.S. government took the position that it would consider requests for export licenses (for U.S. satellites to be so launched) on a case-by-case basis and would grant licenses only if they complied with the START Treaty and the MTCR Guidelines.[315] As we saw earlier, these Guidelines permit

312. See brief description of this DASA-Khrunichev joint venture in Chapter 1.2.1.
313. See Space News (Feb 28, 1994) at 8 ("Russia accused of underbidding to win Greensat launch") and (Nov 7, 1994) at 10 ("Denel derails launch of Greensat") respectively. A spokesman of the Defense firm Denel said in this connection: "It is safe to say that the space industry in South Africa has come to an end". The project to develop an indigenous space *launch* capability had already been abandoned in mid-1993 after an investment of USD 55 million, see *ibid*.
314. See ACDA Annual Report 1995, *supra* note 272, Chapter 3, at C ("Controlling missiles used as space launch vehicles"). Dennis J. Burnett and David Lihani give an other interpretation to the text of this Joint Statement Number 21, "On space launch vehicles that incorporate first stages of ICBMs or SLBMs", Geneva, Switzerland (Sep 28, 1995): "U.S. and Russia agreed that, on a case-by-case basis, the existence of a first stage of an ICBM or SLBM that is incorporated into a space launch vehicle, during maintenance, storage and transportation of the launch vehicle, and is located apart from other stages of an ICBM or SLBM, does not result in ICBMs or SLBMs of that type of missile being considered as a ballistic missile. On that basis, U.S. and Russia agreed that the Start space launch vehicle assembled from stages of the SS-25 ICBM is not a variant of the SS-25 nor a new type of ballistic missile for Treaty purposes." See *Developments in U.S. bilateral launch service agreements - an update*, XXI(3) Air & Space Law 100-104 (1996) (text to) note 9.
315. See *Policy on the use of foreign excess ballistic missiles for space launch*, Fact sheet, White House, Office of Science and Technology Policy (Sep 29, 1995).

MTCR members to support the space programs of other countries or international cooperation "... as long as such programs could not contribute to delivery systems for weapons of mass destruction."

An immediate beneficiary of the new policy was a Colorado-based company, called Earth Watch Inc., which received permission from the U.S. government to launch a commercial remote sensing satellite on a Russian Start-1 launcher.[316] Understandably, the two U.S. companies that had lobbied hard to keep these converted missiles out of the commercial market, Orbital Sciences and Lockheed Martin, were far from pleased, and expressed particular concern about the prices that would be quoted by the Russians.[317] (Though Russia, by virtue of its launch trade agreement with the U.S., was bound to observe pricing guidelines meant to prevent 'dumping' of launch services, only the more general provisions (prices should be comparable to prices for comparable 'market economy' launches) applied to low earth orbit launches, see Chapter 3.2, *infra*).

The overall effect of the 'ex-missiles', although recognized as a possible alternative on the launch market, has remained limited. Noteworthy in this connection is not so much the fact that the various controls and policies restrict the use of both U.S. and foreign missiles, but that (a) the U.S. (small) satellite manufactures and (small) launch manufacturers were pitted against each other, with the U.S. government caught in the middle, and that (b) the latter had to balance an array of diverse interests and obligations, such as national security, including non-proliferation of missiles, arms control and high technology exports, (fair) trade and foreign policy issues. It is submitted that, in view of the high priority and importance the U.S. in the early nineties attached to a reduction of Russia's (and Ukraine's) missile stockpiles and in the light of the cost involved and of the economic woes of these countries, a policy providing for case-by-case approval of foreign missile-derived launches, paid in hard currency by U.S. clients, made particular sense without dramatically affecting

316. See Space News (Oct 9, 1995) at 1 ("Converted Soviet missiles gain entry to U.S. market"). A more recent UN Report (partially) on worldwide space transportation systems development noted matter of factly: "The Subcommittee also took note of the introduction into the space transportation system of the Russian Federation of the Start and Rokot launchers that were based on converted ballistic missiles.", see Report of the Scientific and Technical Subcommittee on the work of its thirty-fifth session, UNCOPUOS, UNGA Doc. A/AC.105/697 (25 Feb 1998) at 25-26.

317. *Ibid.* A December review by this publication of the performance of the above small rocket companies in the year 1995 listed only failures: Start-1 failed in its first flight in March, destroying the Israeli, Russian and Mexican satellites on board; Orbital Sciences' Pegasus XL went out of control shortly after its launch in July and was destroyed (following the fate of its predecessor); the Lockheed Martin Launch Vehicle (LLV) for small payloads also did not survive its maidenflight in August; and in October 1995, EER System's Conestoga rocket exploded in mid air, see Space News (Dec 11, 1995) at 8. There was, as a result, certainly some room for additional small launchers, whether U.S. or Russian-built!).

the other interests concerned. The fact remains that State Department and DoD interests determined the fate of this market entry/access issue and thus interfered with the autonomous, free market development of the trade in launch services.

### *2.3.4 Liberalization of U.S. export controls*

For the purpose of this study 'liberalization' of export controls is of relevance to the extent that the liberalizing measures, if any, resulted in *e.g.* (a) new launch companies being able to get off the ground and enter the international commercial launch market, (b) both new and incumbent launch companies gaining access to all (important) parts of that market, and (c) a reasonably level playing field making competition on price and quality possible.
The export controls discussed in the previous paragraphs can be distinguished in two main areas: *launcher/missile* controls and (high tech) *payload* controls. Roughly translated these controls address two situations: (a) a country wishes to acquire the capability to launch (weapons or civil loads) and needs foreign hardware and technology for that purpose, and (b) a country already possessing a launch industry wants to sell its service to the market of satellite manufacturers and owners/operators of satellites or satellite systems. Both candidates and their potential launch technology suppliers have, through the years, been confronted with (multi-)national regulatory barriers, which made it hard to 'just' join the ranks of the incumbents. To what extent did the various U.S. and international export control 'liberalization' measures make life easier for the above newcomers?

#### *'Payload controls'*

Through the years, the restrictions on the export of dual-use items in particular have been the subject of hot debates and challenges by the industry concerned. This is understandable.
The arms industry, or the 'military-industrial complex', has always been fully aware of the risks and uncertainties inherent in their line of trade: today's accepted customers may be the subject of tomorrow's restrictions, imposed by the Administration or by Congress due to shifts in national security and/or foreign policy priorities or threats.
It is different for the manufacturer and exporter of aircraft or personal computers, whose exports to foreign customers may be severely handicapped by the fact that, what they consider to be off-the-shelf technology, readily available in everyday commerce both at home and abroad, is also considered by the U.S Administration to be of military-strategic value for certain countries and should therefore not be exported without a license, with all the concomitant uncertainties, red tape, delays, costs and risks of loosing the contract to a foreign provider. (For example, the avionics and computer

systems aboard Airbus planes sold to the Soviet Union in the late eighties/early nineties were much more sophisticated than those found on many military jet aircraft, yet were not prohibited).[318]

The expansion of the licensing bureaucracy within State and Commerce in the 1980s brought at the same time increasing demands for a relaxing of controls and for a faster and less cumbersome processing of export license requests on the part of the 'high tech' industry. Where the national controls - at least with respect to the communist countries - had been multilateralized through CoCom, a two-step approach was needed: first the U.S. administration had to be convinced of the commercial benefits and strategic harmlessness of more relaxed controls with respect to certain (types of) dual-use goods and technologies. And thereafter these proposals would have to be endorsed by all CoCom members.
Such endorsements were in fact a less formidable barrier than it would seem, as, through the years, the U.S. Departments of State and Defense and the security/intelligence community - all involved in listing and de-listing decisions - had in general been more security conscious and control inclined than the foreign CoCom members.

The developments in the Soviet Union and the ensuing relaxation of East-West tensions in the years after 1990 gave sufficient domestic impetus and foreign support for substantial cuts in the list of CoCom controlled dual-use goods. Thus, in line with the objective to 'build higher fences around fewer items', controls were reduced in June 1990, and again, more substantially in September 1991, for sales to former East bloc countries of such items as: navigation, avionics and aircraft technology (including B-747 and 767 aircraft) and related communications equipment, aircraft propulsion systems, electronics, machine tools, computers and telecommunications, and some liquid fuel rocket engines and their technologies.[319]
But, as we saw earlier, CoCom, on the instigation of the U.S., made a distinction between the levels of sophistication allowed to the Soviet Union on the one hand and such 'democratized' countries as Poland, Hungary and Czechoslovakia on the other hand. The latter, to which the so-called 'Bikini list' (*sic!*) of only 40 restricted items applied, were allowed to buy sophisticated telecommunications equipment from the West. This was considerably superior to what the Soviet Union was permitted to acquire: the latter was allowed to upgrade its telephone network only to the level of American systems of the early 1980s.[320]

318. See IHT (Jun 17, 1991) at 9 ("CoCom red tape eases with tensions").
319. See AW/ST (Jun 10, 1991) at 73.
320. In the somewhat condescending, but, at the time, probably - materially - correct view of the US, "... what the Soviets need is plain old telephones and not a lot of bells and whistles.", Allan Wendt, head of the US delegation to CoCom, see IHT 1, 10 (May 56-26, 1991) at 10 ("CoCom cuts back barriers").

The new CoCom regulations changed a fundamental aspect of the multilateral control structure. It turned a system of a presumption of denial, meaning that high technology products could not be exported unless specifically approved or exempted by CoCom, into one which enabled the manufacturers to export anything not specifically banned by CoCom; in other words, 'if it is not listed it can be sold'. But the rules continued to apply restrictions to the transfer of technology, in other words, 'ship the goods but keep the technology'.[321]

These 1991 reductions in export restrictions freed exporters considerably. As an example, Commerce faced 70% fewer computer export applications, and the liberalization of controls represented an overall reduction of some 50% in the CoCom list of militarily significant goods and technologies. But not all was well for the parties concerned. For one thing, as observed earlier, the Gulf war taught a few lessons on the military relevance of some dual-use goods, such as night-vision devices (Iraq's Soviet technology-based capabilities turned out to be far less sophisticated than the products used by the allies) and fiber optic links (which Iraq used for military communications and the coalition forces found difficult to knock out).[322]
As a consequence, U.S. export controls on these items remained in force vis-à-vis the Soviet Union (and it would take a unanimous 'yes' from CoCom to permit any member to export such technology to that country).[323]
Business groups representing 'high tech' companies were still disappointed, particularly in the area of computers and telecommunications,[324] but had to wait until 1992 for another modest liberalization step. In that year, the State Department, concluding an exercise started two years earlier with Executive Order 12735 of November 1990, published a Final Rule transferring some 'innocent' satellites from the USML to the Commerce Control List.[325]
What had started as a "harmonization exercise" aimed at bringing *all* space items of a primarily commercial nature under Commerce jurisdiction, turned out to be a measure of such limited scope and importance to the U.S. manufacturers that a Congressional Hearing on "Export control reform in high technology" one year later became a full-fledged U.S. industry attack on the

321. See IHT 9, 14 (Jun 17, 1991) at 9.
322. See AW/ST (Jun 10, 1991) at 73.
323. The SU had expressed interest in buying a state of the art fiber-optic communications network to span their entire territory, but the NSA had argued that it is harder to listen in on a fiber optic telephone line than on traditional telephone wiring, see IHT 1, 10 (Jun 25-26, 1991) at 10.
324. "Our expectations had been raised by the rhetoric used by President Bush when he announced the core list reductions last June [1990] ... [but] we are seeing very little improvement in the last year", see *ibid.*
325. Final Rule of October 23, 1992, to amend Sec. 38 of the AECA. The rule transferred commercial communications satellites that do not have certain sensitive characteristics (under nine categories) to the export licensing control of the Commerce Dept. Military satellites and communications satellites with any of the nine categories of sensitive characteristics remained on the USML.

country's outdated, complicated, bureaucratic, costly and ineffective, if not futile, export controls.[326]
Noteworthy is that, already at that occasion, the U.S. software industry strongly criticized the export controls both on computers as such and on commercial *encryption* software (which is used to protect, 'encrypt', confidential computer data (transmission) against theft, manipulation, etc.) as unrealistic and virtually meaningless given the wide foreign availability of this technology.[327] In 1998, the issue of the protection of encryption technology had grown to become the biggest export control 'headache' of the U.S. security and intelligence community and the single most time and energy consuming export licensing issue for both the State Department and Commerce.[328]

Notwithstanding the above severe criticism on the part of the industry and intense lobbying efforts, with a leading role of Hughes Space and Communications, and supported by Commerce[329], a bill proposed in Congress in April 1994 transferring all commercial satellites from USML to CCL was defeated as a result of a determined Defense and State Department defense of the *status quo*.

In 1995, the U.S. administration improved the dual-use export control process by, *inter alia*, strengthening the role of other agencies in the review process. By Executive Order, the Departments of Defense, Energy, State and ACDA were given the right to review any license of interest to them, with, in case of dissent, each department casting a single vote and decisions taken by simple majority; moreover, enforcement of the regulations was strengthened.[330]

The demise of cold war export regulator CoCom in 1994 freed the former Communist countries of multilaterally enforced restrictions on military and dual-use goods and technologies, bringing computers, encryption and satellites (as an example of one highly valuable combination of advanced technologies

326. See High technology hearing, *supra* note 278, *passim*.
327. See *id.*, at 30 (testimony James A. Abrahamson, chairman, Oracle Corp.).
328. See *inter alia* Reinsch, Update West 98, *supra* note 262, at 3-4.
329. As Hughes Space and Communications' President Dorfman said (in 1994), "communications satellites are commercial products having nothing to do with weapons, and should be under the Commerce Department to facilitate international trade of US industry." Hughes wanted to use Chinese launch vehicles for its satellites "without having to convince skeptics in the Pentagon and the State Department that the satellites do not pose a technology proliferation hazard." And he called the Export Administration Control Act, proposed by Jane Harman, D-Calif, in April 1994, which would transfer license approval from the State Dept to the Commerce Dept for communications satellites, an "improvement ... because the approval process would be centered in a single agency and the State Dept would not use satellites as a tool to conduct foreign policy.", See 5 (18) Space News (May 94) at 30.
330. E.O. 12981 (Dec 1995), see *US/China technology transfer*, testimony of William A. Reinsch, Under secretary for export administration, Dept of Commerce, before the Joint Economic Committee (Apr 28, 1998) <http://www.bxa.doc.gov/press/98/PRCtech.html>

of relevance in the space market) in principle within reach, though henceforth depending on less predictable *national* laws, policies and practices. Since both China and Russia, once prime targets of CoCom controls, were at the same time potential launch providers restrained in the performance of that role by these controls, the end of CoCom meant the removal of *a multilateral Western-made barrier to market entry and access.*[331]
The Wassenaar Arrangement now focuses in a different way on other countries with a - so far - less effective control mechanism. None of these - possibly - targeted countries belong to the category of prospective launch providers which would be prevented from entering the market as a result of Wassenaar controls. To the extent Wassenaar discourages its parties from selling certain dual-use items, such as satellites or satellite components, to terrorist-supporting or other 'rogue' countries, all Wassenaar launch providers (and satellite manufacturers) may perceive this as effectively *limiting their market access* through the restrictions imposed on their free choice of clients.

An additional complication for the export of satellites is the increasing sophistication of the software and the concomitant need for sophisticated data (transfer) protection, *i.e.* encryption. The more sophisticated the latter, the more hesitant the U.S. security and intelligence community has been with respect to the export thereof, and the more complicated and time-consuming the accompanying licensing process has become.
Where, originally, the sale and export of encryption was seen as a national security-endangering activity (how can you listen in on international communications if the messages concerned are encrypted?) and therefore subjected to State Department controls, at the end of 1996 new Commerce regulations were published that transferred licensing of *encryption* products

331. Three years later, in testimony before the Senate Committee on governmental affairs, Subcommittee on international security, proliferation, and federal services, of Jun 11, 1997, hereinafter referred to as Reinsch testimony 1997, Commerce Under secretary for export administration Reinsch made the following statement on the Administration's post-CoCom attitude towards Russia: "Russia is continuing to develop its own export control system and is in the early stages of participating in international export control regimes. It is a member of Wassenaar ... It is a party to major non-proliferation treaties and agreements ... At the same time ... although Russian policies with respect to the development and export of weapons of mass destruction are encouraging, actual events from time to time are not consistent with those policies. Until we see greater consistency between Russian policy and practice, including a Russian export control system that is more reliable and fully harmonized with our own and that of our Wassenaar partners, we will continue to maintain appropriate controls on exports to Russia." With respect to China, the same official said: "our export control policy toward China seeks to support our engagement strategy and creation of higher -paying, export-based jobs in the U.S., while denying licenses for items whose export would pose significant national security risks to the U.S. ... we scrutinize carefully exports which might raise national security concerns. We also continue to maintain Tiananmen sanctions, which limit the items that can be licensed for China. Where appropriate we impose sanctions on Chinese entities for proliferation or other activities, consistent with U.S. laws. <http://www.bxa.doc.gov/PRESS/97/warcon10.htm >."

from the State Department' Munitions List to the Department of Commerce's dual-use list (CCL). This did not result in a substantial lessening of controls, but created a different, more industry-oriented starting point for national controls (which remain an *inter-agency* responsibility).

From 1994, on an *ad hoc* basis, a number of satellites received State Department or Commerce clearance - depending in each case on the satellite's performance characteristics - for export to China.[332] But it took until March 1996 before President Clinton, following - what is now called - a "tense Washington turf war between the State and Commerce Departments, and a broader debate over how to balance America's security concerns and commercial competition in the hottest of all the commercial markets",[333] decided that control of export licensing for communications satellites was to be transferred to Commerce. Henceforth, *all commercial communications satellites* would be controlled by Commerce even if they had embedded in them individual munitions list (USML) components or technologies.
Though at the same time national security and foreign policy controls in the Commerce regulations were tightened, this shift from State to Commerce control was hailed by the U.S. satellite manufacturing industry at the time because it de-emphasized the national security and foreign policy aspects of the sale of satellites to, and *their launch by* foreign countries.

In the meantime, in 1998, the Clinton decision has become the subject of intense - though largely partisan - Congressional criticism, in part because of the benefits it provided to the Chinese launch industry, in part because of technology transfer issues which arose in 1996, and, in large part, because of the suggestion of improper re-election campaign-related influence peddling by a combination of Chinese and U.S. satellite industry (Loral Space and Communications) interests, including sizeable donations to Democratic causes by the two parties concerned.[334]

One of the actions the House took in this connection, infuriating and frustrating the U.S. satellite industry, was the approval of legislation which prohibits exporting American-made satellites to China, a measure which would prevent China Great Wall Industry from launching any satellite built in the U.S. or any satellite that contains U.S. components for which an export license is required.[335] (The Senate fortunately did not concur with this piece of rather ill-considered legislation).

332. Part of these export licenses concerned satellites which were to be launched on Chinese Long March rockets, see Chapter 3.1.
333. See NYT 1, 18 (May 17, 1998) at 1 ("How Chinese won rights to launch satellites for U.S.").
334. See *id.*
335. See 9 (21) Space News 1, 20 (May 1998) at 1.

At a May 1998 Hearing of the Senate Governmental Affairs Subcommittee on international security, proliferation and federal services members questioned Clinton's 1996 decision to transfer the licensing of communications satellites exports to Commerce.[336] This already resulted in legislation adopted by both House and Senate, and - reluctantly - signed into law by President Clinton on October 17, 1998, to transfer this authority back to the State Department, a move with which Congress reintroduced a more emphatic national security and foreign policy imprint on satellite export licensing (see further Chapter 4).

The political uproar created by these allegations has led to the setting up of a special nine-member House Committee with far-reaching authority to look into whether U.S. national security was undermined by Clinton Administration actions by allowing the launch of U.S. satellites on Chinese Long March Rockets. The committee was given wide subpoena powers and the ability to examine tax records of people and businesses it deems relevant, dating back to 1988.[337]
That year had not been chosen at random. It is the year in which Chinese entry into the international commercial launch market through the possible launch of U.S.-built satellites became a matter of debate within and between the Administration and Congress. (The U.S.-Chinese launch trade relations will be discussed in the next Chapter).

In June 1997, a U.S. Commerce official made the following statement before a Senate Subcommittee (under the heading "Further export control liberalizations will be limited"):

"We are down now to less than 9,000 licenses annually, and, increasingly, they are limited to items that are multilaterally controlled or items that are controlled to terrorist or other

336. See *ibid*. The suggestion that national security was compromised by the Clinton decision was firmly rejected by the Director of ACDA, John Holum, in testimony before the House International Relations and National Security Committees in June 1998. As he observed, "... the further shift in control was accompanied by new control procedures and regulations to strengthen safeguards. Interagency review was strengthened, giving State and Defense the right to review all Commerce export license applications. A new foreign policy and national security control was established in Commerce's Export Administration Regulations whereby State and Defense could recommend denial of a satellite export to any destination on the basis of national security or foreign policy interests. Commercial communications satellites were made exempt from the foreign availability requirements of the [EAA]. ... it remains the judgement of the Department of State, that the changes made in the Commerce export licensing system in 1996 were sufficient to deal with the national security sensitivities associated with foreign launches of communications satellites. They provide a degree of protection for these items when under Commerce control that approximates the strict controls of the [ITAR]. Therefore, [State] was provided with reasonable assurance that U.S. national security would not be adversely affected with the jurisdictional change.", see Holum testimony 1998, *supra* note 230, at 4-5.
337. See IHT (Jun 20-21, 1998) at 3. And see Chapter 4 *infra*.

rogue states where our policy is unlikely to change in the short run. Accordingly, we are not likely to see many dramatic control list modifications in the near term. Nevertheless, we have an ongoing need to keep our controls up to date with advances in technology and spreading foreign availability. In sectors like electronics, where product life cycles are short, we need to review our policies regularly to make sure we are not continuing to control old generation items that are now widely available from other sources."[338]

Less than one year later, the same official expressed his frustration about Congressional action in 1997 which, contrary to his Department's policy (*i.e.* to focus controls on those choke-point technologies without which a weapon cannot be built and which can be controlled because of their special qualities, small number of producers, or limited alternative uses), imposed new restraints on the export of 'high performance' computers, requiring his Bureau of Export Administration (BXA) to perform post-shipment checks on U.S.-built computers sold to 50 countries. The many customers involved and the fact that these computers possessed a level of sophistication available in other exporting countries made this requirement not only "an unsustainable burden" but also one "that served no purpose".[339]
The Commerce official went as far as qualifying this Congressional intervention as "attempts ... to roll back those hard-fought improvements [made through reform, streamlining and liberalization of the export control system] and return us to a darker era."
On the issue of further liberalization of export controls, it was noted that one of the reasons why BXA licensing load was inching back up (instead of further being reduced) was the transfer of encryption licensing to Commerce. A decline of licenses to be processed was also not expected "because I see few high volume areas ready for major liberalization." The latter, it must be concluded, is both a result of earlier streamlining and liberalization activities on the one hand and a more or less stable membership of the group of terrorist supporting or 'rogue' states as referred to earlier on the other hand. Of course, the liberalization of 'payload controls' has been dealt a severe blow by the decision of Congress to treat commercial communications satellites as arms for the purpose of export controls. (The relevant Strom Thurmond Act will be discussed in Chapter 4.1.2).

*Launcher/missile controls*

The limited 1991 relaxation of CoCom controls included an easing of restrictions on the export of some liquid fuel rocket engines and technologies to the 'East bloc' (while retaining such controls on more modern solid fuel rocket technology). Although, apparently, the U.S. delegate did not veto this

338. See Reinsch testimony 1997, *supra* note 331, at 4.
339. See Reinsch, Update West 98, *supra* note 262, at 2.

measure, the new rules would not likely result in a new market for American exporters of such rocket engines because, notwithstanding pressure from U.S. manufacturers, the State Department did not amend the Munitions List accordingly.[340] Other CoCom members would thus be in a position to sell these engines to the Soviet Union and Eastern Europe, thus rendering the U.S. restrictions less than effective.

An important feature of the new CoCom agreement was that individual countries would continue controlling those goods and technologies which, though dropped from the CoCom list, could contribute to the development of nuclear, chemical and biological weapons and the missiles to deliver them. This provision originated from a U.S. domestic initiative to *strengthen* rather than liberalize State and Commerce controls on WMD and missile proliferation, the so-called *Enhanced Proliferation Control Initiative* (EPCI) of 1991.[341]
As we saw earlier, these expanded controls provided authority for the government (Commerce) to block exports on any dual-use goods regardless of whether such items are specifically listed on the CCL, in cases involving exports to end-uses or end-users 'of proliferation concern' or involving risks of diversion to proliferation activities. And it imposed on exporters the burden of 'knowing' these destinations or missile projects. Put differently, an exporter should apply for a license when he knows (or is informed by BXA) that the end use of an item *may* be destined for a project or activity of WMD and/or missile proliferation concern.

In 1993, the Clinton administration proposed a new policy on non-proliferation and export control, which included important provisions on U.S. exports of space launch and missile technology. The policy which was developed in consultation with the Departments of State, Commerce and Defense, proclaimed the ambitious aim of finding a balance between proliferation concerns on the one hand and commercial needs and economic benefits on the other hand, "avoiding ineffective or unduly burdensome constraints while maintaining controls essential to curbing proliferation."
The Presidential Directive in its draft version permitted U.S. companies to sell missile and launch systems on a case-by-case basis to countries that agreed to

340. See 2 (20) Space News (Jun 1991) at 16.
341. See Ch. 2.3.1.2 *supra*. The EPCI expanded controls, first published by Commerce in March 1991 and effective as an interim rule as from August 15, 1991, reflected measures called for by President Bush's December 13, 1990, decision on the EPCI and included in his E.O. 12735 of November 16, 1990 on chemical and biological weapons proliferation, see *Imposition and expansion of foreign policy controls*, 15 CFR Parts 771, 773, 776, 779, and 799, Interim rule with request for public comment, BXA Docket, Commerce, 56 FR 40494 (Aug 15, 1991) The Rule grouped the regulations relating to weapons proliferation in a newly designated part 778, Proliferation Controls. These new regulations supplemented controls exercised *inter alia* by State's ODTC under the AECA.

abide by the MTCR guidelines. This *quid-pro-quo* ("become a member and you may buy my launch technology")[342] which originated in the State Department, brought severe criticism from a Congress which did not see MTCR membership as a sufficient guarantee against misuse of the technologies bought. (And they were right in the sense that MTCR does not provide for (multilateral) inspection or other measures to ensure that peaceful launch technology is not diverted to military programs.) The main worry Congressional opponents had was that any (developing) country, by becoming a MTCR member, would be eligible for receiving launcher, and thus missile, technology, which would in fact defeat the purpose of the non-proliferation exercise. Administration officials denied that the new policy would automatically open the door to increased sales, while at the same time highlighting the benefits of the policy to the exporting industry. What they did maintain however was the principle of case-by-case appraisal of each export, which would give the Administration the desired latitude for each individual case, exactly the situation Congress tried to prevent[343]. The end result of (hurried) discussions on the matter between the administration and Congress was a new "*Non-proliferation and export control policy*", issued on September 27, 1993, which still did not quite please Congress, as it maintained a difference in treatment depending on the purpose, either military (missile) or civil (launcher), and did not limit this 'relaxation' of controls to deserving trusted allies only. The relevant text on "missile proliferation", apart from strongly supporting the MTCR and promoting the guidelines' principles as a global missile non-proliferation norm, stated:

"We will support prudent expansion of the MTCR's membership to include additional countries that subscribe to international non-proliferation standards, enforce effective export controls, and abandon offensive ballistic missile programs ...
The [U.S.] will continue to oppose missile programs of proliferation concern and will exercise particular restraint in missile-related cooperation.
We will continue to retain a strong presumption of denial against exports to any country of complete space launch vehicles or major components.
The [U.S.] will *not support* the development or acquisition of space launch vehicles in countries *outside* the MTCR.
For *MTCR member* countries, we will *not encourage* new space launch vehicle programs which raise questions on both non-proliferation and economic viability grounds.
The [U.S.] will, however, consider exports of MTCR-controlled items to MTCR member countries for peaceful space launch programs on a case-by-case basis.

342. The idea was to induce all those countries to become MTCR member which already possessed a level of launcher or missile technology and were therefore potential exporters of that technology to 'rogue' countries known or suspected to have offensive missile programs: in that connection Russia, Brazil, South Africa, India and Israel were mentioned as possible candidates for this membership drive, see 4 (37) Space News (Sep 1993), at 4 ("Gore to mediate missile dispute").
343. See *ibid.*

*We will review whether additional constraints or safeguards could reduce the risk of misuse of space launch technology*. We will seek adoption by all MTCR partners of policies as vigilant as our own." (emph. add.).[344]

The emphasized safeguard clause was added by the White House following the above discussions with members of Congress. Statements made in the House after the release of the policy showed that this measure alone did not allay Congressional fears of missile proliferation through exports to developing countries. An amendment approved by the House called for the U.S. government to consider export of space launch vehicle technology identical to ballistic missile technology exports, and therefore subject to the same stringent export restrictions.[345]

On the subject of export controls in general, the policy confirmed that "[t]o be truly effective, export controls should be applied uniformly by all suppliers. The United States will harmonize domestic and multilateral controls to the greatest extent possible." But, on the other hand, the policy recognized that "... the need to lead the international community or overriding national security or foreign policy interests may justify unilateral export controls in specific cases."

Disappointed exporters could find some comfort in the promise of the President "to review our unilateral dual-use export controls and policies and eliminate them unless such controls are *essential* to national security and foreign policy interests" and in the plan to streamline the implementation of the controls and to make the system more responsive and efficient "and not inhibit legitimate exports that play a key role in American economic strength, while preventing exports that would make a *material* contribution to the proliferation of weapons of mass destruction and the missiles that deliver them." (emph. add.)

The emphasized words would appear to place the burden of proof (that a product or service must remain on either the Munitions List or the Commodity Control List) on the government and, if so interpreted, would mean a significant victory for the U.S high technology product exporters. However, as we saw above, the period immediately after September 1993 did not see any substantial relaxation of dual-use controls.

344. See 1993 non-proliferation policy, *supra* note 295, at 677.

345. See 4 (39) Space News 4, 20 (Oct 1993) at 20 ("Launcher export policy changes draw opposition") The sponsor of that legislation and principal opponent to "the misguided efforts of some State Dept officials to have ... Clinton loosen existing missile and nuclear non-proliferation controls", recalled that earlier (1989) State Dept suggestions to aid emerging international space launch programs had led to the missile technology control provisions that were ultimately adopted as part of the 1991 Defense Authorization Act, requiring the [US] to treat exports of space launch vehicle technology as restrictively as those relating to ballistic missiles. But "[a]pparently, the State Dept did not get the message.", see 4 (40) Space News (Oct 1993) at 18 ("Maintain missile proliferation policy").

Finally, the policy promised to "intensify efforts to ensure that the former Soviet Union, Eastern Europe, and China do not contribute to the spread of weapons of mass destruction and missiles."
In an address to the 48th session of the U.N General Assembly on the date of the policy's release, President Clinton proposed new steps to thwart the proliferation of ballistic missiles. And "... working with Russia, Argentina, Hungary and South Africa, we have made significant progress toward that goal."[346]
As we saw earlier, these countries soon became adherents to MTCR, and at least one, Russia, demanded substantial space trade concessions in return.

The above controls mainly addressed the *supply*-side of the U.S.' missile non-proliferation effort.

The *demand*-side is a much longer and more complicated path, which the U.S. nevertheless has been following as the logical complement to the above approach. Consequently, the Policy announced that the U.S. "will also promote regional efforts to reduce the demand for missile capabilities", and singled out regions of tension such as the Korean Peninsula, the Middle East and South Asia for efforts to "address the underlying motivations for weapons acquisition and to promote regional confidence-building steps." The latter region was the target of a particularly ambitious goal:

"... we will encourage India and Pakistan to proceed with multilateral discussions of non-proliferation and security issues, with the goal of capping and eventually rolling back their nuclear and missile capabilities."

The May 1998 nuclear tests performed by India and immediately reciprocated by Pakistan dealt a heavy blow to the U.S. ambitions in this respect[347] and in fact refocused attention in the region on the nuclear option and thus also on

346. See Address by the President to the 48th Session of the [UNGA], White House Press Release (Sep 27, 1993) The White House Virtual Library <http://library.whitehouse.gov/cgi>.
347. In a commentary on the tests, Zbigniew Brzezinski, former national security adviser to President Carter, attributed this failure of US non-proliferation policy to two causes: first, the US policy since 1945 was in fact an active, though selective and in fact opportunistic, proliferation policy, aimed at assisting friends and allies, such as the UK, France and Israel, to get nuclear capabilities, and discouraging all others. So why shouldn't China and Russia do likewise with their friends and allies like Pakistan and Iran? Secondly, an effective non-proliferation policy is only possible if countries which adhere to the Nuclear Non-proliferation Treaty and abstain from the nuclear option, will not fall victim to agressive neighbours which possess such WMD. In other words, the US would have to give guarantees for the protection of the 'unarmed' against (nuclear) agression. (Of course, Brzezinski admits that Congress would never agree to such a blanket guarantee), see de Volkskrant (May 19, 1998) at 9.

the corresponding need for missile capabilities (thus frustrating the administration's demand-side approach).

At the same time, the Indian and Pakistani tests brought swift U.S. sanctions in the form of restrictions on the export of, *inter alia*, defense articles and services on the USML. The legal basis for these sanctions was the Glenn Amendment to the Arms Export Control Act, which requires the U.S. President to impose an array of sanctions on a so-called "non-nuclear state" (*i.e.* a state which does not belong to the official club of nuclear 'haves'), which explodes nuclear devices. These sanctions include the termination of all sales to India and Pakistan of any defense articles and services and of all licenses for the export to that country of any item on the USML.[348]
As far as India is concerned, the State Department consequently revoked all export licenses and technical assistance agreements, involving that country, dating back to 1994,[349] representing a value of several hundred million US dollars (not counting the value of possible Commerce sanctions).
(For instance, the ban was expected to block the export to India of Loral Space and Communications' Globalstar ground station equipment and other space-related goods and services, also affecting cooperative projects such as U.S.' use of Indian environmental satellites.)

Obviously. India and Pakistan are being hurt by these sanctions. But it is equally clear that the U.S. interests are also affected. First, this failure of its non-proliferation policy may have serious destabilizing and proliferatory consequences in the region, with countries like Pakistan, Iran and China prodded into renewed interest in and more investment into nuclear and other arms, including missiles. Secondly, the sanctions undermine the U.S. aerospace industry's reliability as a contract partner and encourages (potential) clients to seek alternative, more reliable foreign suppliers of the aerospace goods and services they require. As such, it is another example of the pitfalls of legislated unilateral export sanctions. As a Commerce official stated a few months before the nuclear tests took place:

"Increasingly ... we think of [sanctions] as a first resort, rather than as a last resort. More than many other issues, however, the sanctions devil is in the details. Badly implemented, these measures can cause enormous uncertainty and difficulty for businesses - even for those who do not trade with these [sanctioned] countries and have no intention of doing so. Careful implementation will minimize the extraterritorial impact that so irritates our allies. The Administration is working to develop a healthier sanctions policy. The one lesson we've all learned is that unilateral sanctions almost never work - support and agreement for

348. See U.S.C. Title 22, Sec. 2799aa-1 (b), "Prohibition on assistance to countries involved in transfer or use of nuclear explosive devices ...".
349. See 9 (20) Space News (May 1998) at 1, 35.

sanctions among the international community is paramount to reaching a successful result."[350]

The above 1993 missile proliferation controls made it very hard for non-MTCR member countries to acquire any missile or launch technology from the U.S. for either military or civil purposes. For member states however, the opening was there, though subject to the conditions as outlined above. One of the few 'lucky' countries was Brazil, which saw its new-found status as an MTCR member in October 1995 as its ticket to becoming a space-faring nation with an indigenous launch capability and an international - Equator based - commercial spaceport. Its membership would, in its view, allow it to purchase from other MTCR signatories key foreign technologies needed to build launch vehicles.[351]
Though neither the Regime nor national legislations provided an automatic and guaranteed access to the desired technology, the assured civil character of Brazil's plans (whatever their economic viability), the country's MTCR-adjusted export control laws and its status as a political ally of the U.S. and other Western states, made arrangements to that effect a distinct possibility.

With respect to missiles and launchers, Clinton's 1996 National Space Policy basically repeated the same approach as the above 1993 policy, by:
- opposing missile programs of proliferation concern,
- retaining a strong presumption of denial against exports of complete space launch vehicles or other MTCR Category I components,
- not supporting the development or acquisition of space launch vehicle systems in non-MTCR states, and, for MTCR countries,
- not "encouraging" new space launch vehicle programs "which raise questions from a proliferation and economic standpoint", while at the same time
- considering exports of MTCR-controlled items to MTCR countries subject to additional safeguard measures where appropriate.[352]

Though there may be small differences in emphasis between the above 1993 and 1996 policies and related practices, neither the national controls nor MTCR have been liberalized to any appreciable extent. On the contrary, the widely held concerns about WMD and missile proliferation, renewed by the Gulf war and, more recently, by the nuclear tests on the Indian subcontinent have resulted in a sharp awareness of the potential risks of a further spreading of launcher technology.

350. See Reinsch, Update West 98, *supra* note 262, at 6-7.

351. See Space News (Oct 1995) at 1 ("Brazil relishes freedom as MTCR member").

352. See National Space Policy, Intersector guidelines, (4) *Non-proliferation, export controls, and technology transfers*, Fact Sheet, The White House, National Science and Technology Council (Sep 19, 1996) <http://www.pub.whitehouse.gov/uri-res/12R?urn: pdi://oma.eop.gov.us/1996/9/20/1.text./> hereinafter referred to as Clinton space policy.

In general, therefore, new space launch programs, whether in MTCR or non-MTCR member countries, have little chance of getting any substantial support from the U.S. and from the other MTCR members (although the latter may in some cases, that is, vis-à-vis some applicants, have fewer qualms about selling launcher technology than the U.S.).
Thus, non-member applicant countries with a *missile* program face in principle considerable problems convincing an MTCR supplier of launch technology that the technology is destined for a purely civil launch program, the more so where the poor economic prospects of an indigenous launch industry will raise foreign eyebrows as such and will also raise proliferation worries. If the new program is a commercial failure, the technology may still be used to strengthen the indigenous missile program or, worse, may be sold to third parties with missile development aspirations.
And even non-members with a nascent or existing *civil* space launch program will find little encouragement, for basically the same reasons.
So the solution is to become a member of MTCR? There is no doubt that the thresholds to launch technology are lower among members, subject to certain safeguards and conditions.
But MTCR is meant to prevent the proliferation of missile/launcher technology, and targets particularly those countries which are known, suspected or potential missile 'proliferators'. In that connection it would appear to be a higher priority for the members to woo China or North Korea than to aim for *e.g.* Brazil. (And, of course, countries which do not posses such technology or whose technology is not sufficiently sophisticated to warrant restrictions on its export to third countries, are not suitable candidates for membership at all)

The U.S., as we saw earlier, has applied a 'carrot and stick' approach to those countries whose potential exports it considered potentially proliferatory. Russia's membership of MTCR was 'bought' with considerable concessions in the field of space trade, including participation by Russia in the space station program and limited access to the international launch trade market. The *quid-pro-quo* was clear: Russia would loose the revenues derived from the export of missiles but would be compensated by substantial civil space technology sales to particularly the U.S.
The same approach is being used vis-à-vis the U.S.'s prime candidate for membership, China.
In 1994, China agreed to follow the principles of MTCR, although it continued sales of missile components and technology to Iran and Pakistan, creating concerns on the part of the MTCR members about China's interpretation of the guidelines and a sense of urgency concerning China's full MTCR membership.
Where in the field of export of nuclear or dual-use commodities, China's adherence to stricter non-proliferation commitments was rewarded with nuclear cooperation programs with the U.S., the latter also promises to increase cooperation in the space launch field, in the form of more or speeded-up licenses for the export of U.S. satellites to China (for launch by the Chinese)

in return for strengthened Chinese controls on the export of missile technology.[353]
(The threat of) sanctions in case of missile-related sales violating the principles of MTCR and the above positive incentives are some of the tools used by the U.S. to get China, which is considered both part of the proliferation problem and at the same time indispensable to any effective nonproliferation policy, to fully adhere to the MTCR guidelines and, preferably, to become full member of the MTCR group.

Notwithstanding the fact that among MTCR members further development of launch capabilities are not encouraged, the combination of increased membership and the - admittedly modest - 'loophole' of peaceful space cooperation ("The [MTCR] Guidelines are not designed to impede national space programs or international cooperation in such programs as long as such programs could not contribute to delivery systems for weapons of mass destruction.") which would permit cooperation in the launch field and, finally, political pressure from 'allies' within MTCR insisting on their place under the (launching) sun - see Brazil -, has created a large group of 'insiders' with some - modest - prospects of increased launcher (and, potentially, missile) knowledge and a number of 'outsiders', non-members which are not supposed to receive any launcher/missile technology assistance at all, either because they sell missiles (proliferators) or because they buy missiles and are considered a (regional) security hazard.
The effectiveness of MTCR, dependent as it is on strict controls of all of its members, may be threatened by its very success. Do *all* members give the same interpretation to, and (continue to) faithfully comply with, the export guidelines vis-a-vis non-members? And do they all apply common principles toward the other members?

The number of countries with a civil launch capability has remained very small. New viable *commercial* operators which could threaten the oligopoly of the incumbents in the international launch market have not materialized. A number of countries have been discouraged either by the national and multilateral missile and launcher export controls or the poor economic prospects or incentives of various kinds or by any combination thereof and have decided to forego the development of an indigenous launch industry. Only some countries with other than purely commercial reasons retained this ambition. Within MTCR, Brazil is one of these. Outside MTCR, *India* would appear to be the only country with a sufficiently strong strategic 'independent-access-to-space' drive (on top of its military missiles programs) and the expertise and technology-base to turn a non-MTCR supported development of its own launch capability into a reality. But both U.S. missile controls and

353. See Holum briefing, *supra* note 189; also Holum testimony 1998, *supra* note 230.

MTCR have, up till the present time, certainly slowed down the process, and will continue to discourage other countries to follow India's example.
The strengthened export controls and increased national security awareness brought about by the 'China affair' and the resulting Strom Thurmond legislation (see Chapter 4.1.2) will only reinforce the U.S. government's resolve to oppose all programs which *could* contribute to missile development.

182

CHAPTER 3

# The U.S. bilateral launch trade relations and agreements

## 3.1 China

### *3.1.1 The Long March: China's entry into the launch market - prologue to the U.S. - China launch trade agreement*

With the space shuttle not available for private commercial launches and a severe shortage of U.S. launchers as a result of both the late entry of the U.S. private launch industry into the launch market and a spate of U.S. private launch failures, Asia Satellite Telecommunications Co. Ltd (*AsiaSat*), in 1988, concluded a contract with China Great Wall Industry Corporation (CGWIC) for the launch of its U.S.-built communications satellite on a Long March launcher.[1] CGWIC quoted especially friendly introductory prices for its launch service in order to break into the lucrative international commercial launch market. This attractive pricing also induced the Australian *Aussat* Company to procure Long March launchers for its two Aussat B communications satellites, also made in the U.S.[2] Asiasat, in testimony to Congress, gave yet

1. In 1986, the four major U.S. launch vehicles (the Space Shuttle, Titan, Delta and Atlas) were grounded because of launch failures (the Atlas was grounded because of similarities with the Delta). Delta and Atlas resumed operations by the end of 1986 and a variant of the Titan was back in service by Februari 1987. Also in 1986, the Ariane failed, and did not resume service until September 1987. All these failures created a significant backlog in satellites awaiting launch, see Marcia S. Smith, *Space Commercialization in China and Japan*, CRS Report for Congress, July 28, 1988, reprinted in Space Committee Hearing 1988, *infra* note 6, at 414 (footnote 28).
   Asiasat Ltd. is a private consortium owned equally by Cable & Wireless PLC of the U.K., the Beijing based, state-run China International Trust and Investment Corp. and Hong Kong's Hutchison Whampoa Group.
2. An Aussat official, in a 1991 article, mentioned some - additional - factors influencing the Australian choice of the Long March launcher: the first contacts with the Chinese were already established in 1986, when, after both an Ariane launch failure and the Challenger accident, Aussat, looking for reliable and timely alternatives for the launch of the Aussat A-3 satellite, only found the Long March 3 fit, willing and able to do the job. The A-3 would nevertheless be flown on an Ariane launcher, but this first technical and commercial contact was further pursued in 1987 when, again, the search for a suitable launcher brought the

another reason to accept the Chinese launch offer, and not Arianespace's, namely the inability of the latter to pin down the schedule and the fact that with a shared (dual) launch - which is the preferred Arianespace practice as it keeps the price per satellite/customer down - Asiasat would be at the mercy of the schedule of the companion payload.[3]

Since these satellites, included as defense articles in the *United States Munitions List* (USML), could not be exported (to China) without specific authorization from the State Department's Office of Munitions Control (later renamed Office of Defense Trade Controls), both companies asked for the required export licenses with that Office.[4] Hughes Aircraft Corporation, the manufacturer of the satellites, actively supported the application through an intense lobbying campaign, but the U.S. launch companies, particularly Martin Marietta and General Dynamics, opposed the granting of licenses since this would permit China, a country with a non-market economy, to become a full-fledged low-priced competitor in the international commercial launch market.[5]
The export license application, lodged by Hughes in July 1988 (but informally already broached in late 1987,[6] prompted a governmental review of prevailing U.S. space policy, which included such issues as the (necessity and effectiveness of) technology transfer controls, the - increasing - trade relations with China, the relations with Australia, the importance of the satellite industry for the U.S. economy as compared to that of the launch industry and the possibility of offering the license as a non-proliferation *quid pro quo* in the form of a Chinese commitment to refrain from selling *Silkworm* missiles to - at that time - Iran.
The trade relations in general and the satellite industry in particular won: on September 12, 1988, President Reagan notified Congress of his approval of the export licenses for the three satellites.[7] As a result, Hughes felt sufficiently

Australians in touch with a China that "had the ability to become a very competitive supplier of launch services." The contract for the two Aussat B satellites was awarded to Hughes Aircraft Company in June 1988. A thorough (on-site) review of the Chinese launch vehicle programme, including its manufacturing facilities, design capability and launch site support services further reinforced the favourable impressions gained earlier: it was this Chinese technical credibility coupled with the attractive introductory pricing which, later in 1988, made Aussat confirm its choice of the Long March 2E (LM-2E), see Gordon Pike, *Chinese launch services, a user's guide*, hereinafter referred to as Gordon Pike 1991, 7 (2) Space Policy 103-115 (1991) at 103, 104.

3. See testimony, 1988 China hearings, as quoted by Stephane Chenard, *The long march to launch regulation*, hereinafter referred to as Chenard launch regulation, 4 Space Markets 193-201 (1990) at 199.
4. On the U.S. export control regulations, see *supra* Chapter 2.3.
5. McDonnell Douglas was less prominent in its opposition, beause of its involvement in China as an aircraft manufacturer. See, for more background information, Chenard launch regulation, *supra* note 3, at 197-199.
6. See Gordon Pike 1991, supra note 2, at 114.
7. Section 36 (c) of the Arms Export Control Act requires the Administration to notify Congress before issuing a license for an item on the U.S. Munitions List that is sold under

confident to conclude a formal launch services agreement with CGWIC, on condition that Aussat would stick to its selection of the LM-2E and that CoCom would endorse the export license issued by the U.S. Government.[8]

But a price had to be paid to also satisfy the concerns of the U.S. launch industry. So the U.S. Trade Representative was asked to negotiate an agreement with the People's Republic on the conditions to be applied to the latter's first steps into the international commercial launch market and the way in which the Chinese were to behave whilst selling their launch services to international customers. Also, technology transfer and liability concerns created by the Chinese launching U.S. satellites from their national launchpads had to be addressed.[9]
In the mean time Congress, by virtue of the Arms Export Control Act, had 30 calendar days (ending October 12) during which time it could object to the intended licensing via joint resolution prohibiting the export. For that purpose House of Representatives hearings were held on September 23 and 27 (Committee on Science, Space and Technology) and on September 28 (Committee on Foreign Affairs).[10]

The Committee on Science, Space, and Technology examined the issue in two days of extensive hearings, involving government witnesses, the principal private parties directly involved in the decision, outside experts on China, and representatives of the American launch and satellite industries. The Committee on Foreign Affairs had a one day meeting to review the issue, and consulted largely the same parties and experts. A wealth of background material was made available to both Committees, and both oral and written statements and

contract for $50 million or more. The Aussat contract was valued at $260 million; the export value of the Asiasat was about $40 million, but "[i]n an effort to keep Congress fully informed of related developments, the Administration also informed Congress of its intent to approve the Asiasat license ...", see statement of Eugene McAllister, Assistant Secretary for Economic and business Affairs, Department of State, in *The Administration's decision to license the Chinese Long March launch vehicle,* Hearings before the Committee on Science, Space, and Technology, U.S. House of Representatives, 100th Cong., 2nd Sess. (Sep 23 and 27, 1988), hereinafter referred to as Space Committee Hearing 1988, at 24.

8. See Gordon Pike 1991, *supra* note 2, at 114.
9. For the text of the Dept of State statement of Sep 9, 1988, announcing the Administration's intended decision to issue the export licenses subject to the conclusion of agreements with the PRC on the above subjects, and subject to Congressional and CoCom approval, see Dept of State Bull. (Nov 1988) at 27-28; also in Space Committee Hearing 1988, *supra* note 7, at 174.
10. See Space Committee Hearing 1988, *supra* note 7, and *Proposed sale and launch of United States satellites on Chinese missiles,* Hearing before the Subcommittees on Arms Control, International Security and Science, on Asian and Pacific Affairs, and on International Economic Policy and Trade of the Committee on Foreign Affairs, House of Representatives, 100th Cong., 2nd Sess. (Sep 28, 1988), hereinafter referred to as Foreign Affairs Committee Hearing 1988.

(additional) questions & answers provided all information possibly required for a thorough evaluation and an informed Congressional view.

The Government, represented by the State Department and the Department of Defense made a strong case for the granting of the export license.
With respect to the *national security* angle, the government addressed two aspects: the viability of the U.S. expendable launch industry (to assure access to outer space for national defense purposes) and the protection of sensitive U.S. technologies with potential military applications.
With respect to the first aspect, the State Department made it clear that, with or without the approval of the U.S., the Chinese would enter the international market for launch services anyhow as a number of other nations could also produce and sell satellites and procure Chinese launches for their customers. The fact that Aussat and Asiasat had bought *U.S.* satellites gave the U.S. government, by virtue of its export control legislation, the unique opportunity and the leverage to negotiate a bilateral launch trade agreement with the Chinese which would stipulate appropriate Chinese behavior, when selling Long March launch services, with respect to the entire international satellite launch market and not only that portion relating to U.S.-made satellites. "Allowing limited competition now will strengthen our [ELV] industry before other nations enter the launch services market later in the 1990's".[11]

As for the protection of U.S. technology, the Department of Defense observed that, on the one hand, the U.S. had already significantly liberalized its policy with regard to technology transfer to China, a "friendly non-allied country", over the past five years. Moreover, as part of the U.S.'s developing military relationship with China, weapons and equipment had been transferred to China which embodied military technologies in some instances more advanced than those to be found in the satellites in question. Furthermore, many of the technologies embodied in the satellites had already been sold or released to China via commercial channels.
On the other hand, and this to some extent contradicted the above soothing remarks, both a government-to-government agreement on technology

11. See Space Committee Hearing 1988, *supra* note 7, at 30. The State Dept official gave the following example to illustrate his point: "If these were British satellites the U.S. would have the opportunity in a sense to veto the licenses in CoCom if we believed the technology was sensitive and could not be protected. However, we will not necessarily have the opportunity to establish as a pre-condition the negotiation of a U.S. -PRC agreement on launch practices. If the satellites were Brazilian, we would have not have the opportunity to veto the sale, nor would we have the opportunity to establish a fair trade agreement as a pre-condition.", *id.* at 19. Conversely, one might add, the denial of a license would have robbed the U.S. government of the opportunity, at *this* moment in time, to set the stage for this new field of international competition. The above example simplified the situation to the extent that it did not refer to the distinct possibility that a British or Brazilian satellite would almost invariably contain one or more U.S.-built components, enabling the U.S. authorities to use the export licensing system to require (fair trade) conditions.

safeguards was a condition precedent to the issuance of the export license and a detailed safeguard regime had to be actually in place. The regime as proposed by the applicants would include strict control over access of Chinese personnel and dedicated, secure payload handling facilities.
The Department concluded in its testimony "that China's entry into the foreign commercial space launch industry will provide no additional impetus to the development of China's military capabilities to include its capabilities in space."[12]

On the issue of technology safeguards, one of the Asiasat partners confirmed that its technology control plan would preclude any Chinese access to the satellite, except to those visual aspects that were already in the public domain. In fact, "the only involvement of Chinese personnel will be to operate the crane that will lift the satellite on top of the launch vehicle."(!)[13]
In its presentation to Congress, the State Department put considerable emphasis not so much on the dollar value of the satellite sale as such, but rather on the impact of the license decision on Chinese-American *economic and trade relations* in general.
Thus, impressive figures were quoted reflecting the expansion of two-way trade, of U.S. exports to China and U.S. investment in China, and including in particular the promising, ever-growing market for U.S. high technology products in China. And the Department also stressed that, for China, entry into the international satellite launch market represented an important national

12. See statement of Dr. Karl D. Jackson, Deputy Assistant Secretary of Defense (East Asia and Pacific Affairs), Department of Defense, in Space Committee Hearing 1988, *supra* note 7, at 36, 37.
13. See statement of Alan L. Cooper, General Manager, Satellite Policy and Planning, Cable & Wireless, plc., in Space Committee Hearing 1988, *supra* note 7, at 114. The statement further elaborated on the controls as follows: "To the extent that there is any activity surrounding the preparation of the spacecraft on-site, all such work and incidental exposure of constituent elements of the satellite will take place in a locked facility to which the Chinese will be denied access. Whenever the satellite is outside the preparation building, it will at all times be sealed, even while it is lifted on top of the launch vehicle and installed in its fairing.", *ibid.* The Ambassador of the PRC to the U.S. gave the following assurances: "The security of foreign satellites shipped to China for launches is guaranteed. To a foreign satellite manufacturing country, the entry of its satellite into China for launch is a matter of transit and not of export or transfer of technology. The satellites made by U.S. companies and those produced by other countries with U.S. patents and technical know-how will be exempted from customs inspection in China if they are to be launched on Long March launch vehicles. The satellite and its related equipment will remain under the control and supervision of its owner during the entire process of transportation, storage, testing and launch operation from its entry into Chinese territory. China has no intention to seek any classified technical know-how therefrom about the satellite and its related equipment." see letter to Hon. Stephen J. Solarz, Chairman of the Subcommittee on Asian and Pacific Affairs, H.R. Committee on Foreign Affairs, in Foreign Affairs Committee Hearing 1988, *supra* note 10, at 134.

initiative in high technology trade and an opportunity to earn much-needed foreign exchange.[14]

Finally, both State Department and Defense addressed the most thorny internal issue, *i.e.* the conflicting interests of the U.S. *satellite industry* on the one hand and the U.S. *launch industry* on the other hand.
With respect to the former industry, they submitted the following considerations.
The U.S. commercial satellite industry was an important asset: over the next five years more than $2.5 billion, representing more than 60 percent of all western-built communications satellites, would be earned in export revenue. But the U.S satellite manufacturers faced increasing competition from European firms. (For instance, the runner-up to Hughes in the Aussat competion was the European team British Aerospace/Matra). Permitting U.S. firms to use cost competitive launchers such as the Long March would allow them to remain competitive vis-à-vis both foreign satellite firms and terrestrial competitors such as fiber optics.
Denying the U.S. industry this possibility would in this particular case mean the probable loss of approximately $40 million in Asiasat export value (as the commercial viability of the Asiasat consortium depended on the Chinese partner's access to foreign exchange provided by the Long March contract). It would also put at risk the approximately $250 million to be spent in the U.S. by Hughes and its major subcontractors under the proposed Aussat contract, as Aussat would have to choose an alternate supplier of either the satellites or the launch services; and foreign firms would be most happy to oblige![15]

14. See statement of Eugene McAllister, in Space Committee Hearing 1988, *supra* note 7, at 28, 29: "Two-way trade increased from about $1 billion in 1977 to over $10 billion in 1987. Exports to China in 1987 exceeded $3,5 billion. The U.S. is the third largest investor in China, with about $2 billion in assets ... High technology trade has become particularly important in our economic relationship. Over the past five years, the U.S. has supplied anywhere from 30 percent to 47 percent of China's total high technology imports." As for the foreign exchange, Alan Cooper of Cable and Wireless, in his testimony on behalf of Asiasat, stated that the dollars earned with the launch would be needed to a.o. pay Hughes for the satellite: "In terms of the direct needs of the venture, the purchase of launch services from Long March will provide a hard currency in-flow that will justify outflows for the Chinese investment in Asiasat, through CITIC, and the payment of Asiasat of usage charges for capacity actually subscribed by domestic PRC users." See his statement, *supra* note 13, at 100, 108.
15. See statement of Eugene McAllister, Space Committee Hearing 1988, *supra* note 7, at 29, 30. Richard Johnson, Aussat's general manager, responding to a question by the chairman of the Hearing, confirmed that there was certainly no guarantee that the business, *i.e.* the satellite procurement, would stay with the U.S. and that a U.S. launch firm would be chosen in case of a Congressional veto of the Long March. In fact there were a number of options available to Aussat, which had received four tenders for its satellite system, three from U.S. suppliers (Hughes Aircraft Company, Ford Aerospace and GE Astrospace) and one from a European consortium (British Aerospace/Matra). As a result of Aussat's requirement that tenders should offer a package of satellite construction *and* launch arrangements, each

The interests of the U.S. *launch* industry were, as we saw earlier, in the view of the Administration officials better served by saying "yes" to the license request and being able to attach conditions thereto with respect to Chinese fair launch trade practices, than by saying "no" and postpone the discussion on Chinese launch behaviour and/or leave it to *e.g.* the Europeans to deal with the threats and opportunities of Chinese launch competition; in the latter case, the U.S. leverage would be far less than in the present situation.[16] Besides, there was no guarantee whatsoever that the U.S. launch industry in this particular case would benefit from a veto of the Long March launcher. Apparently, the European Ariane launcher, and not a U.S. company, was Hughes' and its customers' chosen alternative in case the Chinese were barred from launching the satellite.[17]

Predictably, the *U.S. launch industry*, represented primarily by General Dynamics (Atlas) and Martin Marietta (Titan), expressed rather strong views on the matter, along the following lines.
The U.S. ELV industry was still in its infancy, if not "embryonic", had not even had its first commercial launch yet and had been able to win a number of international launch contracts since mid-1987 only because the Ariane launch manifest had quickly filled through early 1991 (and contracts therefore more or less spilled over to the U.S. companies): in other words, this young U.S. industry was only now entering into a much more truly competitive phase involving launches for 1991 and beyond.
It was at this sensitive stage that they felt confronted with new and unexpected competition. For the companies concerned, strongly encouraged by policy intiatives and statements of both the President and Congress, had invested

tenderer had offered more than one launch vehicle, collectively including the U.S. Titan and Atlas Centaur rocket, the European Ariane and the Long March. All four had offered the Long March, which - through its low introductory price - meant a prospective cost reduction to Aussat of some $80 million or 20% of the system cost. Aussat's initial selection of Hughes to negotiate with resulted in a letter of intent in which Aussat directed Hughes "to enter into a Launch Services agreement for the provision of a Long March launch", see Johnson statement, *ibid*, at 91, 92. If this cost advantage could not be had with a U.S. satellite firm, the logical step for Aussat would be to turn to the European consortium which, apparently, not only had made a very competitive satellite offer but also had fewer qualms about using a Chinese launcher. (Arianespace Inc. USA President Heydon, in a letter of October 7, 1988 to the Chairman of the Committee hearing, denied this, stating that the European bidder British Aerospace had consistently supported the position that "it is not in Europe's long-term interest to use Long March as a weapon in their competitive battles with the major U.S. satellite builders.", see Space Committee Hearing 1988, *supra* note 7, at 426).

Of course, the other, more expensive, options -*i.e.* a U.S. satellite delivered in orbit by either U.S. or European launcher and a European satellite with the same launcher choice- were not completely off the table, but less likely to be choosen.

16. See *supra* (text to) note 11.
17. See Bill C. Lai, *National subsidies in the international commercial launch markett*, 9 (1) Space Policy 17-34 (1993), herinafter referred to as Bill Lai, at 26.

significant amounts in launch pad and launch vehicle improvements, believing that the U.S. Government, interested in a healthy commercial U.S. space transportation industry, would not put that strategic asset at risk by voluntarily bringing in unfair competition.
In that connection, Chinese *pricing* practices were seen as most threatening. As the Martin Marietta representative put it,

"... American launch companies cannot compete against a foreign government program that is totally independent of free market pressures, and whose pricing decisions seem driven by foreign exchange needs and foreign policy considerations rather than private enterprise considerations of cost and return on investment."

Chinese entry into the market place would thus disrupt and undermine the viability of the U.S. companies; that is, unless this entry was made subject to a thoughtful, balanced and comprehensive trade policy, in which (guarantees with respect to) fair pricing behavior would have to play a central role.
Both U.S. companies expressed their concern about the contents of the conditions yet to be agreed upon with the Chinese in this regard, and strongly recommended to first have the fair trade / fair pricing agreement concluded (and considered by Congress), after which the licenses could be resubmitted by the State Department.[18]

*McDonnell Douglas,* the third U.S. company, though showing a more positive attitude towards granting an export license in view of its broader business involvement with China, made its support conditional on agreement having been reached on *inter alia* economic conditions, "most likely centered around establishing a specific and limited number of Long March commercial launches per year, and establishing fair cost-based pricing for those launch services."[19]

*Arianespace* echoed the concerns of the U.S. industry about the impact of non-market entrants' less than fair competition on the viability of the western commercial launch services companies (with Arianespace being even more vulnerable because it lacked the "healthy military production base" the U.S. companies could rely on[20], and demanded prior Chinese demonstration of

18. See Foreign Affairs Committee Hearing 1988, *supra* note 10, at 47, 53 (statement Martin Marietta) and 88 (statement General Dynamics).
19. See Space Committee Hearing 1988, *supra* note 7, at 168.
20. In its "fact sheets on the China launch issue" of Sep. 1988, the Department of State largely confirmed Arianespace's observation, stating that "[h]istorically, the major source of investment for development of ... (ELVs) in areas such as design launch facilities, and tooling has resulted from Department of Defense (DOD) and NASA contracts. The magnitude of that investment as indicated by the size of the total military contracts discussed below is significant ... - U.S. ELV Manufacturers have signed contracts for 48 military launch vehicles worth $4.8 billion.", see Space Committee Hearing 1988, *supra* note 7, at 392. There is no comparable (European) military production base available to Arianespace.

willingness and ability to abide by rules of fair and reasonable competition based on market-oriented principles before such entry could be permitted. The European launch company consequently called for a (prior) *multilateral* agreement on pricing and trade practices to ensure reasonable and fair competition.[21]

Although the above launch companies were asked to state their views on a number of other issues, such as the question of technology transfers and liability for Long March launches, their views were particularly sollicited on standards for "fair pricing for launch services". In the absence of a reasonably accurate insight in the true costs of the Long March, there was a general tendency to take the (historical) western launch prices as a yardstick: on the basis of an analysis of price/performance ratios, General Dynamics came to the conclusion that they all fell within a rather narrow band, and suggested that Chinese pricing in dollars per pound within the same band would not be unfair.[22] Martin Marietta, McDonnell Douglas and Arianespace expressed similar views.[23]

In this connection, the State Department, already sufficiently aware of the U.S. launch companies' views prior to the hearing, had identified the following items as "market disruption safeguards", which the Chinese would have to agree on to help establish a level playing field:
- price future launches at "international rates"
- participate in "rules of the road" talks regarding government involvement in, and support for, the commercial launch industry, and
- limit the number of future launches to an appropriate level.[24]

China Great Wall Industry Corporation, in its submission to the Foreign Affairs Committee Hearing, rejected the suggestion that it was "dumping" their launch services or received subsidies from the Chinese government. They attributed the comparatively lower price of their launch services to a combination of factors, such as "practical and reliable rocket design, fairly high successful launch record, entirely home-made materials and components, fairly low labour costs and the corporation's practice of seeking no high profit ...". The company also defended the promotional price for its Long March-2E, a new type of launch vehicle, as fully in accordance with international practice, and submitted that the introductory price for the new Ariane 4 launcher had been even lower than the one offered for its Long March. Finally, the Chinese company cited certain operational limitations which put its launch vehicle at

21. See Space Committee Hearing 1988, *supra* note 7, at 184, 185.
22. *Id.*, at 282, 284.
23. *Id.*, at 288, 290 (Martin Marietta), 295, 296 (McDonnell Douglas) and 301, 303. (Arianespace).
24. *Id.*, at 389.

a disadvantage compared to its western competitors and made price comparisons inappropriate.[25]
Expert testimony at the hearing supported the statements made by the Chinese with respect to the difference in price based on qualitative differences between their own launch vehicle and the western ELV's. In essence, the comparison boiled down to a sharp contrast between sophistication on the one (western) hand and the inexpensive and simple "big dumb booster" concept on the other (Chinese) hand.[26]
Of course, the above justifications for lower Chinese prices only addressed the contention of dumping or "unfair pricing", and, rather than reconciling the western launch industry with Chinese entry into the launch market, only heightened their concerns about the effects thereof.

As for a possible safeguard in the form of quantitative limitations, the U.S. launch industry itself recommended a numerical standard of one award of *one* launch per year; its European competitor, hardly more generous, came to one or two.[27] These were in reaction to indications received from China that the Chinese would be agreeable to a limitation to *four* launches per year, which represented the maximum number of launch vehicles China Great Wall Industry Corporation could spare each year for foreign customers taking into account its domestic launch needs.[28]
Whereas, in the view of the Department of State, this latter number of launches would not jeopardize the U.S. launch industry[29], the latter, seeing a "thin" world launch market for the 1991 and beyond period of some 16 or 17 annual launches (with Arianespace acquiring at least half of the contracts), felt "discouraged" at the prospect of loosing such a sizeable part (25%) of the market to the Chinese, and spoke in this connection of a "serious blow to the nascent U.S. commercial launch industry".[30]
At the time of the hearing, the Administration had not made up its mind on either the level (or even the principle) of a quantitative restriction[31] or on the definitive approach to be taken with respect to "fair pricing".

The Administration presented a number of other issues which had been the subject of inter-agency study and review prior to its decision: the role of CoCoM, the U.S. policy on Soviet launches of U.S. satellites, the liability condition, and its relations with the European Space Agency (ESA).

25. See Foreign Affairs Committee Hearing 1988, *supra* note 10, at 118, 119.
26. See statement David R. Scott, Foreign Affairs Committee Hearing 1988, *supra* note 10, at 112.
27. See Space Committee Hearing 1988, *supra* note 7, at 288 (Martin Marietta) and 302 (Arianespace).
28. See Foreign Affairs Committee Hearing 1988, *supra* note 10, at 120, 134.
29. *Id.*, at 36.
30. *Id.*, at 45 (Martin Marietta) and 44 (General Dynamics).
31. *Id.*, at 41.

*CoCoM*, whose - unanimous - approval was needed before the U.S. Government could issue the licenses, had already been approached in June 1988, *i.e.* prior to the official license applications, for an early consideration of the matter.
At that time, the U.S. had confirmed its support for case-by-case review of satellite export cases involving China with a presumption of approval (provided national security concerns could be met) as opposed to similar *Soviet* cases where a presumption of denial was maintained. This was consistent with both the CoCoM policy of differentiating between the PRC and the USSR, with the U.S. view of Soviet threat, and with U.S. export regulations.
Although CoCoM's export embargo proscribed export of satellites to Warsaw Pact nations, Korea and other communist countries, China had, through the years, been subjected to increasingly less rigorous controls.
CoCoM's initial consideration did not result in agreement on policy or procedure, and further discussion of the matter was scheduled for November 1988, *i.e.* after the 30 days Congressional review (and assuming export approval of the latter had been obtained).[32]

*Soviet* launches of U.S. satellites remained prohibited, affirmed the Department of State, and any pressure, domestic or foreign, to treat the Soviets in the same way as the Chinese would be strongly resisted: the P.R.C., a "friendly, non-allied" nation, did, in the consistent view of State, not pose the same threat to the United States space assets as did the Soviet Union. Moreover, Soviet and Chinese capabilities to exploit vulnerabilities in U.S. satellites were vastly different.[33]

*Liability* involved the applicability to the Chinese launches of the 1972 Space Liability Convention, to which the United States was, but China was *not*, a party. That Convention holds a "launching State" absolutely liable for damage caused by its space objects on the surface of the earth or to aircraft in flight. As the definition of "launching State" includes "a State which procures the launching of a space object", and it could be argued on the basis of the provisions of that Convention that the U.S. was "procuring" the launching of the satellites in question, the U.S. Government wanted to ensure that China would compensate the U.S. for any payments the latter would have to make pursuant to its liability under the Convention. A government-to-government agreement, covering this eventuality, was therefore considered a necessary pre-condition by the U.S.[34]

At the request of the *European Space Agency*, the U.S. Government and ESA had met on several occasions since July 1987 to develop "rules of the road"

32. See Space Committee Hearing 1988, *supra* note 7, at 384.
33. *Id.*, at 390.
34. *Id.*, at 388.

with respect to government involvement in, and support for, the commercial space launch industry. Although, at their most recent meeting in July 1988, the two sides had made considerable progress in identifying specific governmental practices which directly affect commercial operations and had concluded that further work on *indirect* supports was needed, the talks between the two parties had not yet progressed to negotiation.
ESA, confronted by the U.S. at the latter meeting with the export license applications, had expressed its concern about additional entrants into the "crowded" launch market. The two sides had subsequently discussed possible (joint) approaches to launches by such third parties, but, according to the State Department, had not come to a decision on how to proceed.
The U.S. Administration had in the mean time informed ESA about its decision with respect to the Chinese launch services and expected to have further discussions with that organization on the matter.[35]

In the two Committee Hearings brief discussions took place on the politically sensitive issue of Chinese (future) behavior in the area of *missile proliferation*, particularly in the Middle East, and on the possible linkage of this issue with the the export license decision. Basis for the discussion was the rather veiled reference to this "trade off" in the statements made by the representative of the Department of Defense before both Committees:

"Entry into the commercial space field will also foster efforts to direct China's missile and space activities into areas more compatible with our own non-proliferation concerns and objectives."[36]

While denying a direct linkage between the two issues, upon questioning on the part of Committee members the Defense official conceded that the Secretary of Defense, during his - recent - visit to China had raised U.S. Administration concerns about Chinese sales of *Silkworm* missiles to Middle East countries and that the Chinese were undoubtedly aware of the negative effect these sales had on their relationship with the U.S. And, as the spokesman added, "the discussions that Secretary Carlucci had in China were the most successful discussions we have had to date with the Chinese on this topic."[37] By finally drawing Congress members' attention to the fact that the President's decision on the export licenses had taken place at the end of the Secretary's successful mission to China, he appeared to put the trade off rather squarely on the table.[38]

35. *Id.*, at 391. (Some further discussions did indeed take place but dit not result in an agreement between the two parties, see Ch. 3.4.3 *infra*).
36. *Id.*, at 36; see also Foreign Affairs Committee Hearing 1988, *supra* note 10, at 33.
37. See Space Committee Hearing 1988, *supra* note 7, at 47.
38. *Id.*, at 33. Ten years later, this veiled linkage has become an express and openly proclaimed policy; in June 1998, a high State Dept official stated in testimony before the House: "One aspect of our efforts to persuade China to adopt a more responsible nonproliferation policy,

Although "healthy skepticism" was expressed both on the part of Committee-membership about what verbal commitments the U.S. Secretary of Defense had exactly extracted from the Chinese[39] and on the part of Defense itself about the Chinese "deeds" to be expected on that basis,[40] details given to Congress in private session apparently further justified the Administration's hope that "the problem of missile proliferation is now behind us."[41]

In his letter of October 14, 1988 to the Chairman of the Committee on Foreign Affairs, the Secretary of Defense noted a recent legislative initiative in the Senate to block the export of the satellites. The House of Representatives, through its opposition against this attempt, in the Secretary's view, not only "helped build our bipartisan effort to develop a constructive relationship with China. More importantly, however, it signaled strong support for our diplomatic efforts to stem missile proliferation in the Middle East".[42]
Expressing concern that other attempts might be made to block the export of the satellites or delay consideration of the licenses until the next Administration, Secretary Carlucci warned against the effect of the ensuing withdrawal of the Administration's notification (of intended approval) to Congress:
- it would undercut the U.S. negotiating position with the Chinese on the three conditions, *i.e.* the conclusion of agreements on market access, on technology safeguards and on liability, if the latter were to commit themselves to specific terms without knowing whether the Administration would then have the authority to provide the licenses;
- because of the time-sensitive character of the contracts, delay would jeopardize $300 million in U.S. exports (as well as related American jobs), and other exports would be at risk if China responded by switching to other countries for high technology equipment, such as commercial aircraft;
- it would mean trouble with "a staunch ally in the South Pacific", Australia, which had a strong interest in the success of the Aussat launch by China;

particularly regarding missile transfers, has been the basic policy of three administrations, *beginning in 1988*, to allow U.S.-made satellites and foreign satellites with significant U.S. components and technology to be launched on Chinese rockets. This policy has been used judiciously as a "carrot" to encourage China to enforce strengthened nonproliferation standards". (emph. add.), see Holum testimony 1998, *supra* Ch. 2 note 230.

39. See statement Hon. Solomon, Representative, ("I really think that our good friend, Secretary Carlucci, was hornswoggled."), Foreign Affairs Committee Hearing 1988, *supra* note 10, at 16. See also critical press coverage ("Mr. Carlucci apparently was unable to persuade his hosts to change their policy, because the statements at the end of his visit said nothing about China expressing willingness to stop being a merchant of death, only that China conducts and would continue to conduct its arms business "responsibly"), Chicago Sun-Times, Sep 10, 1988, reproduced in Space Committee Hearing 1988, *supra* note 7, at 223.

40. See Foreign Affairs Committee Hearing 1988, *supra* note 10, at 39.

41. *Ibid.* As we saw in the previous Chapter, this was a clear overstatement of the Administration's accomplishments: the problem is still there today.

42. See Foreign Affairs Committee Hearing 1988, *supra* note 10, at 122.

- finally,

"... it would most certainly imperil the important progress made in my talks with Chinese leaders in Beijing in August. These meetings touched on a number of bilateral issues, but most important were the successful discussions on China's arms sales policy. I said in Beijing that these talks on arms sales were "the best discussions that we have ever had" with the Chinese, and I am now hopeful that we can put the issue of missile proliferation behind us."[43]

And, as late as October 20, National Security Advisor Colin L. Powell, in a similar letter to the Committee on Foreign Affairs, warned against any last minute legislative efforts in Congress to prohibit or delay issuance of the export licenses, and confirmed the linkage between the two issues: "Finally, the extremely positive results achieved during Secretary Carlucci's recent visit to China in putting the issue of Chinese IRBM sales behind us could well be lost [if such legislation would be adopted]."[44]
As we saw earlier and will revert to later, Chinese (non-) proliferation behavior would dominate the export licensing and launch debate for many years to come.

In the Committee on Foreign Affairs, Chinese *human rights* behavior was also brought up as a matter of concern and linked with the satellite export licenses. As one member observed "... the manner in which a number of us will react to these negotiations will have a great deal to do with the manner in which the Chinese observe the human rights problems and correct the human rights abuses that are evident in Tibet."[45]
At the hearings, the matter was not further pursued. As an important Congressional concern, it would nevertheless join missile proliferation as a factor which would continue to considerably affect and complicate U.S.-Chinese launch trade relations.

*Congress* felt rushed with just 30 days to make up its mind, and in both Committees complaints were voiced that the members had to judge the issue without knowing the contents of the agreements yet to be negotiated by the U.S. Government with China. (And after those 30 days, Congress would, to the concern of some members, essentially loose jurisdiction over the matter).[46]

43. *Id.*, at 123. (And see note 41).
44. *Id.*, at 101.
45. *Id.*, at 40.
46. See Space Committee Hearing 1988, *supra* note 7, at 38, 39, and Foreign Affairs Committee Hearing 1988, *supra* note 10, at 4, 6, 92, 94.

There was - at times heated and emotional - debate about the various dimensions of the issue as presented above. Already prior to the hearings, a number of Congressmen had appealed to the National Security Advisor to protect the U.S. ELV industry, on the brink of (re-)assuring U.S. access to space, against the detrimental effects of non-free market economy prices, mentioning the loss of (launch-) trade opportunities and American jobs and the dangers of technology transfers as added reasons for denying the license applications.[47] A joint resolution of dissapproval was introduced in both Senate and House of Representatives[48], and particularly in the Foreign Affairs Committee hearing, China's missile sales to Middle East countries were cited as the type of behavior that should not be "rewarded", nor abstention from that behavior be bought, by having them launch U.S. satellites.[49]

The determination of the Administration to improve (trade-) relations with China and the assurances its representatives gave that all interests would be scrupulously and evenhandedly served, both in the negotiatiations on the three agreements the Administration proposed to conclude with China and in the follow-up period thereafter, in the end prevailed.
On October 7, 1995, the Chairman of the House Space Committee wrote to Secretary of State Shultz:

"Following the committee"s careful scrutiny of this issue and vigorous discourse with affected parties on the implications of this licensing decision, I have concluded that the licensing decision outlined in the President's notification to Congress, including the specific conditions therein, is responsible, fair and prudent to the overall interests of the United States. Moreover, this license and the conditions to which it is subject present significant opportunities to this country that extend far into the future."[50]

On October 12, when the deadline for Congressional disapproval had passed, the Foreign Affairs Committee had also, albeit tacitly, accepted the Administration's decision. Nevertheless, some of its members remained sufficiently opposed to it to consider further legislative action, which prompted both the National Security Advisor and the Secretary of Defense to write urgent letters to the Committee Chairman requesting his assistance in forestalling these last minute actions.[51]

A reason for the Congressional opponents to bide their time may well have been their conviction that, where this battle appeared to be lost, the Administration had reaffirmed that it would decide each future export license

47. See Foreign Affairs Committee Hearing 1988, *supra* note 10, at 95-97.
48. *Id.*, at 6, 122.
49. *Id.*, at 6.
50. See Space Committee Hearing 1988, *supra* note 7, at 422, 423.
51. See Foreign Affairs Committee Hearing, *supra* note 10, at 100 and 122 respectively.

request on its own merits[52] and would have to submit its decisions to Congress, whose members would continue to closely monitor Chinese "behavior" and have every opportunity to link the issues. An opportunity they used soon thereafter.

On *January 26, 1989*, after two rounds of negotiations, the U.S. and China signed a *Memorandum of Agreement between the Government of the United States of America and the Government of the People's Republic of China regarding international trade in commercial launch services*. This Memorandum of Agreement (M.o.A.) was preceded by, and intimately linked with two other M.o.A.'s signed by the same parties on December 17, 1988, *i.e.* a *Memorandum of Agreement on satellite technology safeguards* and a *Memorandum of Agreement on liability for satellite launches* ; the latter lost most of its relevance when China, on December 20, 1988, acceded to the U. N. Space Liability Convention of 1972.[53]

The three agreements, which will be referred to hereafter as the (Launch) Trade Agreement, the Technology Safeguards Agreement and the Liability Agreement respectively, entered into force on *March 16, 1989*, the date on which the U.S. Government had notified its Chinese counterpart that U.S. licences for the export of the Asiasat and Aussat satellites to China for launch from Chinese territory had been approved.[54]

52. *Id.*, at 100.
53. The technology safeguards and liability M.o.A.'s were negotiated under State Dept chairmanship and initialled by the two parties in Beijing on Oct 21, 1988. The trade agreement was negotiated under USTR chairmanship, with participation from other agencies, and was initialled on Dec 17, 1988. At the latter occasion, the State Dept issued a statement in which it outlined the contents of the trade agreement and declared not yet to be "... in a position to issue the export licenses for the three ... satellites ... We must still review and formally approve the trade agreement. We also must await CoCoM approval of the satellite exports"., see American Foreign Policy (1988) at 539 (Doc. 321).
54. The agreements are reproduced in 28 I.L.M. 596 (1989). The guidelines for the implementation of the main M.o.A., approved by the Trade Policy Staff Committee and the U.S. Trade Representative (USTR) and issued by the Office of the USTR appear in 54 Fed. Reg. No. 19 (Jan. 31, 1989) at 4931-4933. To avoid issues of liability between China, the launching state, and the United Kingdom, the state of registration of the Asiasat satellite, the two parties exchanged notes on March 16, 1990, which provided that "China and the United Kingdom agree that, with regard to the compensation arising during the launch phase (from ignition of the launch vehicle to the separation of the satellite from the launch vehicle), China shall assume the liability as between them under the Liability Convention, the Outer Space Treaty and other principles of international law". See He Qizhi, *Legal issues of China's entry into international space market*, 40 (3) Zeitschrift fuer Luft- und Weltraumrecht 278-281 (1991) at 279. For a detailed analysis of the *Convention on international liability for damage caused by space objects* of March 29, 1972, e.i.f. September 1, 1972, 24 U.S.T 2389, T.I.A.S. 7762, see H. Peter van Fenema, *supra* Ch. 2, note 9.

### *3.1.2 The U.S.-China Agreements of 1989*

#### a. The Launch Trade Agreement

Under the article II heading "trade issues and market entry", the agreement sought to regulate (future) Chinese behaviour in the international market place through adherence to both general principles and specific - launch capacity and price - limitations.

Thus, the Agreement had the U.S. and the PRC support the

"application of market principles to international competition among providers of commercial launch services, including the avoidance of below-cost pricing, government inducements, and unfair trade practices."

*Government support*
Included in the steps the PRC had to take to ensure that Chinese launch providers upon entry "do not materially impair the smooth and effective functioning of the international market for commercial launch services", was a commitment to ensure that any direct or indirect government support extended to its launch companies "is in accord with *practices prevailing in the international market*" (emph. add.); this latter term, according to the Annex on definitions which forms part of the agreement, refers to practices "by governments of market economies", and thus, for all practical purposes, to the behaviour of the U.S. government and of the governments of ESA and the ESA member states in this field. To what extent these entities do subsidize - either directly or indirectly - their launch companies is a matter which is at best not easily answered and thus unfit for specific guidance for the Chinese, at worst a total regulatory-financial mystery of nightmarish proportions. Consider a few elements, assembled for a study published in 1993.[55]
In the U.S., although various policies through the years have rejected direct government subsidies to private (space) companies, the U.S. launch industry has benefitted from its association with the government in a number of ways. One form is the economies of scale resulting from government, in particular Department of Defense, contracts. Examples include General Dynamics, which, in 1987, invested USD 400 million to produce 18 commercial Atlas I and II launch vehicles. At the same time it received a contract from the U.S. Air Force for another 11 Atlas II vehicles. By combining the two production orders GD created economies of scale resulting in lower cost per launcher and a lower, more competitive price in the international market.[56] Martin Marietta

55. See Bill Lai, *supra* note 17.
56. *Id.* Timothy A. Brooks, *Regulating international trade in launch services*, 6 High

(Titan) and McDonnell Douglas (Delta) could make similar arrangements with the Government. For all three launchers, according to the above study, Defense accounted for 29-93% of all launches, and with NASA included U.S. government usages accounted for as much as 57-93%. In fact, without the prospect of military contracts, these companies would probably not have decided to modernize their production facilities and enter the commercial launch market after the Challenger accident.
Another form of indirect government support is research and development (R&D) funding for military products and technologies, which can later be transferred to commercial applications without obligation to reimburse the government. Finally, the U.S. government's commitment to use as much as possible the domestic launch services may also be seen as a clear support for the U.S. industry (see chapter 3.4.4. *infra*).

In a more recent trade press report on the activities of Japan's aerospace firms, reference was made to NEC, Mitsubishi and Toshiba which spent 1997 "pushing toward commercialization of their products and technologies" and using work on satellite projects for the government agencies NASDA and ISAS "as springboards to making a commercial splash." The same report has Nissan, (co-) builder of the H2A launcher, looking forward to major revenues from NASDA purchases of this new rocket, while at the same time selling 30 of these launchers to Rocket System Corporation which is marketing the H2A for commercial launches.[57]

The various ways and means through which ESA and its member states (may) have supported the production and sale of the Ariane in the past, have been discussed in the framework of the TCI case in Chapter 2.2.2 (ii). This is not the place to further review all - possible - indirect-subsidization methods. The foregoing is simply to indicate that subsidization or other support may take many forms in Western countries; the respective provision in the Agreement therefore gives China a large measure of freedom in supporting CGWIC and its family of Long March launchers.[58]

*Government inducements*
A related provision, in article II d., had the U.S. state that

"The U.S. does not provide government inducements of any kind in connection with the provision of commercial launch services to international customers which would create discrimination against launch service providers of other nations ..."

Technology L.J. 59-107 (1991) at 75.
57. See 9 (28) Space News (Jul 1998) at 16 ("Commercialization drives Japan's big three").
58. On subsidies, see also Yanping Chen, *China's space commercialization effort - organization, policy and strategies*, 9 (1) Space Policy 45-53 (1993) at 52, 53.

China agreed to behave in the same way.
The agreed definitions in the Annex to the Agreement gave the following explanation to the term "government inducements":

"Government inducements' with respect to particular launch services transactions include, but are not limited to, unreasonable political pressure, the provision of any resources of commercial value unrelated to the launch service competition and offers of favorable treatment under or access to: defense and national security policies and programs, development assistance policies and programs, and general economic policies and programs. (*e.g.*, trade, investment, debt, and foreign exchange policies)".

In other words: no bribes, no threats, no trade-offs, no special "deals".

*Pricing*
In order to avoid unfair pricing, the agreement provided:

"The PRC shall require that its providers of commercial launch services offer and conclude any contracts to provide commercial launch services to international customers at prices, terms, and conditions which are on a par with those prices, terms, and conditions prevailing in the international market for comparable commercial launch services." (emph. add.)

The latter part of this provision as emphasised, according to the Annex "includes but is not limited to prices, financing terms and conditions and the schedule for progress payments offered to international customers by commercial launch service providers in market economies."
Further, insurance and/or reflight guarantees were subject to the same "on a par" condition as the launch prices. And the Chinese launch providers would be prevented from offering introductory or promotional prices except for the first or, in extraordinary cases, second successful commercial launch of a new launch vehicle.

Some remarks on the above pricing condition.
The idea was, as we saw earlier, to avoid a practice of dumping or below-cost pricing conducive to hurting or even destroying the (competitive position of the) U.S. launch companies.
By setting a (U.S./European) international market standard in pricing, the assumption was created that those prices were above-cost or at least that with those prices a break-even could be reached. That would imply that the international cost was to be considered the true cost, undistorted by direct or indirect government support or so distorted only to an extent regarded as acceptable by the above governments of market economies. However, already for quite some time, these governments and their - fiercely competitive - launch companies had been accusing one another of government subsidization

and/or preferential treatment distorting the free market mechanism.[59] In other words, although during the Congressional Hearings on the subject the western launch companies agreed on this "international standard" as being an acceptable one for providing guidance to their new competitor, in reality this standard would only produce the real price in a temporary - oligopoly driven - sellers market, and hardly play a role in a competitive "buyers market" environment.

On the other hand, it was noted before that in practice the cost of constructing and launching a vehicle in China was considered substantially lower than in western countries, and that, anyhow, cost calculation was not the first priority of the Chinese launch industry.[60]

The provisional conclusion of the above could be that the pricing provision would force the Chinese launch industry to raise its prices to an international level where the launch quality difference would induce the customer to choose an American launch provider. Alternatively, Great Wall Industry would still conclude the contract and make a substantial profit on it, because of the difference between the - artificially increased - launch price asked and the launch cost incurred. In both cases the launch customer would pay a higher bill than necessary.

Of course the Chinese launch price could also be set at a level which, in the eyes of the U.S. or European competitors, would be too low to pass the test of the Agreement, in which case the U.S. producer of the satellite (components) probably would not obtain an export license from the U.S. government, or only get one after lengthy investigations and negotiations (and possibly with the help of some political pressure on the part of the country most affected by the delaying process).

For, in case of violations of the provisions of the Agreement, the U.S., by virtue of article V of the Agreement, had the right to take any action permitted under U.S. laws and regulations. Moreover, the same article reaffirms the U.S. government's quasi-total freedom of action in this regard as follows:

"With regard to export licenses, any application for a U.S. export license will be reviewed on a case-by-case basis consistent with U.S. laws and regulations. Nothing in this Agreement shall be construed to mean that the U.S. is constrained from taking any appropriate action with respect to any U.S. export license, consistent with U.S. laws and regulations. Nevertheless, the U.S. will do its utmost to assure, consistent with U.S. laws and regulations, continuity of issued license(s) and the completion of the transactions covered in such license(s)."

59. See TCI case 1984, Chapter 2.2.2.2. *supra*, and see *supra* (text to) note 20.
60. See *supra* (text to) notes 25 and 26.

The above would indicate a distinct need of clarity on the question of - permissable, *i.e.* "market" - pricing on the part of Great Wall Industry, before responding to any launch tender. But, although the Agreement offered abundant consultation and information exchange possibilities for that purpose, it neither sought to produce any specific reference prices nor did it provide acceptable discount percentages which would assist the Chinese in establishing "on a par" launch prices taking into account the differences in cost and other launch-related aspects.

Here, the Agreement's above-quoted pricing provision created uncertainty for China but also a loophole, where it referred to prices for "comparable" launch services.
One aspect, already noted earlier, is the comparative level of sophistication of the launch vehicles used.[61] The lack of precision it offered and the more limited life expectancy resulting therefrom were quoted as additional handicaps.[62]

Another related aspect was its performance level in the sense of *range*.
As CGWIC stated at the Congressional hearing:

"Chinese Long March-2E, unlike many other western launchers, is a Low Earth Orbit mission launch vehicle which cannot directly deliver the communications satellites into Geosynchronous Transfer Orbit without an upper stage. Therefore, the price offer of Long March 2E should not be put on a par with the price offer of other countries launch vehicles that perform direct Geosynchronous Transfer Orbit (GTO) mission. ... In order to provide GTO capability, Long March-2E needs a third stage (upper stage), such as McDonnell Douglas Astronautics Company's PAM-D3 or PAM-D3 A or other American firms upper stages. When using a Long March-2E, the customer needs to purchase a U.S. made upper stage ..."[63] [64]

Yet another aspect was the geographical position of the Xichang launch *site*, used for the Long March launches. Kourou in French Guyana, used by the European Space Agency for the Ariane launches, is situated near the equator and the location of Cape Canaveral, the primary U.S. launch base, is also

61. See (text to) footnotes 24 and 25.
62. "Asiasat contends that the effective cost of its $27-28 million launch was in fact almost doubled by the loss of 6-9 months of use (equivalent to about $13 million in revenues), due to the lower orbital-injection accuracy of the Long March.", see Chenard, launch regulation, *supra* note 3, at 199.
63. See Foreign Affairs Committee Hearing, *supra* note 10, at 119.
64. And Gordon Pike 1991, *supra* note 2, observes with respect to Aussat (at 107): "... As currently planned [large spacecraft destined for GTO] will be delivered to a relatively low (typically 200 km) orbit ... An additional perigee kick motor (PKM) will then be used to boost the spacecraft into GTO. For the Aussat-B missions the PKM will be supplied by the spacecraft manufacturer [Hughes] ...".

closer to the equator than the Chinese base: because less fuel is thus needed to get the satellite into its final - geostationary - orbit, more of it remains available for the satellite's orbital life, which is thereby extended by reportedly up to two years.

Finally, as an Asiasat official observed after the launch of Asiasat I, the price advantage of the Long March launch was partially offset by poor facilities and limited assistance at the launch site, resulting in twice as many people of Hughes Company being necessary for twice as long to get the satellite prepared for launch.[65] This quality aspect would supposedly not be a permanent handicap to be used by the Chinese as a justification for a lower launch price. Annual consultations between the parties were foreseen by the Agreeement. An important purpose of these meetings was to review possible Chinese (and U.S.!) direct or indirect government support, but more in particular the pricing practices of both parties.

*Capacity limitation*
By way of introduction to and/or explanation of the Agreement's provisions on the number of satellites the Chinese would be allowed to launch, a Chinese statement was included in the text to the effect that China had a limited capability of manufacturing launch vehicles which (first) had to meet the domestic launch needs, thus leaving only a limited number of communications satellite launches each year for international customers. "Chinese launch services", the explanation concluded reassuringly, "therefore, are only a supplement to the world market, providing international customers with a new option."

The capacity limitation, which included some special measures aimed at reducing the commercial impact of (a concentration of) Chinese launch contracts, was formulated as follows:

"(i) PRC providers of commercial launch services shall not launch more than 9 communications satellites for international customers (including the two Aussat and one Asiasat satellites) during the period of this Agreement [*i.e.* until December 31, 1994], and
(ii) The PRC shall require that any commitments to provide commercial launch services to international customers by PRC launch service providers are proportionately distributed over the period of the Agreement.
To this end, the PRC shall prevent a disproportionate concentration of such commitments during any two-year period of the Agreement.
The PRC may make commitments in any 3-year period of the Agreement consistent with subparagraph (i) above.

65. See AW/ST (Apr 16, 1990) at 25, 28.

The PRC shall also require that PRC launch service providers shall not commit at any time to launch in any calendar year covered by the Agreement more than twice the average annual number of launches permitted under subparagraph (1) above.
The PRC shall seek to ensure that PRC launches of communications satellites for international customers are performed as scheduled in the original launch commitment."

Given the period covered by the Agreement, it was difficult to foresee all eventualities and developments in the international launch market. In order to give an opening to the Chinese to enlarge their above entitlement, and also to safeguard the interests of the U.S. satellite manufacturers and users (the Challenger accident and other launch failures of both U.S. and European ELV's happened only three years before!), annual consultations were foreseen, which would address developments in the international launch market and also, if so requested by the Chinese, a reconsideration of the above quantitative restriction, with a U.S. decision on such a request to be be made within thirty (30) days after the completion of the annual consultations.

### b. The Technology Safeguards Agreement

The Technology Safeguards Agreement is intended to preclude the transfer of sensitive U.S. technology, associated with the launch of the Asiasat and Aussat satellites, to China, and specifies the security procedures to be followed by the parties when undertaking a launch of a U.S.-manufactured satellite on a Chinese launch vehicle.

The Agreement controls access to U.S. spacecraft and related equipment, and requires that under no circumstances shall there be unmonitored or unescorted access to U.S. *spacecraft*, or to any *equipment* and *technical data* related to the launch.
In this connection, the following - extensive - interpretation is given to the emphasized words:
spacecraft covers the satellite and kickmotor;
equipment means support equipment, ancillary items, components and spare parts thereof;
technical data means, for the purposes of the Agreement:

"(a) Classified information relating to the equipment;
(b) information covered by an invention secrecy order;
(c) information which is directly related to the design, engineering, development, production, processing, manufacture, use, operation, overhaul, repair, maintenance, modification, or reconstruction of the equipment. This includes, for example, information

in the form of blueprints, drawings, photographs, plans, instructions, computer software, and documentation".[66]

These security procedures applied to all phases of the launch activities, starting already at the Hughes facilities in the U.S. and covering the transportation of the spacecraft from the U.S. to China and the activities in China. The procedures of the Agreement supplemented other provisos and restrictions detailed in the so-called 'technology (transfer) control plans' - which must identify the extent and level of hardware and technical data to be released - which the State Department license required to be included in the launch contracts signed by Hughes and CGWIC. (And in case of conflict between the provisions of the contract and the Agreement, the latter would apply).
A determination on the part of the U.S. government that any of these provisions had been violated could result in suspension or revocation of the export license of the satellites.

The Agreement made a distinction between "authorized technical data" and "unauthorized technical data and assistance". The former, which could be released, basically consisted only of specified interface information that described mechanical and electrical mating requirements for attaching the spacecraft to the launch vehicle. The latter covered all other technical data, whose disclosure was therefore prohibited. Moreover, The PRC was expressly forbidden to seek, and Hughes to provide, any assistance relating to the design, development, operation, maintenance, modification, or repair of the equipment and the launch vehicle.

Detailed "access controls" included:
- the right of the U.S. government to oversee and monitor implementation of the Hughes-CGWIC Plan,
- 24-hour controls by U.S. security personnel of access to all equipment and technical data, throughout launch preparations, satellite transportation, mating/demating, test and checkout, satellite launch and return of equipment to the U.S,
- the right of the U.S. government to inspect, without prior notice, the equipment and technical data provided by Hughes to the PRC, at the facilities of Hughes or in China,
- the right of the U.S. government to electronically inspect and monitor, including through a closed circuit television system and electronic devices, all areas where Hughes equipment and data are located, "including the spacecraft clean operation area after the mating of the spacecraft to the launch vehicle."
- the wearing of identification badges by all persons performing duties associated with the launch, and badge-dependant access to the facilities

66. See Technology Safeguards Agreement, para. I, footnote.

housing the equipment, the technical data, the spacecraft and/or the motors.[67]

The transportation of the satellites to China has to take place by U.S.-registered aircraft operated by a U.S. crew, though upon arrival at the Chinese point of entry, non-U.S. persons may join the crew to perform navigational duties from the point of entry to the launch site; they are not permitted to enter the cargo area of the aircraft during the flight.
The U.S. aircraft carrying the satellite, the equipment and technical data can pass through Chinese customs without inspection and will not be subject to inspections while in China.
(And the export license requires Hughes not to carry aboard the aircraft any contraband goods unrelated to the launch activities(!) and to make sure that the aircraft complies with Chinese customs regulations).
In the event of accident or crash of the aircraft transporting the satellite in the territory of China, the same procedures will apply as in the case of a launch failure after liftoff, *i.e.*:
- U.S. persons are permitted to assist in the recovery of all parts/debris resulting from the accident,
- a U.S. controlled "satellite debris recovery site" will be located near the launch facility,
- all satellite-related items recovered by Chinese nationals have to be returned to the U.S. without any examination (including photographs),
- U.S. search and recovery personnel has access to the accident site.[68]

At the launch site, non-U.S. persons may, under supervision of U.S. persons, unload the aircraft and deliver the sealed crates to the "satellite preparation area". While the satellite is being tested and/or prepared for integration, non-U.S. persons are not allowed into that area. U.S. persons assemble the spacecraft, add propellant to the spacecraft and place the spacecraft in the fairing.
Transportation of the sealed container to the launch pad takes place under supervision of U.S. personnel, though the driver of the vehicle may be Chinese.
U.S. persons will conduct the launch preparation and satellite testing at the launch pad and will monitor access to the spacecraft clean operation area once the spacecraft and the launch vehicle are integrated.[69]
In case of delays or cancellation of the launch, all steps reversing the above sequence of events, would again be controlled and supervised by U.S. personnel up to and including the loading of the satellite on a U.S. registered aircraft for return to the U.S.

67. See *id.*, para. IV ("access controls").
68. See *id.*, para.V.B ("transportation of the spacecraft") and VI (recovery terms).
69. See *id.*, paras V.C ("preparations at launch site") and D.("launch pad operations").

The same applies to "post-launch" return of all equipment and technical data associated with the launch (including exemption from Customs inspection).[70] Finally, the agreement prescribed the conduct of U.S persons while in the PRC, forbidding in particular activities "that will harm launch safety or would lead to the transfer of *Chinese* launch vehicle and launch operations technology." (emph. add.), and contained a dispute settlement clause providing for consultations through diplomatic channels in case of disputes regarding the application and interpretation of this M.o.A.[71]
On February 11, 1993, as a result of a renegotiation of the security procedures, the two parties signed a new agreement on satellite technology safeguards which superseded the above agreement. Notwithstanding the above far reaching safeguard provisions, transfer of sensitive U.S. technical data *may* have taken place after two Long March failures (in 1995 and 1996), in the form of the release of U.S. co-authored reports on these failures to the Chinese (see discussion in chapter 2.3.4. *supra* and chapter 4 *infra*).

### c. The Liability Agreement

The Memorandum of Agreement on Liability for Satellite Launches sought to regulate questions of liability between the U.S. and China arising from the launch of the Asiasat and AUSSAT satellites. This agreement was found necessary because at the time of the negotiations on the Launch Trade Agreement, China had not yet become a party to the Space Liability Convention. This situation would have resulted in the U.S., a party to that Convention, becoming a - potential - liable State under the Convention in case of damage resulting from the launch of the satellites to third parties, whereas China, though having performed the launching, could not be held liable under the Convention.

Since the U.S. felt that, as one of the *quid-pro-quo*'s for allowing China's entry into the international commercial launch market, China should bear the burden of liability in case of damages, the above Agreement provided that China would assume, and compensate the U.S. government for all amounts for which the U.S. government may be liable under the Space Liability Convention, the Outer Space Treaty or any other applicable international law. Other provisions dealt with the practicalities of involving China in the (handling of the) claim for compensation brought against the U.S., as follows:
- the U.S. government notifies its Chinese counterpart as soon as practicable of a claim received,

70. See *id.*, paras VI ("launch failure, delay or cancellation") and VII ("post-launch procedures").
71. See *id.*, paras VIII ("conduct of U.S. persons while in the PRC") and IX ("settlement of dispute") respectively.

- the U.S. shall not make any settlement with any such claimant without full consultation with the Chinese government,
- if China doesnot agree with the terms of the proposed settlement, the U.S will submit the claim to a Claims Commission as provided for in the Space Liability Convention, or, in case the claim is not based on that Convention, to a claims commission with similar procedures,
- China will compensate the U.S. government for any settlement up to the amount recommended by the respective claims commission,
- China will provide the U.S. with all information and cooperation necessary for the U.S.'s defense against a claim.

When China, in December 1988, had become a party to the Space Liability Convention as well, a decision no doubt speeded up by the launch contract and the U.S.-Chinese talks on the matter, it became also a potential target for claims under that Convention. The agreement kept its relevance because the U.S. could still be sued or held liable as a "launching State" together with and separate from China, in relation to the launch of the three satellites.

As the Asiasat satellite was owned by the Hong Kong based and registered Asia Satellite Telecommunications Company Ltd., and this in itself was a sufficient link with the United Kingdom to make the latter country, as a "launching State" (i.e. as the State which procured the launching of the satellite) under the Space Liability Convention, potentially liable for damage caused by that satellite, the United Kingdom concluded an agreement with China which was virtually identical to the above agreement, both in substance (China assuming all liability) and in procedure.
The two differences were that, first, on the date of the entry into force of the agreement, which took the form of an exchange of diplomatic notes, both countries were parties to the Space Liability Convention and the Outer Space Treaty. Secondly, this arrangement was limited to the extent that China only assumed liability for damage arising during the launch phase of the satellite, that is from ignition of the launch vehicle to the separation of the satellite from the launch vehicle.[72]

### d. Guidelines for the implementation of the Launch Trade Agreement

A few days after the signing of the Agreement, the USTR published a set of guidelines which the government would follow in implementing the agreement.[73] A paragraph on "remedies" or enforcement in these guidelines

72. See Exchange of Notes between the Government of the United Kingdom and the Government of the People's Republic of China concerning liability for damage arising during the launch phase of the Asiasat satellite, Peking, 26 March 1990 and 2 April 1990, e.i.f. on 2 April 1990).
73. USTR, *International trade in commercial launch services; Guidelines for implementation of*

reflected the USTR's view that the agreement should be seen and treated as a trade agreement for purposes of (the application of) Sec. 301(a)(1) of the Trade Act of 1974, which deals with investigations into alleged unfair or illegal trade practices or violations of trade agreements and provides for possible sanctions. (The TCI case was brought under the same provision, see Chapter 2.2.2.2. *supra*).

The responsibility for the overall implementation of the Agreement was given to a new *Subcommittee on commercial launch services*, chaired by the Office of the USTR, and reporting to the existing Trade Policy Staff Committee (TPSC) of the USTR. To assemble the information necessary for this Subcommittee to carry out its responsibilities, a Working Group on Information was established under the chairmanship of DOT, and including among its members the Departments of Commerce and State.
An important part of the functions of the Subcommittee was the collection of data for the effective monitoring of the PRC's compliance with the Agreement. Reflecting the obligations and prohibitions laid down in the Agreement, the Working Group had to collect information on such matters as:
- the number of launches committed and carried out by the PRC,
- the distribution of such launch commitments,
- promotional prices, and, in general,
- prices, terms and conditions in the PRC launch contracts,
- government supports and inducements,
- insurance,
- non-discrimination, and
- launch delays.[74]

The Working Group also had the task to assemble information for the Subcommittee which the U.S. had to provide to China, e.g. on the prices and conditions, including insurance arrangements, prevailing in the international commercial launch market, but also possible U.S. and other government (European, Japanese?) supports or inducements and the number of U.S. launch commitments.

Additionally, the annual consultations with China had to be prepared and, once held, would require (recommandations for) follow-up by the Subcommittee.[75]

*the Memorandum of Agreement with the People's Republic of China*, Fed. Reg. Vol 54, No. 19 (Jan 31, 1989), hereinafter referred to as (the) Guidelines. The Guidelines entered into force on the same day as the e.i.f. of the Agreement.

74. See Guidelines, para. III.1.
75. See *id.*, para. III.2. Where the Agreement, in art. IV.4, contained the somewhat obscure commitment of the parties "to work toward a common understanding of the application of market principles to prices, terms, and conditions of commercial launch services for international customers", para. III.3 provided vaguely that the Subcommittee "will consider ways to carry out" this provision. Additionally, the Subcommittee was asked to consider at

A provision on remedies dealt with the way USTR and its organs were to handle cases of (suspected) non-compliance with the Agreement by the Chinese. The following consecutive steps could be distinguished:
1.-the Subcommittee finds out or determines that PRC's launch providers have not complied with the Agreement,
-it will notify the TPSC and recommend consultations with China if appropriate,
-if consultations do not lead to a satisfactory resolution or consultations are deemed inappropriate, the Section 301 Committee of USTR may recommend that the latter initiate an investigation pursuant to its authority under section 310(a)(1) of the Trade Act.
2. The initiative may also come from a private party, *e.g.* - predictably - a representative of the U.S. launch industry: this will lead to the following steps:
-a petition may be filed with the section 301 Committee, alleging a denial of U.S rights under the Agreement or a violation of the Agreement,
-the section 301 Committee will seek the advice of the Sucommittee on Commercial Launch Services,
-if the Subcommittee finds that China did not comply with the Agreement, "it will make such recommandations to the section 301 Committee as it deems appropriate",
-if USTR determines that a violation of the Agreement has occurred it will take such action, subject to the specific direction of the President, if any, as is appropriate under section 301.[76]

The Executive Branch has a broad range of measures from which to choose under Section 301. For example, in taking retaliatory action pursuant to Section 301 (c), USTR may
(i) suspend, withdraw or prevent the application of trade agreement concessions,
(ii) impose duties or other import restrictions on the goods of the foreign country,
(iii) impose fees or restrictions on the services of the foreign country, or
(iv) enter into an agreement with the country that commits the latter to eliminate or phase out the offending practice or provide compensation.

least yearly whether discussions with other international parties could be beneficial; in the affirmative it could make a recommandation to the TPSC and the USTR to that effect, see para. III.4. The Guidelines, in para IV, also provided for consultations on the above issues with domestic interests, *i.e.* the US launch companies and launch vehicle manufacturers, satellite manufacturers,and, as appropriate, interested Congressional committees, the user community and other interested parties, including the relevant private sector advisory committees such as COMSTAC and possibly also the AIAA. Finally, the Guidelines also instruct DOT, as chairman of the Working Group, on how to deal with business confidential information, see para. IV.

76. See para. VII (1)-(3).

An additional provision allows USTR to restrict the issuance of service sector authorizations in certain circumstances. "Ultimately, the Trade Representative's authority under Section 301, subject to the direction of the President, encompasses any power of the President."[77]

### *3.1.3 Implementation of the Launch Trade Agreement and U.S. sanctions*

Already in June 1989, the U.S. Government, sanctioning China in response to the June 4 Tiananmen Square incident, *inter alia* suspended indefinitely all export licenses, including the above Asiasat and Aussat permits.[78]
Congress went a step further and, limiting the Administration's freedom of action in this field, enacted a law prohibiting the approval of export license applications for the launch of U.S.-built satellites on Chinese - built launch vehicles.[79] The law, enacted in *November 1989,* thus effectively suspended

77. See Peter Allgeier, Assistant U.S. Trade Representative for Europe and the Mediterranean, statement at *Global trade in satellites and launch services*, hearing, House Committee on Science, Space and Technology, Subcommittee on space (Sep 29, 1994), hereinafter referred to as Launch trade hearing 1994 and Allgeier statement resp.
78. At a press conference on June 5, 1989, President Bush stated: "... mindful of these complexities [of the US-China relations], and yet of the necessity to strongly and clearly express our condemnation of the events of recent days, I am ordering the following actions: Suspension of all government to government sales and commercial exports of weapons, suspension of visits between U.S. and Chinese military leaders, sympathetic review of requests by Chinese students in the United States to extend their stay, and the offer of humanitarian and medical assistance through the Red Cross to those injured during the assault, and review of other aspects of our bilateral relationship as events in china continue to unfold.", see "This is not the time for an emotional response", Press Conference by President Bush (Jun 5, 1989), American Policy 1989, Doc. 312, at 517-519).
79. Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act, Fiscal Year 1990, Pub. L. No. 101-162, 610, 103 Stat. 988, 1038 (Nov. 21, 1989). Sec. 610 of the Act read as follows:
"(a) No moneys appropriated by this Act may be used to reinstate, or approve any export license applications for the launch of United States-built satellites on Soviet - or Chinese - built launch vehicles unless the President makes a report under subsection (b) or (c) of this section.
(b) The restriction on the approval of export licenses for United States-built satellites to the People's Republic of China for launch on Chinese-built launch vehicles is terminated if the President makes a report to Congress that: (i) the Government of the People's Republic of China has made progress on a program of political reform throughout the entire country which includes (A) lifting of martial law; (B) halting of executions and other reprisals against individuals for the non-violent expression of their political beliefs; (C) release of political prisoners; (D) increased respect for internationally recognized human rights, including freedoms of expression, the press, assembly, and association; and (E) permitting a freer flow of information, including an end to the jamming of the Voice of America, and greater access for foreign journalists; or
(c) *It is in the national interest of the United States". (emph. add.)*
The prohibition was reintroduced in 1990 through the Foreign Relations Authorization Act, Fiscal Years 1990 and 1991, Pub. L. No. 101-246, "902, 104 Stat. 15 ( Feb. 16, 1990).

the implementation of the above agreements. However, already on December 19 (!) the Bush Administration, for "engagement" policy reasons, reversed its course and, using an express exception in the legislation adopted by Congress, invoked the "national interest of the United States" and re-approved the export licenses for the three satellites.[80]
This decision would set the pattern for the following years: Presidential licenses by exception to the Congressionally legislated restrictions (which remain in force until today).

As a result of this Presidential waiver, on April 7, 1990, Asiasat 1 was launched from the Xichang launch base in South-West China, in the presence of a dozen military and Hughes Aircraft Company guards who had watched the satellite around-the-clock to prevent any unwanted transfer or misuse of

Sec. 902, apart from suspending, or rather continuing the suspension of, the issuance of licenses under Sec. 38 of the Arms Export Control Act for the export to China of any defense article on the U.S. Munitions List, also specifically provided that "[e]xports of any satellite of United States origin that is intended for launch from a launch vehicle owned by the People's Republic of China shall remain suspended unless the President makes a report under subsection (b) (1) or (2) of this Section"; the envisaged report, on which a presidential waiver would be based would have to contain findings as detailed in Sec. 610 above.
And the prohibition was reintroduced again in 1991 through the Appropriations Act concerning the same departments, Fiscal Year 1992, Pub. L. 102-140, "608, 105 Stat. 824 (Oct. 28, 1991); Sec. 608 provided:
"(a) No funds provided by this Act may be used to reinstate or approve any export license applications for the launch of United States-built satellites on Chinese-built launch vehicles *unless the President waives such prohibition in the national interest* or under sub-section (b) of this section. The term export license applications also includes requests for approval of technical assistance agreements or services that would serve to facilitate launch of such satellites.
(b) The restriction on the approval of export licenses for United States-built satellites to the People's Republic of China for launch on Chinese-built launch vehicles contained in subsection (a) may be waived by the President on a case-by-case basis upon certification by the United States Trade Representative that the People's Republic of China is, with regard to the respective satellite, components, or technology related theretofor which the export license request is pending, in full compliance with the Memorandum of Agreement between the government of the United States of America and the People's Republic of China regarding international trade in commercial launch services". (emph. add.)

80. In December 19, 1989, the President reported in letters to the Speaker of the House of Representatives and President of the Senate the following: "Pursuant to the authority vested in me by section 610 of the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act 1990, P.L. 101-162) ("the Act"), and as President of the United States, I hereby report that it is in the national interest of the United States to lift the prohibition on reinstatement and approval of export licenses for the three United States-built AUSSAT and AsiaSat satellites for launch on Chinese-built launch vehicles", see 25 (51) Weekly Comp. Pres. Docs. (Dec. 25, 1989) at 1972, as quoted in Foreign Relations Authorization Act, Fiscal Years 1990 and 1991, *supra* note 78, at footnote 77.
"Mr. Bush argued that the satellite would provide badly needed telecommunications services to friendly Asian nations and would support the U.S. aim of maintaining commercial relations with China even while imposing some sanctions against Beijing", IHT (April 9, 1990), at 3.

satellite technology. According to an Asiasat official the price advantage of the Chinese launch, which at about US$ 30 million was considered to be some US$ 15 million cheaper than the Ariane alternative at the time, was partially offset not only by the cost of the above guards but also by poor facilities and limited assistance at the launch site, resulting in twice as many people of Hughes being necessary for twice as long to get the satellite prepared for launch.[81]

The *Arabsat* case, which "erupted" in January 1990 brought the first test of the pricing provisions of the launch trade agreement. Arabsat I C was a communications satellite built in 1985 for the 22-nation Arab Satellite Communications Organization by the French firm Aerospatiale. In 1989 serious bidding for the launch contract started with Arianespace offering a launch for US$ 50 million and CGWIC responding with a US$ 35 million bid. McDonnell Douglas, in an early stage of the 'race' opted out. In October of that year Arabsat and the Chinese launch company concluded a contract on the latter price. In January 1990, Arianespace made a last-ditch effort by underbidding its Chinese competitor with a launch price of US$ 34 million, down 30% from its previous bid. China was pressed for a reaction by Arabsat and finally won the contract for US$ 25 million, half the original Arianespace price.
The latter company complained furiously to both the French and the U.S. governments, accusing Great Wall Industry of "unfair and predatory" pricing and of thus violating the U.S.-China Agreement of 1989. Belgium and West Germany took similar actions.[82]
In a *July 1990* meeting between USTR and the Chinese vice minister for the aerospace industry, the above complaints were discussed, but no definite result was reported afterwards; as a USTR representative put it: "The issue is not resolved ... The possibility of future meetings is open but no date has been set."[83]

The above course of events motivated the European Space Agency to meet separately with their Chinese counterparts in December 1990 for "exploratory talks regarding the international provision of launch services". The press release issued after that meeting stated *inter alia*:

81. See AW/ST (April 16, 1990) at 25, 28).
82. See Chenard launch regulation, *supra* note 3, at 199; also 1 (35) Space News (Sep 1990) at 1, 19.
83. Statement as quoted in Chenard launch regulation, *supra* note 3, at 199. According to Chinese officials, interviewed in September 1990, China had received no complaints from U.S. government officials "in recent negotiations regarding China's launch price policy", see 1 (35) Space News (Sep 1990) at 1. Around the same time, officials from China Aerospace and the Chinese government approached the American ambassador in China, pressing for Pres. Bush to waive the Tiananmen Square sanctions. According to the ambassador, "[t]hey hit me very hard ... [i]t was a prestige national program. It was putting China on the map as the big space country of the 21st century", see NYT (May 17, 1998) at 18.

"Arranging for the fair exportation of [launcher] technology on the international market is a difficult task that will have to be faced in the coming period."

It concluded vaguely that the talks had been informative. An ESA representative later in 1991 specified that the talks had centered around the question of creating a "level playing field" in the space transportation business, calling the matter highly sensitive and very complicated. The discussions were open-ended: they would, according to the same press release, be continued "in a framework to be defined."(!)[84]

The fact that the Arabsat 1 C satellite had been built by a French company but also contained communications equipment largely supplied by a U.S. manufacturer meant that export licenses had to be obtained from both governments. Although neither of the two countries' authorities had ever received such a request from the Arabsat consortium, the possibility that the French - to protect "their" Arianespace - and the Americans - for political reasons - would have refused to issue a license within a specific time frame, must certainly have influenced Arabsat's decision in *March 1991* to cancel the planned October 1991 launch on Long March and to switch the launch contract back to Arianespace. Another - though probably not in itself decisive - reason for (re-)consideration was the fact that, as the Asiasat launch had shown, the cost of extensive modifications and of logistics connected with a Long March launch would have eroded much of the cost savings on the low launch price.[85]

The launch trade agreement, in stead of creating a stable and predictable regulatory environment for the U.S. and Chinese industries concerned, became itself subject to the political uncertainties caused by the multifaceted U.S.-Chinese relationship, which involved human rights, trade and nonproliferation issues, a critical if not hostile Congress and an Administration determined to strengthen that relationship while at the same time trying to reconcile this aim with the views of Congress and the other U.S. industry players and with the unhelpful proliferation behaviour of the Chinese.
The following years thus show a series of export licenses granted, U.S. sanctions suspending those licenses, and Presidential decisions to lift those sanctions, followed by Chinese actions inviting new sanctions.
Though the launch trade agreement remained in force, so did the U.S. export regulations to the continued - overriding - applicability of which the agreement specifically referred, and the Congressional Tiananmen legislation of 1989

84. See ESA Press Release No. 56, Paris (Dec 17, 1990).
85. See 2 (11) Space News (Apr 1991) at 1, 20 ("Arab group opts out of Long March launch"). It has been suggested that the Iraqi invasion of Kuwait (both members of Arabsat), in August 1990, probably added yet another delaying and complicating element to the launch contract picture, see *ibid*.

forbidding export of satellites for launch to China unless an express Presidential waiver had been obtained.
Chinese sales of missiles and/or related technology to third countries, violating the U.S. MTCR-based regulations, would trigger specific sanctions affecting the sale of defense articles and/or dual use goods and services (depending on the kind and seriousness of the violations) to specific Chinese and third country companies or (semi-) governmental entities.
The following events, presented in chronological order, give an idea of the interplay of the various forces that dominated the launch trade relations of the two countries for many years to come.

On *April 30, 1991* President Bush barred the export of U. S. components for the Dong Fang Hong 3 ("The East is red"), a Chinese domestic communications satellite, because "certain activities of Chinese companies raise serious proliferation concerns." (Actually, the Department of State was believed to have reported that China was helping Algeria in building a nuclear reactor and was in the process of selling ballistic missiles and technology to Pakistan).[86]
At the same time, the export licenses for the two *Aussat* satellites were reconfirmed, mainly to prevent problems in the U.S. -Australian relationship. And for the same reason components for *Freja*, a small Swedish scientific satellite, were cleared for export as well, the latter thus becoming the fourth spacecraft authorized for launch on a Chinese rocket since the agreement was concluded.[87]

86. According to the trade press, Pres. Bush's denial of the license was to punish China for attempting to *obtain* classified missile-related technology, see 2 (16) Space News (May 6-12, 1991).
In the respective official press statement, reference was made to the well-known fact that U.S. satellites, their components and associated technologies, because of their inclusion in the U.S. Munitions List, require licenses for export to controlled destinations, including China. Moreover, under sanctions contained in the Foreign Relations Authorizations Act, FY 1990-91, licensing of these exports is prohibited unless the President determines it to be in the national interest. (For the text of this provision see *supra* note 79). "Given our proliferation concerns, it would not have been appropriate to waive the legislative prohibition for the Dong Fang Hong", see statement by Press Secretary Fitzwater on restrictions on U.S. satellite components exports to China, April 30, 1991, 27 (18) Weekly Comp. Pres. Docs. (May 3, 1991) at 531-532. (The Dong Fang Hong 3 (DFH-3) contained also important German components thanks to cooperation with German MBB, later absorbed by Deutsche Aerospace DASA, dating back to 1982 satellite development contracts. The DFH-3 contract was the first public tender by a foreign company for a Chinese satellite. On the basis thereof, DASA built the C-band antenna, solar generator and attitude controls of the DFH-3, see AW/ST (Oct 3, 1994) at 66. It is not clear whether, in view of this German interest in the satellite, there was any diplomatic pressure on the part of Germany to get a waiver for its Long March launch.
87. "... the President decided that it is in the national interest to waive legislative restrictions on exports for two other projects, AUSSAT and FREJA ... The President had previously waived legislative sanctions against launches from China for AUSSAT, but the project

When, in *May 1991*, President Bush extended China's Most-Favoured-Nation (MFN) trading status for another year,[88] he ordered at the same time that, as long as China continued to sell missile technology to countries such as Syria, Pakistan and Iran, U.S. satellite companies would not receive export licenses for Chinese launches. Though the connection between the granting of MFN and the imposition of the export restriction was officially disclaimed, it was generally felt - and privately confirmed - that the President, under pressure from Congress to punish China for its human rights record and for selling missiles to the Third World, had chosen the export restriction as the less damaging way to display displeasure with Chinese policies, particularly where also the U.S. launch industry was asking for measures to limit the ability of the Chinese to undercut American business with their "unreasonably low-priced" launch services.[89]

required additional export licenses. The President was concerned that we live up to our earlier commitment to allow Australia to to proceed with this project. The Swedish FREJA satellite ... will be used by civilian atmospheric researchers in the U.S., Sweden, Canada, Germany, and Finland"., see press statement, *supra* note 16, *ibid.* For full text, see "*Justification for waiving legislative prohibitions on approval of U.S. origin exports to China for the Aussat project*", and *id.* "*... for the Freja project*", as attached to letter from Pres. Bush to Speaker of the House (Apr 30, 1991), reprinted in Gorove US Space Law, *supra* Ch. 2 note 55, at I.A.4 (a-1).

88. MFN, notwithstanding its literal meaning, does not denote any special or preferential treatment in trade matters but allows "normal" non-discriminatory tariff treatment for Chinese exports to the US. The reciprocal granting of MFN treatment was the main pillar of the US-China Trade Agreement signed in 1979, which created the basis for normal commercial relations between the two countries. As a non-market-economy country, China needs an annual renewal of its MFN status through a US presidential waiver stipulating that China meets the freedom of emigration requirements set forth in the Jackson-Vanik amendment to the Trade Act of 1974. (This amendment, enacted as Sec. 402 of the Trade Act, not only linked the treatment of Soviet jews to trade concessions, but was originally directed at all communist countries, which, in the mid-seventies apart from the Soviet Union, included Cuba, China, Albania, Vietnam and North Korea. Sec. 402 allows a non-MFN nonmarket economy country to receive MFN status, incl. access to US financial facilities, only if the President determines that it permits free and unrestricted emigration of its citizens; the President is also authorized to waive the requirements for full compliance if he determines that such waiver will "substantially promote the objectives" of the freedom-of-emigration provisions and if he has received assurances that the emigration practices of the country will lead substantially to the achievement of those objectives.) China received the waiver routinely prior to 1989, but after Tiananmen, although the waiver continued, Congress began to exert strong pressure to oppose MFN renewal, and in 1991 (and 1992) voted to place conditions on this MFN renewal (subsequently vetoed by the Bush Administration), see Background notes: China, October 1997, Dept of State <http://www.state.gov/www/background _notes/china_1097_bgn.html".

89. See, for disclaimer by senior administration official of connection between MFN and export restriction, IHT May 28, 1991, at 2: "One is not being done to sell the other". But this restriction did form part of a series of three measures to limit the export of missile and satellite technology, including high-speed computers that can be used for flight testing of missiles, as outlined by Secretary of State Baker in a memo to president Bush that proposed a strategy for how to sell his decision on Chinese trade to a reluctant Congress. See text to note 19; see also 2 (20) Space News (Jun 1991) at 16. One of the arguments used by the

On *June 16, 1991,* the White House clarified both the measures taken and the factors and reasoning that led to these actions, detailing three separate measures under the following headings: "[e]xport of high performance computers", "[s]atellite launches on PRC missiles", and "[m]issile proliferation sanctions".

As to the first issue, the Administration expressed serious national security concerns regarding the export of high performance computers to China, based on such factors as the potential diversion to military use of computer technology and experience acquired and the resulting enhancement of the capabilities of high technology military systems such as missiles (as demonstrated in Operation Desert Storm!). These concerns were heightened by the risk that the PRC might transfer advanced weapons-related technology to other countries, "as in the case of ballistic missile transfers". Because of the threat to regional stability resulting from ballistic missile proliferation by China, the President had decided to license the export of computers exceeding a certain composite theoretical performance "only after extensive review to ensure that the proposed sale poses no threat to national security." (And by involving CoCom, whose unanimous approval was anyhow required for the export of this category of computers, the U.S. ensured a common front of the 17 members concerned vis-à-vis China).

While acknowledging his right under the prevailing Congressional legislation to waive the suspension of licenses to Chinese entities of U.S. satellites (technology) and components if this is in the U.S. national interest, the President had decided "that PRC actions related to the proliferation of missiles make it inappropriate for the United States to approve any *further* export licenses for commercial satellite launches at this time." (emph. add)
This decision thus did not affect the Aussat and Freja licenses already granted.

Finally, two Chinese entities were identified as the culprits that had transferred missile technology to Pakistan, namely the China Precision Machinery Import-Export Corporation and China Great Wall Industry Corporation, the launch company. Both would face sanctions as prescribed by MTCR-based legislation, laid down in the Arms Export Control Act and the Export Administration Act.[90]

U.S. President to defend his MFN decision was that he continued to need China's cooperation for other U.S. foreign policy objectives, such as "seeking peace in Cambodia, reducing tensions on the Korean peninsula, and *restricting transfers of nuclear, CBW [chemical and biological weapons] and missile equipment and technology*" (emph. add.), see *President's report on MFN status for China,* released by the White House, May 29, 1991, in US Dept of State Dispatch 430-432 (Jun 17, 1991) at 432.

90. Sec. 73(a) AECA and Sec. 11B(b)(1) of the EAA respectively, see Chapter 2.3. supra. See *US trade with China*,White House Fact Sheet, Office of the White House Press Secretary, June 16, 1991, in US Dept of State Dispatch (Jun 24, 1991) at 456. The

On *October 30-31, 1991* the annual U.S.-China launch trade talks as prescribed by the 1989 agreement took place. "The United States was expected to call on the Chinese to adhere to the fair-pricing provisions [of the 1989 launch trade agreement], while the Chinese were expected to complain about White House sanctions, imposed in May, that prohibit the export of U.S. made satellites to China. In a nutshell, they wanted the export sanctions lifted and we said that wasn't a trade issue", said a member of the U.S. delegation.[91]

In *February 1992* the State Department voiced plans to lift the eight-month ban on U.S. satellite exports to China in exchange for China's MTCR adherence. Already during a November 1991 visit to Beijing, Baker, the U.S. Secretary of State, had received oral assurances from Chinese officials in this regard.[92] After having requested written promises from the Chinese, Secretary Baker, on February 1, 1992 received a letter from his Chinese counterpart which confirmed that China would abide by the MTCR guidelines and parameters. Consequently, the State Department, on February 21, 1992, announced that the Administration intended to lift the sanctions and, as a result, expected China to announce its adherence to the Regime.[93] On March 23, President Bush indeed lifted the above MTCR sanctions.
In *July 20-21, 1992* discussions took place in Washington at the request of the Chinese on the possibility of receiving export licenses for the Chinese launch

Administration had expressed urgent concern to the Chinese Government about exports of missile technology, a subject that the Under Secretary of State was to discuss in detail during his June 17-19 meetings in China; there is no report on the contents or outcome of his talks.

91. See 2 (36) Space News (Oct 1991) at 1, 21 and 2 (38) Space News (Nov 1991) at 2.

92. "... the Chinese have told us that they intend to observe the MTCR guidelines and parameters. To us, this means that they will apply them to any exports of missiles and related technology. We understand that this applies to the M-9 and M-11 missiles. The Chinese have told us that they will make this unconditional commitment to the MTCR guidelines if we will remove the proliferation sanctions imposed June 16 on two Chinese companies and on the licensing of high-speed computers and satellites for China". See Secretary Baker, opening statement at a news conference, Beijing, China, November 17, 1991 in US Department of State Dispatch (Nov 25, 1991) at 859.

93. See statement issued by the Office of the Assistant Secretary/Spokesman, Feb 21, 1992: "This in no way means we will slacken our efforts to monitor either missile transfers worldwide, or Chinese missile and missile technology export practices. Transfers of missile technology covered by the MTCR guidelines will continue to be subject to sanction in accordance with US law", US Department of State Dispatch (Mar 9, 1992) at 189. In a March 2, 1992 letter from Pres. Bush to the House, he returned, without his approval, the so-called United States-China Act of 1991, which placed conditions ( improved human rights, cooperation in arms control, dropping barriers to trade) on the renewal of China's MFN trade status. Bush rejected this legislation as an ultimatum that would be counterproductive, and referred to the accomplishments of his Administration's policy of comprehensive engagement: "[r]ecent agreements by the Chines to protect US intellectual property rights, *to abide by the [MTCR] Guidelines*, to accede to the Nuclear Non-Proliferation Treaty by April, and to discuss our human rights concerns-after years of stonewalling ..." (emph. add.), See "China's MFN status", *ibid.*

of *Afristar*, a radio broadcasting satellite built by Defense Systems Inc. for Afrispace Inc. of Washington, and for a future Intelsat spacecraft. At the same time, U.S. negotiators would press China for concrete information to refute charges by U.S. and European commercial launch suppliers that CGWIC was quoting below-market prices for its launches.[94]

On *September 11, 1992*, the Bush Administration, as its last China launch-related decision before the Presidential elections, waived export restrictions based on the Tiananmen legislation on five satellites (Apstar 1, Asiasat 2, Intelsat 7A, Starsat, AfriStar, and parts for China's Dong Fang Hong 3.[95] But already in *November 1992* U.S. intelligence reported another missile-related action on the part of the Chinese, the delivery of M11 missiles or components to Pakistan. China allegedly circumvented its above February 1992 commitment by selling components and technology rather than whole systems to a range of countries including Iran and Pakistan.[96]
The U.S. government, since February 1993 led by President Clinton, was forced to - again - show that it could not tolerate this MTCR violation and, on *August 25, 1993*, the Department of State after an unsuccessful mission to China in July by the under secretary of State for international security affairs, aimed at seeking clarification on the nature of the sales announced the sanctions imposed on the Ministry of Aerospace Industry of China and the Ministry of Defense of Pakistan and their divisions, subunits and any successor entities (which in the case of China involved 10 entities under the above ministry, including CGWIC):

94. At that occasion, the Director of DOT's Office of Commercial Space Transportation suggested that the US government consider enforcement measures, such as retaliatory trade sanctions because the Chinese had not met the letter of the agreement. USTR, leading these negotiations was however not prepared to consider changes to the accord to include enforcement measures, see 3 (26) Space News (Jul 1992) at 3, 20). And, one might add, the export regulations and, in particular, the Trade Act anyhow already provided adequate means for sanctioning violations of the agreement.
95. See CRS China Report 1998, *infra* note 104, at 17. In the mean time, on August 14, 1992 Optus B1, the former Aussat B1, built by Hughes and owned by Optus Communications of Sydney, had been launched on a Long March 2E rocket. It was the second Chinese launch of a US-built spacecraft. The first launch attempt of the satellite had been aborted on March 22, 1992, without damage to either launcher or satellite. Hughes was under contract with Aussat Pty Ltd, Australia's government-owned satellite operator to manage the two-satellite construction and launch program; it purchased launch services and insurance on behalf of Aussat and was to deliver the spacecraft to orbit before receiving final contract payments. Aussat was sold to private companies and in January 1992 became Australia's second telecommunications provider, named Optus Communications Pty. Ltd of Sydney, see 3 (12) Space News (Mar/Apr 1992) at 4, 29 and 3 (30) Space News (Aug 1992) at 2.
On December 21, 1992 Optus B2 (the former Aussat B2), was launched from Xichang launch facility on a Long March 2E rocket. The launch failed and, consequently, the satellite did not reach its planned orbit.
96. See FEER (Sep 9, 1993) at 10, 11.

-all licenses for exports of MTCR equipment or technology controlled pursuant to the the AECA and the EAA to these entities were to be denied for two years;
-no U.S. government contracts relating to MTCR equipment or technology and involving these entities would be entered into for two years.
The same sanctions applied to (export or contracts involving) all activities of the Chinese government relating to missile development or production, as well as all activities of that goverment affecting the development or production of electronics, space systems or equipment, and military aircraft.
These sanctions halted - for the prescribed 2 years - the export of some of the above satellites, insofar as they had not yet received a definitive export approval following Bush's decision of September 1992.[97]
(At the same time, all members of the Senate Foreign Relations Committee voted to increase weapons sales to Taiwan. This vote, which pleased the U.S. arms manufacturers but upset the White House, was seen as at least partly inspired by both the ease with which China's MFN status had been renewed for another year and by China's above weapons sales to Pakistan.[98]

Both China and Pakistan denied the U.S. allegations and criticized strongly the leveling of sanctions. The Chinese condemned the U.S. action as meddlesome and unjustified, and threatened that they would reconsider their commitment to the MTCR Guidelines.

97. See Dept of State, Bureau of Politico-Military Affairs, Public Notice 1857: "Imposition of missile proliferation sanctions against entities in China and Pakistan", Fed. Reg. Vol 58. No. 165 (Aug 27, 1993) The sale by Hughes of a satellite to APT (Apstar1), was apparently not affected, see FEER Sept 9, 1993, at 10, 11. Reason why this satellite and also a Space Systems/Loral-built Intelsat 7 satellite and Hughes components for a domestic Chinese communications satellite escaped the sanctions, was that licenses already granted were not revoked, only those under review were affected. Under review were licenses for export of the Optus B3, a replacement of one that had been destroyed in a launch failure ("the Australians are going to to be screaming, and scratching at our door", according to a State Dept official, referring to the probability that Australia would insist on a waiver of the restriction), and the Asiasat 2; also affected were the Starsat and Afristar communications satellites, *ibid.*

98. See FEER (Aug 5, 1993) at 15. When Clinton, on May 28, 1993, announced the extension of MFN for another year, he also referred to the Congressional attempts in 1991 and 1992 to attach (human rights and other) conditions to MFN and the ensuing Presidential vetoes as the "annual battles between Congress and the Executive [which] divided our foreign policy and weakened our approach to China". In the same statement, the president promised "to pursue resolutely all legislative and executive actions to ensure China abides by international [*i.a.* arms control] standards", and added: "The Administration is now examining reports that China has shipped M-11 ballistic missiles to Pakistan. If true, such action would violate China's commitment to observe the guidelines and parameters of the [MTCR] ... [and] my Administration will not hesitate to act", see Statement by the President on [MFN] for China, White House Press Release (May 28, 1993) The White House virtual library <http://library.whitehouse.gov/cgi>.

Though the sanctions were expected to have a negligible effect on Pakistani-U.S. trade, they affected reportedly about USD 500 million worth of sales (of satellite launch equipment, flight control systems, computers, etc.) by U.S. companies in China, although this figure was not supported by everybody.[99]

Two other aspects of the sanctions warrant additional attention.
One was the fact that, by limiting the accusation to the sale of missile components, in stead of complete missiles or missile systems, the U.S. Administration could also limit the scope and extent of the sanctions, thus minimizing the impact on both China and the U.S. exporters. And even that decision was reported to have been taken with extreme reluctance, reflecting the importance the U.S. attached to restoring relations with a regional power whose support they needed for a variety of issues.[100]
Another aspect was the fact that while the U.S. had repeatedly urged China to respect the missile regime (and China had promised to do so) it had been reluctant to let China into the club of MTCR signatories, reportedly because China would then have to be provided with new technical information about developments in the missile technology field. Although this interpretation of MTCR is not necessarily correct (see Chapter 2), it cannot be denied that the U.S. considered China not yet ready to join. At the same time China was not prepared to formally join the Regime until it had been able to extract a maximum of trade and other concessions from the U.S., including of course the lifting of sanctions and other restrictions on the export to China of 'high tech' goods and technology.

Although the U.S. *launch* companies, notwithstanding crowded launch manifests, saw the sanctions as providing them with welcome opportunities to attract the disappointed Long March clients (though in competition with Arianespace and the Russians), the aerospace manufacturers, represented by the Washington-based Aerospace Industries Association of America (AIAA), voiced sharp criticism, particularly because the U.S. had not insisted that other (MTCR) countries also deny China the components that Hughes and other U.S. companies were now forbidden to sell to companies in that country.[101]

99. See Facts on File, *U.S. imposes trade sanctions on China and Pakistan* [about $500 million in the case of China] (Sep 2, 1993) "Somewhere between $400 and $500 million a year of commercial activity will be affected by the sanctions that are now imposed", see 4 (34) Space News (Aug/Sep 1993) at 21. A regional magazine, having interviewed companies like Hughes Aircraft and Motorola, rejected this figure as probably too high, paticularly because licenses already given would not be affected, see FEER (Sep 9, 1993), at 10, 11 ("Red rockets glare - China's sale of missiles to Pakistan and alleged shipment of chemical weapons to Iran further worsen an already strained relationship with US").

100. See FEER *id*, at 11.

101. As the AIAA asked, "[w]hat is the point of [the U.S. restrictions] if the Chinese can buy from our [Japanese and European] competitors?" And the Hughes Space and Communications president Armstrong stated: "Two of the most serious issues facing the U.S. satellite industry today are the government's current China trade restrictions and the

As we saw in Chapter 2.3.4, although intense lobbying took place on the part of the aerospace industry, focused both on the damaging effects on the U.S. industry's competitive position of the sanctions and on the predominantly "national security and foreign policy"-oriented role played by the State Department in controlling the export of satellites, it did not bring immediate legislative relief. However, in an industry-inspired letter meant for Secretary of State Christopher, several House members from (the "aerospace State" of) California argued that the sanctions should not prevent launches of U.S.-built communications satellites from China and that a continued prohibition would cost thousands of high technology jobs in California and could damage the U.S. satellite industry for years to come.[102]
And, after the Administration in November 1993 had relayed to China its willingness in principle to ease the satellite licensing procedures and had received encouraging reactions concerning possible nonproliferation commitments on the part of China, President Clinton, after an extensive interagency review, "months of bureaucratic wrangling and intense industry lobbying"[103] on *January 6, 1994* announced a new policy exempting commercial communications satellites from the sanctions for missile proliferation imposed in August 1993.[104] This cleared the way for a Commerce export license for the two Martin Marietta satellites, the *Asiasat 2* and *Echostar*. Clinton's decision was seen as a clear victory for Commerce Secretary Brown who had maintained that purely commercial satellites did not fall under the sanctions, whereas the Secretary of State had argued that all satellites should fall under the ban.[105] Although the issue as such is an

need for less expensive reliable launch vehicles. The US government's handling of export licensing and technology transfer in satellite deals involving the Chinese is hampering the industry's competitiveness." His Martin Marietta Astro Space colleague added that "a continued U.S. policy to prevent American satellite builders from using the Chinese Long March rocket would hurt the industry, because many customers want to use that launch vehicle because of its cheaper price tag"., see 5 (4) Space News (Jan 1994) at 10. Armstrong had previously accused the government of playing politics with export licenses and warned that other countries like Germany would benefit by winning future Chinese business. He noted at that occasion that China's National Space Administration said it would sign an $80-100 million contract with Deutsche Aerospace of Munich for a joint venture to build two communications satellites for the People's Bank of China, a contract which Hughes had expect to win, see Space News (Jan 10, 1994) at 3.

102. See 4 (42) Space News (Oct 1993) at 4. The same article mentions the following satellite exports as being affected by the ban: Hughes' Optus B3, the second Apstar (Apstar 1 had already an export license and would be launched by the Chinese in July 1994) and a Chinasat communications satellite for the Chinese government, and Martin Marietta's Echostar direct broadcasting television satellite and AsiaSat 2 (AsiaSat 1, built by Hughes, was the first US satellite launched by the Chinese in 1990 under the launch trade agreement.
103. See Space News (Jan 10, 1994) at 3 ("Clinton approves two satellite exports to China").
104. See Shirley A. Kan, *China: Possible missile technology transfers from U.S. satellite export policy-background and chronology*, CRS Report for Congress, 98-485 F (Aug 13, 1998), hereinafter referred to as CRS China report 1998, at 19.
105. A memo of Nov 16, 1993 from the National Security Advisor to President Clinton proposed

interesting one from a legal point of view, fact is that the Clinton decision was motivated by other than legal considerations, *i.e.* the U.S.-China relations in general and progress in the missile proliferation dispute with China more in particular. That is why a full clearance for export was only to be expected after the Chinese would have provided assurances that they would strictly, or at least in an agreed way *c.q.* on the basis of a common interpretation of the MTCR Guidelines, abide by the Regime. To that end the two parties would meet later that month to sort out their differences which had arisen in relation to China's 1992 commitments.[106]
A third Commerce-controlled commercial communications satellite, Hughes' Apstar 2, was now also exempted from the 1993 sanctions, and could thus expect an export license. There was an interesting though temporary complication: Apstar's owner, APT Satellite Co. of Hong Kong, was partly controlled by the Chinese Ministry of Aerospace Industry, one of the entities specifically implicated by the State Department in its August 1993 sanction notice. A second issue of concern to Hughes was the fact that, although Commerce had cleared the satellite for export, liquid propellants and the perigee kick motor (PKM) rocket attached to the satellite were, as defense articles, covered by the State Department sanctions; so the ban had to be graciously lifted, or, to avoid further departmental delay, Hughes had to remove the U.S.-made PKM and look elsewhere for a non-U.S. supplier of this essential component: the kickmotor enables the satellite to reach its correct orbital position after being put into space. But that would also have caused unwanted delays.[107] In the end, neither of the two issues were important enough to stand in the way of Clinton's strategic gesture vis-a-vis China, and on February 1, 1994, Hughes received the required license for the satellite, including the PKM and propellants, from the Commerce Department.[108]

Finally, a fourth satellite to benefit from the new Clinton policy (or rather: interpretation) was the *Optus B3*, another Hughes-built advanced communications satellite, planned for launch in 1994 to replace the failed

to follow the National Security Council and Commerce's interpretation of the MTCR Sanctions imposed in Aug 1993 to allow the export of two satellites controlled by the Commerce Dept, but not the five controlled by the State Dept. (State had argued that *all* satellite export licenses were suspended under the Sanctions, but Commerce had taken the position that the sanction did not cover the Commerce licences. The President approved the NSC recommendations, see *ibid.*

106. See IHT (Jan 8-9, 1994) at 5 ("U.S. optimistic on reining in China missile sales"). In return, the U.S. had agreed to open talks with China on the US sales of F-16 jets to Taiwan, announced in 1992 by the Bush administration, see *ibid.*
107. See IHT (Jan 15-16, 1994) at 4 ("Satellite exports: battle lines drawn after U.S. signal to China") and Space News (Jan 17, 1994) at 15 ("Curb missiles, not satellites").
108. On January 27, 1995 Apstar2 was launched, but the launch failed. In the meantime, the China Aerospace Corporation had reduced its vulnerability by completing the development of its own PKM which would be marketed for the launch of foreign satellites on the Long March -2E and -3 series launchers, see AW & ST (Sep 26, 1994) at 88.

Australian Optus B2. The satellite originally did not fall under Commerce authorization, because it contained a so-called "encryption device", which protects the satellite communications from being interfered with by unauthorized outsiders. This is a defense article listed on the U.S. Munitions List, which thus brought the satellite under State Department jurisdiction.[109] The manufacturer, in stead of going through the lengthier State Department licensing process, opted for a redesign of the satellite which resulted in the removal of the device and the transfer of the concomitant jurisdiction to the Commerce Department. The latter department issued the export license and on August 28, 1994, the satellite was launched on a Long March launch vehicle.

In June 1994, President Clinton, with substantial bipartisan Congressional and - understandably - U.S. industry support decided to decouple the annual MFN process from China's human rights record, and renewed China's MFN status.[110]

*On October 4, 1994* the Clinton Administration lifted the 1993 sanctions against China in return for China's renewed and expanded commitment to adhere to MTCR. Under the agreement reached China accepted the internationally recognised definition of what constitutes a violation of the MTCR. As a result, China promised not to export ground-to-ground missiles "inherently capable" of reaching a range of at least 300 kilometers with a payload of at least 500 kilograms. The expression used aimed at solving the M11 missile dispute: where China officially had never admitted delivering these missiles to Pakistan, it had privately insisted that the missiles had been specifically designed to conform to MTCR guidelines which contain the above range and payload limits. In the U.S view, if missiles carrying a higher weight than 500 kilogrammes cannot reach a distance of 300 kilometers, they may still be inherently capable of exceeding the MTCR parameters. The above words therefore were seen as covering the M11 and thus satisfied the U.S. concerns. (though it would require further meetings between the parties to fully clarify the matter and prevent any future disagreements on the scope of the restriction. The Chinese went a step further than MTCR requires: where MTCR speaks

109. See 5 (2) Space News (Jan 1994) at 3.
110. As Republican Senator Dole, leading the charge for unconditional renewal, said: "tying trade to human rights does not work. The policy has failed, the president should admit it", see USA Today (May 19, 1994) at 10A. Where one year earlier Clinton had issued an executive order saying MFN would be renewed only if China made "significant progress" in seven human rights areas, according to the State Dept, China's "overall human rights record in 1993 fell far short of internationally accepted norms". And where American jobs, investments (in Hong Kong) and consumer prices, according to the business community, would be severely hit by a trade war and China's aerospace market alone was estimated at $40 billion over the next two decades, pressure on President Clinton not to invite Chinese retaliation was considerable, see ibid.

in general of "control", and in the case of possible export of complete missiles and major subsystems (Cat. I items, "items of greatest sensitivity"), "there will be a strong presumption to deny such transfers", they agreed not to export any MTCR class ground-to-ground (surface-to-surface) missiles anywhere in the world, in other words an absolute global ban.[111]
On November 11, 1994, the Administration's waiver of the August 1993 sanctions took effect.

The above Chinese-U.S. understanding had been preceded by a House Space Subcommittee hearing entitled "Global Trade in Satellite and Launch Services". The focus of the hearing, held on September 29, 1994, was the status of the negotiations between the U.S. and China on the possible extension of the 1989 launch trade agreement, whose 5-year term would expire on December 31. At the same time, the status of a similar agreement concluded with Russia on September 2, 1993, was discussed. And the hearing also served as a forum for senior members of the government and industry to talk with the Subcommittee about U.S. launch policy, U.S. export control laws and policy, and the competitiveness of the U.S. satellite and launch services industries in the global marketplace.[112]

Among the issues raised by the government participants in connection with China were the *capacity* and *price* conditions central to the agreement.
Of the nine launches of satellites for international customers permitted by the agreement in the period 1989-1994 China would, based on current launch schedules, only perform four.
The USTR representative concluded from this figure that

"the Agreement would seem to have served its goal of permitting China the opportunity to demonstrate that it can deliver launch services meeting the exact standards of the international marketplace while recognizing the problems created by a transitional economy. *Having given China the opportunity to compete, it was left to China to demonstrate its capabilities to the international community*". (emph. add.).[113]

111. See China and non-proliferation, Fact sheet, Dept of State (Jun 3, 1997) <http://www.state.gov/www/regions/eap/fs-china_nonprolif_970603.html>. See also FEER (Oct 20, 1994) at 20 ("Goodwill proliferates - U.S. and China sign missile, nuclear accords"), and AW/ST (Oct 10, 1994) at 24 ("U.S., China settle missile dispute"). In the context of this agreement, the US intended to promote eventual Chinese participation in the MTCR, see *ibid.*
112. See Launch trade hearing 1994, *supra* note 77. See also Dennis Burnett, *Global trade in satellite and launch services*, report (Oct 13, 1994) hereinafter referred to as Burnett report, and, by the same author and Francesca Schroeder, *Developments in U.S. bilateral launch service agreements*, 19 (6) AIR & Space L. 326-331 (1994) hereinafter referred to as Burnett development.
113. Statement by Donald Philips, Assistant USTR for Industry, Launch trade hearing 1994, *supra* note 77

It is remarkable to say the least that the total number of Chinese launches performed was presented, as per the emphasised line, as if China had been able to freely compete in an open market context on quality and price alone with its American and European counterparts. It would have been a more honest approach to the question of GWIC's sales successes if the effects of the (possible and actual) delays and refusals of export licenses for the satellites of their (potential) foreign clients would have been taken into account or at least have been mentioned as a factor influencing the competitive position of the Chinese.

On the question of pricing the government was less satisfied. Although the extent of China's participation in the space launch market had been less than permitted by the agreement, the above government representative noted

"... we have been concerned about China's implementation of the "par pricing" standard throughout the six years of the agreement. The "par pricing" assessment is a difficult one. Each launch and each launch package offered in a competition may involve unique characteristics that require adjustments before a fair comparison can be made. However, China's compliance with the par pricing provisions remains a matter of ongoing concern to the U.S. commercial launch industry."[114]

In view of that assessment, the government promised that this would be an area of attention in their discussions regarding a possible renewal of the agreement. An initial round of negotiations had already taken place a week earlier, in which these concerns had been raised, and follow-up discussions on these and other agreement-related matters would take place one month later. On the whole, however, USTR was reasonably happy with the way the Agreement had worked:

"In 1989 when we first confronted this situation with China, there was no model upon which to draw in fashioning an agreement to balance these interests [*i.e.*a strong U.S. launch industry working in an international market place governed by agreements that address the complications caused by transitional economies, the integration of (Russia and) China into the world economy *i.a.* through access to world markets for their competitive goods and services, and access for the U.S. satellite industry to competitively priced launch services]. We believe that a review of the experience with the China Agreement demonstrates that it has worked reasonably well and is a proper basis from which to proceed to the negotiation of an extension of that Agreement".[115]

The opportunity offered to the industry to vent their worries and frustrations about the government's laws and policies was not left unused. We will limit our review to some comments which are (also) of specific relevance to (the

114. *Id.*.
115. See Allgeier statement, Launch trade hearing 1994, *supra* note 77.

relations with) China and are believed to have contributed to set the stage for changes in the government's policies and practices.
The sharpest criticism came from Hughes Electronics' Telecommunications and Space Sector, whose president spoke out strongly against the elements of protectionism found both in the launch trade agreements and in the current export controls:

> "Increasingly, our international customers have access to a number of high quality, very price competitive non-U.S. manufacturers and suppliers who dearly love to cature additional market share. Increasingly [those customers] object to current U.S. export controls as being irrational and unpredictable - and in some cases, they view U.S. export controls as discriminatory.
> We fear that our national export controls are having an adverse effect on our ability to compete in the international marketplace. In the case of China, for example, commercial communications satellite sales have been lost or foregone because of the uncertainty and delay in the U.S. licensing process and customer concern about future export license approvals".

The Hughes official, mentioning the *unilateral* character of the August 1993 sanctions imposed on China, the primary effect of which was to punish only the U.S. satellite industry, and the secondary effect was to place Hughes and other U.S. satellite manufacturers at a competitive disadvantage in the international market place.[116]
One of the solutions suggested was to move all commercial communications satellites, including encryption devices, perigee kick motors (and fuel) from the State Department's USML to Commerce's CCL.
Hughes made another important point, of a more general character: over half the cost of a communications satellite in orbit was the cost of launching, and that percentage had been increasing over time because, where technology and productivity improvements had led at Hughes to a five fold increase in cost effectiveness, the cost of launch services had been relatively constant, partly because of the lack of launch vehicle competition if only Western launchers were made available for launch of the various types of satellites.
So the manufacturers needed greater access to foreign launches at competitive prices. And also the customers, for cost, reliability and geo-political reasons, did not wish to be limited in their choice of the launch vehicle. In this environment, Hughes concluded, the Chinese and Russian launch agreements were damaging to the communications satellite industry (almost 10 times larger than the U.S. launch industry!):

116. According to the official, German DASA filled the void created by the sanctions and concluded an agreement with the Chinese for the purchase and coproduction of commercial communications satellites, worth hundreds of millions of dollars, see *Id.*

"The agreements stifle competition because they place a floor on the prices that Chinese and Russian launch service companies can charge to customers. They limit launch vehicle supply by placing artificial quotas on Chinese or Russian launches at the very time that demand exceeds supply. They distort the marketplace by controlling geostationary satellite launches, but not low earth orbit satellite launches. Consequently, the agreements reduce the incentives for U.S. launch services to invest and restructure in response to changed markets and rapidly changing technologies. The agreements work to the advantage of the U.S. and European launch services industry, and to the disadvantage of the communications satellite industry".

Hughes concluded that both quotas and pricing constraints should be abolished. These views were largely supported by other manufacturers, such as Space Systems/Loral and Motorola. On the other hand, the U.S. launch providers like McDonnell Douglas and Martin Marietta (the latter also a satellite manufacturer), saw the agreements as necessary for an orderly entry of non-market economy launch companies into the market, and asked for more effective enforcement mechanisms.[117] One method, suggested prior to the hearing, took the form of a case-by-case USTR certification of Russia's and China's compliance with all aspects of the bilateral agreements before licenses could be issued for the export of satellites to either country for launch.
Although there had been considerable debate on the latter proposal in Congress, the Administration was not prepared to add another regulatory barrier to the -already strongly criticized-export control process and on top of the enforcement measures available to USTR, because of the trade character of the agreements, under the Trade Act of 1974.

Though the October 4 understanding and the lifting of U.S. MTCR sanctions, coupled with China's renewed MFN status should have cleared the air between the two countries, two developments created new (potential) tensions.
First, the Republican victory in the mid-term elections of November 1994 resulted in the most anti-Beijing, or more specifically "most pro-democracy, pro-Taiwan, pro-Tibet, anti-Chinese Communist Party and anti-People's Liberation Army Congress" in years.[118] Consequently, according to sources in Washington, the Clinton administration would have to deal with pressure from Congress to *inter alia* penalise Beijing for its arms-sale and human-rights policies.

117. In his testimony, Peter B. Teets, President, Space Group of Martin Marietta, expressed his concern about enforcement: "There is little evidence of the Executive Branch's enforcement of these agreements despite the fact that in several instances the prices offered by non-market economies were much lower than permitted in the agreements". He did not give examples. Lockheed, both a satellite builder and a launch company through its joint venture with the Russian company producing the Proton rocket (which was subject to the quota of the US-Russian launch trade agreement), saw the agreement as a handicap to *i.a.* Lockheed and a protection of the European launch competitor, Arianespace, see *Id.*

118. See FEER (Dec 1, 1994) at 14-15.

Secondly, and in probable violation of the above understanding, a continuing stream of intelligence showed the supply of missiles or missile components, training activities and visits of Chinese missile scientists and engineers to the Pakistani military base where the components had been delivered.
Particularly if the supplies involved complete (MTCR Category 1) missiles, this would oblige the administration to impose heavy penalties on China.
That possibility, which would undoubtedly create serious tensions between the two countries, was sufficient reason for the administration to refrain from hasty conclusions or actions as to the intelligence reports.[119]

As a consequence of both this U.S. government attitude and some restraint on the Chinese side, no more missile export related sanctions have been imposed on the Chinese since then. Nevertheless, China still has not joined MTCR, and it remains a matter of debate whether its interpretation of the MTCR limitations particularly in respect of Cat II technology and components fully corresponds with the views of the MTCR members, and more in particular of the U.S. In April 1998, a senior State Department official, returning from talks with the Chinese on proliferation matters, stated:

> "... [the Chinese] relationships in missile components and technology with Iran and Pakistan, in particular, lead us to be concerned about whether they have the same understanding we have about the specific scope of those undertakings ... the difficulty we have is in the detail. What we're trying to reconcile is our approach and their approach to actually controlling technology and components, which would generally fall under Category II."[120]

After the September 1994 hearing the satellite manufacturers would further increase their efforts to get a fundamental change in the regulatory regime applicable to the export of their products. In April 1995, following a visit from Hughes Electronics' CEO and newly appointed head of Clinton's Export Council to Secretary of State Christopher, the latter started an indepth interagency review of the export control role of the State Department with respect to satellites.

### *3.1.4 The revised Agreement of 1995*

It took altogether 5 negotiating rounds to conclude a new seven-year bilateral agreeement extending disciplines governing continued Chinese participation

119. See *ibid*. A nuclear arms control expert wrote in a commentary: "We haven't really been tough on the Chinese", one senior official told us. "They pay lip service to the rules, but they still violate them - sometimes blatantly. The reason we are looking the other way is market potential", see IHT (Apr 25, 1995) at 8 ("From China to Iran as America watches").
120. See Holum briefing, *supra* Ch. 2, note 189, at 7.

in the international commercial launch market. On March 13, 1995, the two parties signed a Memorandum of Agreement regarding international trade in commercial launch services,[121] which would govern the respective Chinese launches with effect from January 1, 1995.

As its predecessor, it sought to carefully balance the interests and needs of the U.S. space launch, satellite and telecommunications industries. At the same time its (continued) aim was to "provide effective safeguards against disruption of the market for commercial space launch services while allowing for disciplined Chinese participation in the market."[122]
To further that aim and provide market stability, the resulting agreement again places quantitative limits and a price discipline on Chinese launch contracts. Where the previous agreement had provided for up to nine Chinese launches for international customers to geosynchronous earth orbit (GEO) over a period of six years, the new agreement allows the Chinese *eleven* such launches through December 31, 2001, *i.e.* a period of seven years. Additionally, the 1995 agreement includes provisions which allow for increases in this quantitative limit to address shortages in the supply of launch services for U.S. satellite manufacturers and users.
The new agreement continues to require that Chinese launch prices must be "on a par" with prices offered by Western launch service providers for comparable launches, but specifies in more detail, along the lines of a provision already included in the U.S.-Russia launch trade agreement of 1993, when such pricing is presumed *not* to meet that requirement.

Special attention is given to the new market for satellite launches into low earth orbit (LEO), one which did not exist in 1989, but already held great promises in 1995. However, the agreement does not place a specific limit on the number of commercial LEO launches. The Agreement also addressed the question of "leasing on orbit", which had arisen in connection with the application of the U.S.-Russia Agreement.

In the following, we will briefly review the relevant provisions of the new agreement, insofar as they changed (the extent of) the rights and obligations of the parties.

*Scope*
The new Agreement made a distinction between on the one hand the geosynchronous earth orbit (GEO) and geosynchronous transfer orbit (GTO)

121. The doc is available through USTR, <http://www.ustr.gov/>.
122. See *U.S. and China conclude new commercial space launch agreement*, Press release 95-07, Office of the USTR, Executive Office of the President (Jan 30, 1995).

and, on the other hand, the low-earth orbit (LEO), the latter a "separately identifiable commercial market with its own particular characteristics".

Both the specific pricing and quantity provisions of the Agreement were, for the time being, exclusively applicable to GEO/GTO launches.[123]

*Quantity*

Market participation of Chinese launch providers is, for the period of the contract, *i.e.* seven years, limited to eleven principal payloads to GEO or GTO for international customers.[124]

Four satellites, for which launch contracts had been signed prior to the entry into force of the new agreement, were considered to be covered by the 1989 Agreement and therefore did not count for the purpose of the new Agreement.[125]

On the other hand, a new category of launches was included, namely any satellite launched by PRC providers that is *entirely* or "depending on the circumstances and facts of a particular case", *primarily* leased on orbit to international customers. The provision was first introduced in the U.S.-Russia Agreement of 1993, and sought to prevent a possible circumventing of the restrictions through the - unrestricted - launch of indigenous satellites for the benefit of foreign users (see Chapter 3.2.2 *infra*).

123. Annex I, which contains the agreed definitions, gives the following meaning to the GEO: "... an orbit approximately 19,400 nautical miles (35,900 kilometers) above the surface of the earth at the equator in which a payload completes one earth orbit in a 24-hour period, holding a fixed position above the earth." GTO is defined as "... a temporary orbit used to reposition a spacecraft or satellite into a geosynchronous earth orbit." LEO "means, for purposes of this agreement, any orbit below [GEO].", see paras. 8, 9 and 10 respectively.

124. See art. II (B)(ii). Para. 11 of the Annex defines principal payload as "a telecommunications satellite, or, in the absence of a telecommunications satellite, any other spacecraft or combination of spacecraft." International customer refers, according to para. 3 of the Annex, to "(a) any person, or any kind of corporation, company, association, venture, partnership, or other entity, whether or not organized for pecuniary gain, or privately or governmentally owned or controlled other than those institutions or entities which are owned or controlled by PRC nationals and provide telecommunications services primarily to the Chinese market; or (b) any governmental body, excluding the Government of the [U.S.] and the Government of the [PRC]; or (c) any international organization or quasi-governmental consortium, including but not limited to Intelsat, Inmarsat, or their respective legal successors; *which is the ultimate owner or operator* of a spacecraft or satellite or which will deliver a spacecraft or satellite to orbit for use by such ultimate owner or operator."
The emphasized parts of the definition aim at including Chinese satellites launched by China for the (quasi-)exclusive use by international customers, see main text.

125. Apstar II, licensed on Feb 1, 1994 and launched on Jan 26, 1995 (failed); Asiasat II, licensed on Jan 6, 1994 and launched on Nov 28, 1995; Intelsat 708, launched on Feb 15, 1996 (failed) ; and Echostar I, licensed on Jan 6, 1994 and launched on Dec 28, 1995.

This quantitative restriction was based on a market (growth) estimate of 12 to 13 GEO satellites per year over the seven year period, i.e. 84-91 satellite launches; the Agreement thus gave China the opportunity to acquire 12 to 13% of the launch market.
As both parties realized the imperfection of this estimate, and a rigid limitation could seriously affect the fortunes of the satellite manufacturers and users, whether U.S. or others, a number of provisions were introduced seeking to provide for the necessary flexibility for the parties concerned, with respect to both the number of launches permitted and the proportional distribution of the launches over the contract period, the so-called "(anti-)bunching provision"[126] during any two-year period of the Agreement. The PRC may make commitments in any three-year period of the Agreement consistent with subparagraph II (B)(ii) [dealing with the overall restriction for the full period]. The PRC shall seek to ensure that PRC launches of principal payloads for international customers are performed as scheduled in the original launch commitment".
For that purpose, annual, semi-annual and special consultations all provided an opportunity to review the development and demands of the satellite launch market and the possibilities for the launch industry to meet those demands.
The PRC and the U.S. consult annually with respect to the obligations in the Agreement, and, in particular, on the implementation of *inter alia* the quantity provision. Though this in itself could lead to the conclusion that the restrictions should be adjusted, the special semi-annual meeting foreseen for this particular issue would be the more appropriate occasion. Article IV.3 provides:

"Semiannually, the limitation on the total number of satellites for international customers that may be launched by PRC providers of commercial launch services will be reviewed by both parties and, if appropriate, adjusted to reflect changes in the demand for launch services (including changes arising from a projected absence of Western launch availability over an extended period) upon request of the PRC in light of developments in the commercial launch services market".

Two such developments are mentioned as justifying a raising of the quantity restriction or a reaxing of the "bunching provision" to satisfy the resulting change in demand:
-(a) a development of the GEO launch market "significantly greater" than the estimated average over the life of the agreement of 12-13 launches per year (on which the quantity restriction is based); or

126. Art.II (B)(vi) provides in part that the PRC "shall make its best efforts to prevent a disproportionate concentration of such commitments [i.e. to provide commercial launch services to international customers, during any two-year period of the Agreement. The PRC may make commitments in any three-year period of the Agreement consistent with subparagraph II(B)(ii) [dealing with the overall restriction for the full period]. The PRC shall seek to ensure that PRC launches of principal payloads for international customers are performed as scheduled in the original launch commitment".

-(b) "the development of a commercially viable project for satellite services that fundamentally changes demand for launch services".
Any party may, by virtue of article IV.2, ask for *special* consultations to discuss matters of particular concern. Such consultations "will be held" (presumably because a U.S. manufacturer or U.S. or international user alerts the U.S. government to the situation) if there is a proven absence of Western launch availability during the required launch period and the PRC has reached its quantitative limit or the "bunching provision" would prevent the Chinese from performing a launch. In such a case the U.S. may increase the quantity restriction or relax the bunching provision to permit the satellite to be placed on the PRC launch vehicle manifest for launch.

By virtue of article IV.5, the U.S. may also independently, i.e. without consultations or agreement with the Chinese, come to the conclusion that any of the above conditions have been met and that consequently a raising of the quantity restriction or a relaxing of the bunching provision is warranted. Unless China objects, for which it has thirty days, the U.S. may take such action unilaterally.

On top of the above provisions on the adjustment of the restrictions in certain situations, there is a semi-automatic adaptation foreseen in the Agreement which is purely based on the - forecasted - number of launches, i.e. the overall size of the launch market over a certain period of time:

- if during the first 3 years of the agreement the average annual number of commercial launches is or, in the opinion of the two governments, is expected to be 20 or more (in stead of the estimated average 12 to 13 per year over the full period), the PRC's quantitative limit "shall be increased" from 11 to 13;
- if this trend continues for a fourth year, in other words if an average of 20 launches or more per year is (expected to be) attained during the first 4 years, China's allotment will go up to 16 launches over the whole period of the agreement.

With the above adjustable quantity provisions, an impressive flexibility, of particular importance to the U.S. and other launch *clients,* has been introduced, while at the same time reserving a fair share of the (growing) market for the U.S. (and European!) launch industry. Absent any other impediments or artificial restrictions, the Agreement gives the Chinese the opportunity to compete on quality and price with the other launch providers, both Western and non-Western, for a substantial part of the international GEO launch market. However, China's pricing of its launch services remains the subject of specific conditions and limitations.

*Pricing*
The 1989 provision on pricing required the Chinese launch providers to sell their services "at prices, terms and conditions which are on a par with those prices, terms and conditions prevailing in the international market for *comparable* commercial launch services". (emph. add.)

The new agreement has a similar provision, but, in order to give a clear (-er) meaning to the two emphasized expressions, identifies and explains in detail the factors which have to be considered to compare the Chinese launch services with those offered by commercial launch service providers from market economy countries, including the U.S.
The provisions of the respective article II.B (iv) cover two situations:
1. the differential between a bid, offer or contract by a PRC launch service provider for a GEO launch and one by a commercial launch provider from a market economy country is less than 15%: in such a case it is assumed, unless information is provided to the contrary, that such a Chinese bid is indeed "on a par" with those of its aforementioned Western competitors, and no special consultations are needed;
2. When this differential is *greater than 15%* “and [,] after taking into consideration the *comparability factors* described in Annex II, the U.S. believes that China's launch service prices are not consistent with subparagraph (iv) [i.e. are not on a par with Western prices], the parties shall have special consultations ["within thirty days of a request by the U.S., to discuss the matter]". (emph. add.)

Annex II lists six such factors for comparing or evaluating launch services in the international market. Such factors can often explain legitimate distinctions in the price offered by the Chinese for the launch of a particular payload relative to market economy launch companies. Each such factor mentioned may have a certain impact on the price the customer will have to pay to the Chinese; this impact is expressed in a cost range expressed in dollar amounts or percentages. In the end these "add-on's"will help to explain and justify a certain - low - Chinese launch price.
The following pricing comparability factors are mentioned:
- *intended orbit:* if the customer opts for launch into GEO, the Chinese launch company will have to additionally purchase a Perigee Kick Motor of $6-7 million; conversely, a launch into GTO may lead to a discount;
- *risk management:* addresses differences in insurance prices for the customer, based on the type and success rate of the vehicle used and also on whether or not, additionally, political risks are insured; basically, insurance rates for PRC vehicles can be 1-4% higher than the rates for Western vehicles;
- *additional cost:* integration and launch support cost (including e.g. transportation to and security personnel in China), estimated to range between $4 and 6 million;

- *vehicle lift capability:* ensures comparison of vehicle classes providing similar performance: there may be differences in vehicle prices from one class of performance to the next;
- *payment conditions and terms:* the issue centers on the economics of the customer's financial condition, which will have an influence on whether or not favorable credit terms or flexible payment schedules may have to be offered;
- *lifetime:* the use of some PRC launch vehicles can result in satellite lifetimes that are 1 to 2,5 years less than launches on market economy vehicles. Evaluation of this factor is complex (in some cases there is no impact on lifetime) and must be done on a cas-by-case basis.

Consideration of the above factors may lead to the conclusion that the Long March price for a specific launch, which at first appeared not to be on a par with Western prices, after adjustment resulting from the application of the above criteria, can be considered as falling within the permitted price differential of 15%.[127]
Where the agreement with Russia still contained a 7.5% level for consultation, this set of quantified factors gave sufficient guidance to the U.S. and China for comparing the launch prices to enable the former to relax the level to 15%.

One other pricing provision addressed a complaint voiced by U.S. and European launch companies about Chinese pricing behavior under the previous agreement, to wit the more than exceptional use of the "introductory price" argument for quoting a low launch price to its international customers. The Agreement now requires consultations and agreement between the two parties for the PRC to be able to offer an introductory price on only the first test flight of a *new type of launch vehicle*, and describes in detail, in the Annex, the criteria a launch vehicle has to meet to be considered a new type. Central to the definition in paragraph 13 is the criterion that a launch vehicle "must have significantly higher risk for the first launch than other launch vehicles already in production in order to qualify for a "test flight" price." And significantly higher risks, in the view of the parties, only result from major changes to high risk systems such as the propulsion or avionics systems.

The LEO launch market received special attention, because of the advent of ambitious and (launch trade) promising satellite systems like *Iridium* and *Globalstar* on the one hand, and the absence of sufficient experience with the demands of that market and the effects on competition between the launch service providers on the other hand. Hence a set of principles to guide China and the U.S. government in stead of specific conditions with respect to quantity or pricing.

127. A May 1997 USTR report cites violation of the pricing provisions of "a bilateral agreement on the Mabuhay launch", see CRS China report 1998, *supra* note 104, at 12 and 23.

As for the latter, for the purpose of enabling the parties to compare prices as in the case of GEO launches, they agreed to undertake a detailed examination on a per payload basis, of the factors affecting the comparability of bids, offers or contracts for such services.
In view of current predictions on growth in, and the structure of, the LEO market[128] the U.S. recognized the possibility of a substantial role for the Chinese launchers in that market segment provided 'they behaved'. The PRC promised not only that its participation in the LEO market would be consistent with the provisions of the agreement and with significant U.S. participation in the development of that market but also agreed to take steps (as yet unidentified) "to ensure that such participation will be proportionate and non-disruptive."[129]

The Agreement foresees consultations in case one of the parties (presumably the PRC) does not behave in accordance with the above, to ascertain the facts and take appropriate corrective action. The U.S. will judge the (potential) effect of the Chinese participation in the LEO market on the basis of *inter alia* the extent and growth of overall PRC and U.S. participation in the LEO market and, with respect to proposals to deploy LEO communications satellite constellations, the extent of participation by U.S., PRC, and third country launch service providers, in particular whether the non-market launchers collectively and per satellite constellation put more satellites into orbit than their market economy (*i.e.* U.S. and European) counterparts. Some more factors should also be taken into account. They are listed here not because they represent essential knowledge for understanding the U.S.-Chinese launch trade relationship, but because they encompass, in the absence of stricter rules for LEO launches, a broad set of generally worded, multi-interpretable facts and

128. The Office of Commercial Space Transportation, in a May 1995 update of its 1994 LEO market assessment, saw as many as five LEO mobile communications satellite systems to be deployed in the 1995-2005 timeframe under its projected "high end" scenario. OCST made a distinction between "Big" LEO systems (for voice communications/hand-held phones) and "Little" LEO systems (for data transmission, paging or other services), and envisioned a deployment of a minimum of two big LEO systems and one little LEO system and a maximum of three big and two little LEO systems.In the deployment phase this would lead to as many as 5 to 10 medium to large commercial launches per year, whereas in the maintenance phase of these projects, and additionally for launches of remote sensing, microgravity and other (scientific) payloads, 8 to 14 small vehicle launches could occur annually, see *OCST sees growing market for low earth orbit satellites*, DOT News release (May 18, 1995) <http://www.dot.gov/affairs/1995/orbit.htm".

129. See art. II.B (iii)(b) Although prior to the China-US talks of 1994/1995 on the revision of the 1989 Agreement,CGWIC, an investor in Iridium Inc., had concluded contracts, both for the initial launch of 12 satellites through 6 Long March launches and for additional "maintenance" launches of a total of 10 satellites between 1998 and 2003, the revised agreement of 1995 did not mention the Iridium launches as agreed and covered by the agreement's LEO provisions. See, on the USD 3.37 billion Iridium system and the launch contracts, 5 (16) Space News (Apr 1994) at 4, 21 ("Iridium acquires launch providers for network").

conditions which give the U.S. ample room for intervening in the competitive interaction between the Chinese and non-Chinese launch service providers, for the benefit of its launch companies, its satellite builders or its telecommunications firms:

"- the extent of PRC and U.S. participation in the deployment;
- launch scheduling requirements and the need to optimize launch vehicle selection to meet deployment or operational requirements;
- the availability of competitively-priced market economy launches to meet these requirements;
- opportunities made available to the parties for participation in the replacement market;
- reasonable considerations by the proposed system operator regarding commercial risk sharing;
- customers' requirements."[130]

Obviously, the above factors, to be properly addressed and used, would require a substantial amount of additional investigative work for the USTR/DOT Working Group, and 'LEO-focused' discussions between the parties.

Consequently, at the first yearly consultation meeting as foreseen in the agreement, in July 1996, the U.S had three issues on its agenda: to reconcile the parties projections of the size of the global markets for GEO and LEO payloads, to review China's participation in competitive bidding for launch contracts, and to examine specific pricing issues for the burgeoning LEO market.[131]

As mentioned before, in order to give some teeth to the agreement, the U.S. attached great importance to the exchange of data, in particular on pricing and number of launch contracts. In practice, however, information on Chinese launches has not always been forthcoming. According to a U.S. Congressman in 1996, in the seven years since the 1989 Agreement, China only forwarded eight papers to the USTR's office. (But Russia, since its 1993 Agreement with the U.S., had not sent any information document at all).[132] Obviously, the U.S.' counterparts saw the information exchange as a rather one-sided obligation which they were prepared to meet in case of own need and certainly not without having the opportunity, during a meeting, to orally present and discuss the data.

130. See art. II.B (iii)(c).
131. See Dennis J. Burnett and David Lihani, *U.S. national space policy and bilateral launch service agreements*, Proceed. Coll. L. Outer Space 263-270 (1996) at 266.
132. See Christina Gair, *The global launch industry: new players enter the scene*, Via Satellite 44-55 (Oct 1996) hereinafter referred to as Christina Gair, at 50.

Enforcement of the agreement is dealt with under the friendly heading "[c]larification of rights and obligations" in its article V, and deals only with Chinese violations of the provisions. The reference to U.S. laws and regulations must be interpreted in the view of USTR as one to the Trade Act of 1974, which has been discussed before.

Separate attention, under the same heading, is paid to the fact that this agreement does not in any way affect the right of the U.S., when faced with a license application for the export of a satellite to China, to take any action by virtue of the U.S. export laws and regulations which it deems necessary. This provision continues to subject the rights and obligations as agreed between China and the U.S. to the national security and foreign policy 'tests' of the Administration and Congress, and thus puts the importance of this instrument as a bilateral "regulator" of the trade in launch services, in perspective.

The U.S. private parties concerned were happy with the results: both launch provider McDonnell Douglas and satellite manufacturers Martin Marietta and Hughes expressed their appreciation to USTR for striking a balance among the various competing interests.[133]

The right of the Chinese to launch U.S. and other Western payloads as laid down in the Agreement of 1995 have, until recently, not been interfered with through the imposition of any special (MTCR or other) sanction.
This may be a result of restraint on the Chinese side with respect to missile sales or other behaviour deemed unacceptable by the U.S. Administration or Congress or of restraint on the U.S. side in its reactions to unwelcome Chinese actions or inactions, or of a combination of the two.
Fact is that, with the Tiananmen sanctions legislation still in place, waivers of the export restrictions have been - routinely - requested and - routinely - granted, until February 1998: according to an August 1998 report of the

133. See MDD News release (Jan 31, 1995): *MDD congratulates USTR Mickey Kantor on the new agreement*. "The [USTR] struck a positive balance among the various competing interests in this emerging international market. The agreement provides for effective "rules of the road", thus ensuring the non-disruptive entry of China into the global satellite launch market; the MM news release of the same date: "Martin Marietta applauds USTR agreement with [PRC] on space launch services: Ambassador Kantor and his staff have successfully negotiated an agreement that balances not only our nation's long-term economic and security priorities, but also the interests of US manufacturers of commercial satellites and launch vehicles ... An attractive feature is the flexibility of the agreement, which addresses potential changes in the international commercial space market place". Hughes, finally, released the following Jan 30 response to media inquiry: "Hughes is pleased with the positive changes that were agreed to last week by the [US] and China ... We expect that the next decade will be one of unprecedented growth for the commercial communications satellite industry. Access by the satellite industry to an increased supply of launch services is an important ingredient of its growth. Thus, the recent USTR action is a step in the right direction, *though additional increases may be necessary*". (emph. add.)

Congressional Research Service, since 1989, Presidents Bush and Clinton have issued 13 waivers for 20 satellite projects, based on 'national interest', on a case by case basis, to allow the export of satellites, increasingly for satellites used by China, not just launched from China (by virtue of the 1995 Agreement).[134]
The latest Presidential waiver was granted on February 18, 1998. It concerned the export of Loral-built Chinasat-8 satellite for China's own use, and has become part of the Congressional 'transfer of high tech (expertise) to China'-investigation, referred to in Chapter 2.3.4 and further discussed in Chapter 4.

## 3.2 Russia

### *3.2.1 Introduction*

Between October 1957 and April 1996, Russia and its predecessor until December 1991, the Soviet Union, performed almost 2,700 launches, an unsurpassed record number with an unequalled success rate of 92.87%.[135]
The technological eminence of the country in this field was, for many years, feared by the U.S. military and envied by the U.S. space establishment.
The U.S. perception of the Soviet Union as, to use President Reagan's words, the "evil empire" or at least as the most heavily armed hostile country to be contained by the U.S., not only blocked the export of defense articles and services and dual-use goods and services to that country, it also prevented, until the early nineties, all major space cooperation which could possibly involve the transfer of high technology to the Soviet Union, thereby also blocking such transfers to the U.S. (with the exception of the Apollo-Soyuz link-up in 1975).
On the other hand the ambitious and costly space exploration and exploitation plans of Presidents Reagan and Bush,[136] coupled with such factors as growing scepticism of Congress and a diminishing interest in "footing the bill", made the idea of mobilizing Soviet space technology an increasingly attractive proposition, particularly in view of its high quality/ low cost image.[137]

134. See CRS China report 1998, *supra* note 104, at 10.
135. See AW/ST (Apr 15, 1996) at 22.
136. At the 20th anniversary of the Apollo moon landing, on Jul 20, 1989, President Bush announced his Space Exploration Initiative (SEI), which involved the completion of the Space Station, a return to the moon and a mission to Mars, and directed the National Space Council, chaired by the vice president, to determine the nature of this program, its cost and schedule and the possibilities for international cooperation, see Remarks by the President at 20th anniversary of Apollo moonlanding (Jul 20, 1989), The White House, Off.of the Press Secretary.
137. See on this subject Bzhilianskaya, *supra* Ch. 1, note 22.

An updated National Space Policy of November 2, 1989, embraced international cooperation in general, though with some caution as far as the Soviet Union's activities were concerned:

"... The United States will foster increased international cooperation in civil space activities by seeking mutually beneficial international cooperation in civil space and space-related programs. The National Space Council shall be responsible for oversight of civil space cooperation with the Soviet Union. No such cooperative activity shall be initiated until an appropriate interagency review has been completed."[138]

That interagency review was made the more necessary when, less than half a year later, a private Australian company, the Cape York Space Agency (CYSA), aware of a worldwide shortage of launch services, proposed to build a launch site at Cape York, in Northern Australia, and to use upgraded Soviet *Zenit* launch vehicles for launches of satellites into GEO. CYSA needed technical assistance for this complicated project and found a division of United Technologies, U.S. Space Boosters, Inc. (USBI), prepared to contribute its know how to the venture. For that purpose, a Technical Assistance Agreement was concluded between the two companies, but in order to be able to thus "export" its knowledge, a "defense service", USBI needed a State Department license, which caused the matter to become a subject of interagency debate.[139]

Obviously, this approach, which would not involve export of satellites to Soviet territory, but to the terrritory of a trusted ally, had a strong appeal to most parties concerned.
For the Soviets, who, though proudly owning and operating an impressive selection of reliable launch vehicles for both big and small loads, destined for either GEO or LEO, sofar had no access to the international launch market, this could be the first opportunity to sell their services for hard currency to the Western world.[140]

138. See Policy guidelines and implementing actions, National Space Policy (Nov 2, 1989), Fact sheet, the White House, Off. of the Press Secretary (Nov 16, 1989).
139. Complicating the situation was the fact that the Congressional Tiananmen legislation of 1989 sough to prevent the approval of license applications for launches of US-built satellites on *Soviet-* (and Chinese-) built launch vehicles, unless the President would report to Congress that such an approval would be in the national interest of the US (see Chapter 3.1, note 79); and Congress had additionally legislated that Technical Assistance Agreements would also be covered by this prohibition, see Marcia S. Smith, *Space commercialization activities in the Soviet Union*, CRS Report for Congress, 90-372 SPR (Aug 3, 1990) at 10.
140. In 1982 the Soviet Union had concluded its first commercial launch contract, with India, for the launch of the latter's indigenously built IRS-1 remote sensing satellite; and another such agreement was signed between the same parties in 1988. No US components, so no US export controls, were involved. Although the Soviet Union had retained a US company to help in marketing its launch services in the US, US policy forbade the export of satellites for launch to their country, and not even exemptions from customs inspections and other

The Australian company saw an interesting launch market, which could be served from a launch site close enough to the Equator to have roughly the same advantages as Arianespace had with respect to GEO launches from its Kourou, French Guyana launch base. And both parties saw the U.S. company as a partner who, as a project manager, could help them, not only with technical/operational expertise but also by convincing the U.S. administration that the risk of unwanted transfer of U.S. technology to the Soviet Union would be minimal given Australian and U.S. controls at the launch site.

The Cape York project prompted an administrative review of U.S. defense, trade and export control policy as it applied to the Soviet Union. At the same time, the Administration looked at the long term interests of the U.S. launch industry, and came, as in the case of China in 1988, to the conclusion that this export license request for the benefit of the Soviet launch industry gave the U.S. a perfect starting point for dealing now with future Soviet launch competition.
As a result, on August 22, 1990, the President authorized the Secretary of State to approve USBI's license application, provided certain agreements were concluded which were deemed necessary to ensure primarily national security interests. Specifically, the U.S. sought agreements to ensure that:

"(1) [t]he U.S.S.R. will provide launch services (boosters, equipment, technology, or training) only from Cape York or any other single location [outside its territory!];
(2) [t]he U.S.S.R. and Australia will observe the [MTCR], and
(3) U.S. regulations on technology transfer to the Soviet Union will be observed.
...
To permit continued U.S. participation, the United States in the coming months will also be seeking agreements to ensure free and fair trade in the international commercial launch market."[141]

(In his Commercial Space Launch Policy of September 5, 1990, President Bush - rather prophetically in retrospect - emphasized that concluding such (launch) trade agreements and enforcing those agreements to limit unfair competition was only a short term action (which, in his view, just as continuing to use only U.S. manufactured launch vehicles for U.S. government satellites would affect competitiveness over approximately the next ten years). For the long-term goal of a free and fair market in which U.S. industry would be able to compete, "the [U.S.] should take actions to encourage technical improvements to reduce the cost and increase the reliability of U.S. space launch vehicles").[142]

safeguards offered by the Soviets could change that position in the late eighties.

141. See Statement by the Press Secretary on the US Commercial space launch policy (Aug 22, 1990), Weekly Comp Pres. Docs (Aug 24, 1990) at 1287.

142. See Policy findings, Commercial Space Launch Policy, NSPD-2 (Sep 5, 1990) <http://www.hq.nasa.gov/office/codez/nspd2.html>. See further Chapter 3.5 *infra*.

CYSA subsequently went bankrupt and another Australian company attempted to proceed with the idea, though without success either. Similar plans involving Australia and a Russian/Ukrainian launcher have later emerged from time to time, but did not materialize, usually for financial reasons.

Important for the purpose of this study is not so much the fate of this one project, but rather the observation that can be made already at this stage, that the project set a trend through which Russia would distinguish itself from China, *i.e.* that of using international cooperation in the launch field, almost exclusively with U.S. companies, to foster and/or help the latter to bring about changes in U.S. launch trade policies.
At least three important factors contributed to this difference in approach:
1. the recognized excellence of Russian launch products and the interest of U.S. aerospace (and in particular launch-) companies in using or marketing these products;
2. the dissolution of the Soviet Union and its economy (with ensuing financially-driven interest on Russian side to sell/make use of its space assets); and
3. the concerns on the part of the U.S. administration that Soviet space, and in particular launch/missile, technology, if left unused or unassisted, would end up in the wrong hands.

In 1991/1992 the Russians made a second attempt to enter the international launch market. As a founding member of the International Maritime Satellite Organization *Inmarsat*, it requested that its well-proven Proton launcher be used for the launch into geostationary orbit of the Inmarsat-3 communications satellite. The U.S. had sofar blocked such launches on the basis of its long-standing policy not to grant export licenses for U.S. satellites and components to Russia (which would, as a result of the December 1991 break-up of the Soviet Union, now mean a launch from a Russian-run launch base in a third country, Kazakhstan)

The above factors played an important role in changing the U.S. views. Additionally, the Bush administration remained interested in an agreement with this (other) "non-market economy" launch provider, to guide its entry into the launch market in a way that would not hurt the U.S. launch companies. Consequently, at the June 1992 Summit of President Bush and Russian President Yeltsin, the U.S. announced that it would grant a one-time exception to its export policy vis-a-vis Russia and allow the Inmarsat-3 launch. At the same time, the U.S. stated that, while no further exceptions would be granted, it was willing to start negotiations on the conditions for Russia's entry into the launch market. These discussions took place amongst considerable uproar about Russian sales of missiles and technology to India (see Chapter 2.3 *supra*). At the same time, heated discussions took place, both within the scientific and technical community and in the Adminstration and Congress, concerning the financial feasibility of the Space Station, with program costs through permanent occupancy (then scheduled for 1999) ranging from USD 30 to 40 billion, and additional operating expenses, estimated by the time Clinton took office, of USD 2 billion per year for its full 30 years life time.[143]

While various and repeated redesigns, aimed at finding a cheaper version, continued to upset America's partners Europe, Canada and Japan, the possible Russian participation in the plan and the extent thereof became an increasingly important part of the U.S. Administration's national security and foreign policy based 'engagement' strategy vis-à-vis Russia.

On September 2, 1993, vice-president Gore and the Russian prime minister Chernomyrdin agreed on a package-deal consisting of the following elements:
- a 'merger' of the U.S. and Russian space station plans,
- Russian adherence to MTCR and an amendment of its contract with India to prevent the transfer of missile *technology*,
- U.S.-Russian space cooperation for an amount of - at least - USD 400 million, the amount Russia would lose by reneging on its contract with India,
- a launch trade agreement permitting Russian entry into the international commercial space launch market.[144]

### *3.2.2 The U.S.-Russia Launch Trade Agreement of 1993*

The Agreement in many ways resembles both the China Agreement of 1989 and its revised version of 1995.

*Inter alia* because of that similarity we will not give an article by article, or subject by subject description of its provisions, but limit the discussion to a number of issues which, for various reasons, deserve some special attention.

*Quantity provisions: GEO/GTO launches*

Russian launch companies were allowed to contract launch services with international customers for a total of *eight* satellites, in addition to the Inmarsat -3 satellite already contracted for. While Russia's freedom of (sales) action was limited by an 'anti-bunching' provision, the above quota could be increased by launching two principal payloads in one launch: a maximum of 4 such dual launches could raise the original allotment of 8 to a maximum of 12 satellites. Additionally, a more favorable development of the international launch market could also result in an agreement to (further) increase the quotas.

143. See, on the space station, Smith, CRS Report 1957-1993, *supra* Ch. 2, note 293 at 34 ("The U.S./International Space Station Program").

144. See, for the texts of the resp. Joint statements and fact sheets, Gorove US Space Law, *supra* Ch. 2 note 55, at I.A.4 (a-2); also 4 (35) Space News (Sep 1993) at 1, 20.

The above quantity provision soon created some problems. One was caused by the Russian plan to launch an indigenous communications satellite and lease the total capacity to a foreign customer. U.S. launch providers saw this as a way to circumvent the capacity restrictions of the agreement, whereas the Russians considered leasing of satellites or satellite transponders a different market not governed by the agreement. To settle the matter, USTR published guidelines in early 1994, which confirmed the official U.S. interpretation that

"[l]easing a satellite on orbit or satellite transponders does not remove a transaction from the terms of the Agreement. As a general rule, the Agreement applies to a contract calling for the leasing of a satellite on-orbit as to one requiring the launch of a satellite purchased by the customer. The definition of "international customer" as defined in the Agreement makes no distinction based upon the financing arrangement selected for the satellite. There will be no special consideration given to leased satellites launched solely for use by an international customer".[145]

Though the Russian delegates at an April 6, 1994 meeting of the two parties found the guidelines too strict and unfair, USTR upheld its interpretation, though exempting the case which started the discussion from the application of the "new" provision.[146]

The Russian complaint about the strictness of the guidelines was also triggered by another USTR interpretation affecting the launch quota, *i.e.* that of 'contract': according to article IV, Russian launch providers may *contract* with international customers to provide launch services for the launch of up to eight principal payloads to GEO/GTO. Article I of the Agreement gives the following meaning to 'contract':

"(i) to agree or commit to the provision of commercial space launch services such that a launch is effectively removed from competition in the international market, or (ii) any such agreement or commitment".

145. See *Guidelines for U.S. implementation of the Agreement between the US and Russian Federation government regarding international trade in commercial space launch services*, USTR, Fed.Reg. Vol. 59. No.47 (Mar 10, 1994). The guidelines cover roughly the same issues as the 1989 guidelines pertaining to the US-China Agreement of 1989, such as the organization and tasks of the Subcommittee on (Russian) space launch services, the monitoring and data collection activities of the Working Group on Information, consultations, collection of information and enforcement.

146. Russian officials contended that leasing Russian satellites launched by Russian launchers did not count as the launch of an international payload and thus should not be counted against the quota. US trade officials strongly disagreed, insisting that such launch opportunities should count against the quota on grounds that these launches should be open to international competition, see *The national space transportation policy: issues for Congress*, Office of Technology Assessment, US Congress, OTA-ISS-620 (May 1995) at 68.

The guidelines considered an *option agreement* or *reservation* for Russian launch services "entered into on or before September 2, 1993", to be equally covered by the above definition. This USTR interpretation affected Russia's contractual relationships with a U.S. and a European client: the deal with Space Systems/Loral of California consisted of one firm order and four options, the arrangement with Société Européenne des Satellites of Luxembourg covered one firm order and an undisclosed number of options.[147] In the Russian view, only the two firm contracts should count; the U.S. interpretation on the other hand would have resulted in the Russian launch quota being exceeded right from the start. Information on the settlement of this question could not be obtained.

*LEO launches*

Prior to the Agreement, Khrunichev Enterprise, a Russian investor in Iridium Inc. of Washington, had concluded a contract for the launch of 21 satellites for Iridium (out of a total of 73) through three *Proton* launches. These three LEO launches were specifically and separately permitted by the Agreement. The draftsmen could foresee possible further contracts for "maintenance" and replacement launches for the 66 satellite-Iridium system, and for other planned satellite constellations to provide global mobile phone or other telecommunications services. Consequently, provision was made for a case-by-case consideration of Russian proposals for additional non-GEO launches, "where there are competing comparable commercial space launch services".[148]

*Pricing*

Under the Agreement Russia was not supposed to charge more than 7,5% less than its "market economy" competitors. This provision did *not* apply to non-GEO/GTO (e.g. LEO) launches. There, the general, vague, pricing criteria of the Agreement applied, *i.e.* that

"[t]he contractual terms and conditions, including the price, of commercial space launch services offered or provided by Russian space launch service providers to international customers *shall be comparable* to the terms and conditions, including prices, for comparable

147. See Space News (March 21, 1994) at 3 ("Proton venture nears sellout on agreement").
148. The definitions article of the Agreement gives the following meaning to the latter term: "Comparable commercial space launch services" means commercial space launch services offered to launch a spacecraft of the weight class that is the subject of a launch competition, taking into consideration specific factors that may be considered when evaluating the price, terms and conditions of such services, including, but not limited to, intended orbit, risk management, financing, satellite lifetime on orbit and integration costs", see art. I, para.5.

commercial space launch services offered by commercial space launch services providers from market economy countries, including the United States".[149] (emph. add.)

In early 1995, serious concerns were voiced by Arianespace officials about the fact that Russian Proton launches were being offered to international customers for as much as 30 percent less than U.S. and European launch fees.[150] The Russian Space Agency, in its reaction to these claims, insisted that various hidden costs should be added to the figures used, to arrive at the "real price" and that, besides, the internal pricing in Russia was going up every month. But more important for the (outcome of the) discussion was the fact that Lockheed Missiles and Space Corporation participated in the debate on the side of the Russians: since mid-1993, this major aerospace and defense company had a joint venture agreement with Khrunichev and Energia, two Russian companies involved in the manufacture of the Proton launcher.[151]

The resulting U.S.-based marketing company, *Lockheed Khrunichev Energia International* (LKEI), had taken over the sale of Proton launchers to international customers.
LKEI offered substantial advantages to both sides: Lockheed, so far inactive in this field, had, with one stroke, entered the international launch market with a highly reliable launch vehicle. The two Russian companies had not only enlisted the sales skills and implied quality guarantees of a reputable U.S. aerospace firm, but had also acquired a powerful ally in their dealings with the U.S. government on such matters as launch quota, pricing, export licenses and all other aspects of the launch trade relations between Russia and the U.S. Together they formed a formidable new competitor to the incumbent U.S. launch providers and, more in particular, to Europe's Arianespace. (A contract and a launch reservation signed by LKEI after the entry into force of the Agreement, with PanAmSat and with Société Européenne des Satellites respectively, marked in each case the first time after a number of European launches that the company concerned decided *not* to use Arianespace's services).[152]

149. See art. V, para. 1.
150. See 6 (1) Space News (Jan 1995) at 1, 20.
151. The initial framework for the cooperation was agreed upon on October 30, 1992 and finalized on January 23, 1993. It started as Lockheed Khrunichev International in 1992; Khrunichev State Space Scientific & Production Centre, the manufacturer of Proton was joined in 1993 by Rocket & Space Corporation Energiya, which built the Russian Buran space shuttle, see Bzhilianskaya, *supra* note 137, at 326.
152. In a written response to questions from the House Subcommittee on Space in May 1993, a high Lockheed official not only criticized the nascent launch trade Agreement ("... [which] will enable LKEI to compete marginally in this commercial space market, constrained in sales and growth by the launch restriction ... LKEI is fully prepared to compete on quality and responsiveness, rather than rely on artificial pricing and/or quota restrictions.") but also defended LKEI and a free launch market as "the most effective and quickest way for the U.S. to undercut Ariane's market share", see *International competition in launch services*,

Lockheed's defense of the launch price had a familiar ring to those who had discussed Chinese Long March pricing. A Lockheed official stated:

"You cannot simply look at the launch price ... You have to look at what is called the adjusted cost. This includes the risk of political upheaval, the costs of adapting the spacecraft to Proton and the added costs of launching from the Baikonur Cosmodrome [in Kazakhstan]. When all is said and done, *our* prices come much closer to the 7.5 percent figure".[153]

That 'special costs' had to be taken into account in the case of Russian launches was already recognized before the Launch Trade Agreement was concluded: in a Congressional hearing on "international competition in launch services" of May 1993, an official of COMSAT Corporation provided the following data as evidence of a highly competitive launch market place:

"[Of the four Inmarsat-3 satellites] the first two ... will be launched on Atlas at a cost of $124.4 million and the third will be launched on Ariane 4 at a cost of $61.6 million. The fourth satellite will be launched ... on a Proton rocket ... [for] $36 million ... Additional costs will be incurred to pay for needed modifications to the satellite, political risk insurance, as well as a policy to insure against launch failure. The final cost of the launch is expected to reach $46 million".[154]

After the 'mega'-merger of Lockheed with the satellite manufacturer and launch vehicle builder Martin Marietta, in June 1995, LKEI became part of a bigger international launch provider created by the new Lockheed Martin company, *International Launch Services* (ILS), which would henceforth sell both the Proton and the Atlas launch vehicle to U.S. and (other) international customers and provide a very strong - international satellite and launch vehicle competition-driven - support for an increasingly liberalized launch market, at least as far as the U.S.-Russia launch trade agreement, and thus the international sale of Protons was concerned.

Hearing before the Subcommittee on Space, House Committee on Science, Space, and Technology, 103d Cong., 1st Sess. (May 19, 1993), hereinafter referred to as 1993 Launch hearing at 159; "... the niche Proton fills (4,000-6,000 lbs to GEO), is not a direct competitor to existing or currently proposed U.S. launchers." *id.*, at 160. McDonnell Douglas was nevertheless far from happy with the advent of low-priced Protons in the launch market, *id.*, at 153.

153. See *ibid.* A European insurance broker agreed with the Russians and Lockheed that a Proton launch involved many special costs: "... insuring yourself against possible political instability in Russia will add substantially to the cost of your coverage ... Also, the costs increase the further away the launch is, because the market's judgment is that political instability in Russia is more likely as you go further out into the future." In this connection, one should also include the costs involved in the security arrangements to prevent transfer of satellite-related technology to the Russians.

154. See statement Warren Y. Zeger, Vice President, COMSAT Corporation, hereinafter referred to as Comsat statement, *id.*, at 126-127.

### *3.2.3 The 1996 Amendment*

Pressure on the part of the partners as of well as of other U.S. satellite manufacturers after the conclusion of the expanded agreement with China in March 1995,[155] and a December 14, 1995 Launch Trade Agreement concluded in the mean time with the Ukraine and benefitting a U.S.-Ukrainian launch joint venture (see Chapter 3.3, *infra*), created the momentum and justification for an amendment to the U.S.-Russia Agreement, eventually signed by U.S. Vice President Al Gore and Russian Prime Minister Chernomyrdin on January 30, 1996, which increased Russia's launch allotment from nine GEO satellites to a maximum of *twenty* for the period through 2000.[156]
At this stage of the 'game', protests against this increase of launch competition came only from McDonnell Douglas, the only U.S. manufacturer of large launch vehicles without a transnational joint venture involving one of the above countries, and from interests defending the State of Florida's Cape Canaveral launch base, the U.S.' only launch site for the satellites covered by the agreements.[157]

Russian companies concluded a number of agreements with other U.S. and European companies (see Chapter 1, *supra*), which served the double purpose

155. In fact already in December 1994 the Russian Prime Minister Chernomyrdin during one of his regular meetings with vice president Gore, as joint heads of a U.S.-Russian commission on cooperation in space, science and energy, broached the topic of a relaxation of the capacity restrictions in view of an Ariane failure on Dec 1, the second in 1994: given Proton's own order book and the full use of Atlas' services in 1995 (and possible 1996) Russia - happily - foresaw a shortage of launch capacity for international customers, see 5(48) Space News (Dec 1994) at 1, 21.
156. See 7 (4) Space News (Jan/Feb 1996) at 8: "Russian [Space Agency] officials say their launch industry deserves at least the same treatment as that accorded to China".; also 7 (5) Space News (Feb 1996) at 3 ("New launch accord clouds Delta 3 future").
157. According to a Director of the Florida Space Business Round table, "U.S. policy-makers struggling to provide economic aid and arms reduction incentives to countries like Russia, Ukraine and China have found another valuable spinoff from the space industry. Through a series of recent bilateral agreements, they have turned the space industry into a tool for achieving U.S. foreign policy goals by providing these non-market economy countries with access to more than $1.5 billion in U.S.-commercial satellite launch business. By offering their impressive collection of rockets and other Cold War space technologies at artificially low prices, these nations are now positioned to capture half of the world's commercial space lauunch business, and perhaps all of Florida's ... The allocation of U.S. market share to foreign competitors, especially in such a strategically important industry, is consistent with our self-destructive history in other long-gone industries ...", see 7 (5) Space News (Feb 1996) at 19 ("Launch agreement locks out U.S."). The author proposed, as a partial remedy, to require these countries to launch their rockets from Cape Canaveral to preserve U.S. jobs and put the spaceport infrastructure to its intended use. But an editorial commentary praised the U.S. government's decision as an important and long-overdue victory for the satellite industry, as it would provide more launch options and should keep a lid on launch costs, see *id.*, at 18 ("Good news for Russia, industry").

of bringing in foreign sales and marketing expertise (and additional revenues) and of foreign lobbying efforts aimed at discouraging U.S. and European governments from restricting the use of Russian-built launch vehicles (or better still, to see these vehicles as part-Western assets to be employed unreservedly). Thus Russians participate in the U.S.-Ukrainian Sea Launch project, have joined forces with Arianespace in Starsem to promote their Soyuz, cooperate with DASA in Eurockot to sell modified SS-19 missiles and have joint ventures with both an American and a German company to market the two-stages Cosmos launch vehicle.

Although in the exchange of data as prescribed by the Agreement, Russia so far was even less forthcoming than the Chinese (see Chapter 3.1 *supra*), Russian pricing practices have not given rise to disputes or complaints, a feat that can be largely attributed to the above alliance-relations with Western counterparts in general and with the U.S. companies in particular.

### *3.2.4 The Satellite Technology Safeguards Agreement between Kazakhstan, Russia and the U.S. of 1999*

Prior to January 1999, each Russian launch from the Baikonur Cosmodrome in Kazakhstan involving U.S. satellites, equipment and data required the negotiation of a separate, trilateral technology safeguard agreement to prevent transfer of sensitive technology.
A review of the experience gained with these agreements and new concerns and ideas, *inter alia* stemming from the 'China affair', led to trilateral discussions in Moscow which, on January 25, 1999, produced a new umbrella agreement to govern all future launches involving the three parties.

The new agreement thus permitted the resumption of launches of U.S. satellites from Baikonur, among which in particular the launch of four Globalstar satellites on a Russian Soyuz, sold by the Russian-French *Starsem* company. The latter launch, which took place in February 1999, had been delayed for three months because of the above export control concerns and the ensuing discussions.

Under the agreement, the U.S., Russia and Kazakhstan commit to take steps necessary to preclude the unauthorized access to and transfer of protected technologies associated with the launching of U.S. satellites (and other satellites with U.S. components) by Russia from the Baikonur Cosmodrome. The agreement establishes controlled access to U.S. satellites and specifies procedures to ensure that U.S. DOD personnel can monitor U.S. technology in Russia and Kazakhstan also in the event of a launch failure of a space launch vehicle carrying U.S. satellites, equipment and data.

Although the agreement only addressed the technology safeguards aspect of the parties' relations, current U.S. non-proliferation worries and Russian trade interests had also formed part of the discussions, witness the following U.S. statement:

"This agreement reflects the U.S. commitment to continued space cooperation with Russia and Kazakhstan because it is in our mutual interests. But our national security interests also require that we not go beyond the current quota for high-orbit launches until the problem of missile cooperation between Russian enterprises and the Iranian missile program is resolved.
If Russia halts all sensitive technology transfers to the Iranian missile program, this agreement will pave the way to even greater space launch cooperation in the future."[157a]

The U.S. thus continues to link trade (concessions) and national security interests.

### 3.3 Ukraine

During the Soviet years, Ukraine's space industry played a key role in the Soviet space programs, right from the latter's origins in the 1950s, with particular emphasis on the design and manufacture of launchers, satellites and spacecraft guidance and control systems. The disintegration of the Soviet Union in 1991 brought about one third of its space industry under Ukrainian control, including the NVO Pivdenne or, in Russian, NPO Yuzhnoye design and production association in Eastern Ukraine. The latter space facility was the Soviet Union's largest manufacturer of space launch vehicles and missiles. According to one author, during the Soviet period, the establishment designed and manufactured twelve of the twenty types of Soviet ICBMs, several types of conventional launchers, among which the *Tsyklon* and the *Zenit*, rocket engines and a large number of remote sensing, scientific and other satellites.[158] Though the demise of the Soviet Union has resulted in fewer orders and a shrunken workforce, the facility still designs and produces launchers and satellites.

The traditional high degree of interdependence between Ukrainian and Russian space industries can still be observed today in, for example, the manufacture of the Zenit launcher, the first stage of which has a Russian engine, made by NPO Energomash of Moscow. (And, as Ukraine has no launch base of its

157.a See U.S. State Dept Fact Sheet, *Satellite Technology Safeguards Agreement: Kazakhstan-Russia-United States*, Off. of the Spokesman, Moscow (Jan 25, 1999) <http://secretary.state.gov/www/travels/1999/>.

158. See Roman Krawec, *Ukranian space policy - contributing to national economic development*, 11 (2) Space Policy 105-114 (1995) hereinafter referred to as Roman Krawec, at 106.

own, launches take place from the Russian-run Baikonur Cosmodrome in Kazakhstan) There appears to be little inclination on the the part of Ukraine to pursue a - costly and time consuming - independent course. On the other hand, export of space products and expertise and cooperation with Western companies are high priorities in Ukraine's space policy,[159] and the *Zenit*, a two-stage liquid-fuelled launcher capable of placing a payload of about 13.7 tons into low earth orbit (LEO) is an important part of those plans.
Though efforts are being made, with so far modest success, to commercialize the Zenit in its present form, the launcher is best known for its three-stage version, the Zenit-3SL, which is part of the innovative Boeing-led *Sea Launch* project.

As briefly described in Chapter 1, Sea Launch will use a mobile floating launch platform, made from a converted offshore oil rig, that will operate in the east-central equatorial Pacific Ocean. The idea came from Boeing Commercial Space Company, part of the U.S. aircraft manufacturer, and Russian RSC Energia. Other partners are NPO-Yuzhnoye which produces the first two stages of the three-stage Zenit that will be launched from the platform, and Kvaerner Maritime of Norway, which modified the launch platform in Stavanger and built the assembly and command ship in Glasgow.[160] Energia manufactures the third, upper stage of the Zenit, which will, *inter alia*, enable Sea Launch to put communications satellites into geostationary orbit. But with a Long Beach, California, homeport and the Pacific Ocean as the - flexible - launch area (the command ship will tow the platform to any location needed for a specific launch), Sea Launch does not have the same limitations with respect to payload options which land-based launch facilities have. Apart from the reliability of the well-proven Zenit and its comparatively low cost, this flexibility is one of its best sales arguments. According to a Sea Launch representative, "[t]he fact we can launch in any orbit, polar or equatorial, off the same launch platform affords the company the ability to stay with a single launcher".[161]

Scepticism existed from the start, not so much about the technical feasibility of the project, but more about its political and financial viability. Both concerns could be largely put to rest in December 1995, when Hughes Space and Communications ordered 10 firm launches over five years and an unspecified number of options from Sea Launch for its communications satellites. The value of the base contract plus the options was reported to be around USD 1 billion; Hughes, as a wealthy "anchor tenant" thus gave Sea Launch the desired financial support and credibility.[162]

159. See *id.*, at 107, 108.
160. Boeing owns 40% of the shares, Kvaerner 20%; the venture is organized under the laws of the Cayman Islands, BWI.
161. See Christina Gair, *supra* note 132, at 50.
162. See 6 (48) Space News (Dec 1995) at 1, 20 ("Sea Launch lands Hughes contract - ten-

As for political support, on December 14, 1995 the U.S. and Ukraine initialled a *launch trade agreement* which allowed Ukraine entry into the international commercial launch market. The agreement, concluded in Vienna, gives Ukraine the right to launch five satellites to geostationary orbit through 2001, with an option for one additional launch if growth of the launch market over the next three to four years "beyond current expectations" justifies this addition.

This rather modest basic allowance for the "Ukrainian space launch services providers", was expanded considerably for another beneficiary of the agreement, the "integrated space launch services provider". The latter was described as a U.S.-Ukrainian joint venture meeting certain criteria with respect to ownership, control and services. More specifically, to qualify as such a joint venture:
- the U.S. partner must maintain control in fact;
- the U.S. must be the source of a significant share of the goods and services employed in any launch;
- a majority of the goods and services, including financing and insurance, must originate in market-economy countries;
- the joint venture must receive a launch license from the DOT.[163]

In a Protocol to the Agreement, the U.S. and Ukraine agreed that the Sea Launch venture met the above criteria!
This brought within the reach of Boeing and its partners *eleven* additional launches exclusively reserved for such qualified joint ventures, and, in case of a launch market development significantly exceeding current expectations, on top of that allowance an additional *three* launches. Sea Launch had thus received the U.S.' political approval for its venture and the go ahead for its launch activities for Hughes.

As the U.S. Administration's initial hesitations to conclude this agreement had been in the field of transfer of U.S. satellite technology to Ukraine and of

launch deal makes Boeing instant player in a crowded market").

163. See Fact sheet: *commercial space launch agreement with Ukraine*, Press release 95-91, Office of the USTR (Dec 14, 1995) <http://www.ustr.gov/releases/1995/12/95-91.html>, hereinafter referred to as USTR press release 95-91. As we saw in Chapter 2.2.2, the Commercial Space Launch Act of 1984 as amended authorizes the Secretary of Transportation to issue licenses authorizing commercial launches and the operation of commercial launch sites. The Secretary's authority is implemented through the FAA Associate Administrator for Commercial Space Transportation (AST, formerly OCST). By virtue of the Act and the Commercial Space Transportation Licensing Regulations, the FAA is authorized to license the launch of a launch vehicle when conducted in the US and launches operated by US citizens abroad. According to an April 1998 AST report, which gives a detailed description of the project and provides for an environmental assessment of the activities concerned, Sea Launch will initially apply for a launch-specific license, and later plans to apply for a launch operator license, see Sea Launch - environmental assessment (draft), [DOT, FAA, AST] (Apr 1998) <http://ast.faa.gov/reports/>.

Ukrainian missile (technology) sales to third countries, both matters were addressed (and linked to the agreement).[164]
First, though Ukraine had signed a joint memorandum with the U.S. in May 1994 committing itself to abide by the MTCR guidelines and had stated its intention to join MTCR, the latter had not materialized. As we saw above, it has been the consistent policy of the U.S. to refrain from giving any assistance or support to the development of foreign launch capabilities, particularly where non-MTCR members are concerned, and, on the other hand, to seek MTCR membership of all countries which possess missile/launch technology. Additionally, the U.S. was, also in the case of Ukraine, concerned about the fate of the latter's space and defense industries if not used and/or assisted by the U.S. By giving NPO Yuzhnoye an outlet for its products, the U.S. hoped to prevent the sale of these products and particularly its military technology to 'rogue' countries in the Middle East and other regions of proliferation concern.
At the same time, Ukraine was known to have a nuclear cooperation agreement with Iran, inherited from the Soviet Union, which included delivery of turbines for the Iranian nuclear program. The U.S. Administration, repeating the approach used vis-à-vis Russia, combined the above issues and interests and, in March 1998, after extensive discussions on these matters in relation to political, economic and trade issues, concluded an agreement on the peaceful use of nuclear energy (which compensated Ukraine financially and in kind for the loss of their Iranian contract) and a Satellite Technology Safeguards Agreement which, in the words of the Ukranian foreign minister "pave[d] the way for Ukraine's participation in international commercial space projects including such large ones as the 'Sea Launch' and the 'Global Star'. At the same occasion, U.S. Secretary of State Albright confirmed that the U.S. supported Ukraine's immediate admission to MTCR, stating that "Ukraine's responsible missile non-proliferation policies will allow us to expand cooperation between our space agencies".[165]

164. The fact sheet appeared to mix the two issues: under the heading 'technology controls and export licenses', it stated: "-The U.S. and Ukraine will negotiate a Technology Safeguard Agreement to facilitate the control on transfer of missile technology; -The U.S.and Ukraine recognize that a relationship exists between this agreement and Ukraine's fulfillment of its obligations regarding the transfer of missile equipment and technology ..." (a provision which mandated case-by-case reviews of US export licenses concluded the statement), see *ibid*. It was noted earlier that "[t]he main apparent stumbling block has been a US fear that assisting Ukraine in the development of launcher technology could lead to Ukraine selling missile technology abroad", see Roman Krawec, *supra* note 158, at 113. Note that the National Space Transportation Policy of Aug 1994 in its para. V ("Trade in commercial space launch services") contained the following principle/obligation: "(b) International space launch trade agreements in which the U.S. is a party must be in conformity with U.S. obligations under arms control agreements, U.S. nonproliferation policies, U.S. technology transfer policies, and U.S. policies regarding observance of the Guidelines and the Annex of the Missile Technology Control Regime (MTCR).

165. See Albright remarks at signing ceremony, Kiev, Ukraine (Mar 6, 1998) <http://secretary.

USTR, aware of severe criticism on the part of both McDonnell Douglas and the Florida space establishment, including its Congressional representatives, on this "sell out" of U.S. space launch interests (see Chapter 3.2.3 *supra*), emphasized in its press release the significant benefits of the agreement for the U.S. economy:

"A project such as the Boeing Sea Launch project alone could generate several hundred jobs and could contribute to the conversion of idled domestic military facilities to productive commercial use ... In addition, ... the agreement would further diversify the supply of launch services available to the $4 billion U.S. satellite industry, and would allow that industry to maintain its world leadership position".[166]

Although the Agreement also contained the usual provisions forbidding unfair pricing (with the well-known 15% threshold for GEO/GTO launches), distorting subsidies and government inducements to customers, in order to guarantee a "non-disruptive" entry of Ukraine into the launch market, there is little doubt that the U.S. government weighing the above national security and foreign policy (and satellite manufacturers') interests against the needs and concerns of McDonnell Douglas and the Cape Canaveral supporters, had clearly chosen for the former. And it may be assumed that the U.S. government was not ill-disposed to the establishment of an additional U.S.-led heavy-lift competitor for particularly Arianespace, in late-1995 still the market leader with a share of approximately 60 percent of all international commercial launches.
A more cynical view, not supported by statements of any of the parties concerned, could be that, even if MDD would not survive this additional competition, the Department of Defense's military-strategic need for "assured access to space" would still be met through its "own" Titan IV, the space shuttle and the Atlas sold by Lockheed Martin's ILS.
(And even the use of foreign launch vehicles through either Sea Launch or ILS, though against current U.S. policy, could still be considered on the basis of an exemption by the President in case of overriding national security needs).[167]
In December 1996, Boeing bought McDonnell Douglas, thus adding one of the most successful families of launchers, the Delta, to its "stable" and establishing itself as a mayor player in the domestic and international launch market.

state.gov/www/statements/1998/980306a.html>. The ceremony included an exchange of diplomatic notes calling for the conclusion of an agreement on the protection of Ukranian technology which will be used in space cooperation.

166. See USTR Press release 95-91, *supra* note 163.
167. The 1994 National Space Transportation Policy provides in its para. VI: "(1) For the foreseeable future, United States Government payloads will be launched on space launch vehicles manufactured in the United States, unless exempted by the President or his designated representative", see on this 'fly U.S.' policy, Chapter 3.4.4 *infra*.

Rockwell International Space Systems, the prime contractor and co-operator of the space shuttle, also had an agreement with NPO Yuzhnoye, to sell the *Tsyklon* launcher to Western customers for the launch of small to medium size satellites into LEO. At the end of 1996, Rockwell was bought by Boeing, an acquisition which gave the latter the possibility to - internationally - market the second Ukrainian launcher as well. Ukraine thus made a fast and - thanks to its alliance - smooth entry into the launch market.

## 3.4 Europe

### *3.4.1 ESRO, ELDO, ESA and the development of the 'Ariane' launch vehicle*

In December 1960, three years after both the Soviet Union and the United States had demonstrated their launch capabilities with the successful launches of Sputnik-1 and Explorer-1 respectively, a group of European scientists and officials from twelve European countries, met to discuss both the impact of this new technology on science as well as the threat of a 'brain drain' towards the United States as a result of the explosive - and attractive - development of science and technology in the latter country. Eleven states subsequently agreed to form a preparatory Commission with the task of setting up an organization for the promotion of space research through cooperation amongst European scientists. It took a number of difficult discussions, negotiations and meetings to arrive at the signing, on June 14, 1962, of the *Convention for the Establishment of a European Space Research Organization.* The Convention entered into force and the Organization, better known under the acronym *ESRO*, came officially off the ground on March 20, 1964 with the following member states: United Kingdom, France, the Netherlands, Switzerland, Germany, Belgium, Sweden, Denmark and Spain[168] With the ratification by Italy total membership came to - and remained - ten Western European states.

The stated purpose of ESRO was "to provide for, and to promote, collaboration among European States in space research and technology, exclusively for peaceful purposes".[169] To that end, the Organization was to carry out a programme of scientific research and related technological activities. Apart from support of research and development as required for its programme and coordination of national research efforts, this also included the task to, among others,

168. See A. Dattner, *Reflections on Europe in Space - the first two decades and beyond*, ESA publ. BR-10, Mar 1982, hereinafter referred to as ESA BR-10, at 5; also Nicolas M. Matte, *Aerospace Law*, Canada (1969), hereinafter referred to as Matte 1969, at 139. Text of ESRO Convention reprinted in Matte 1969, at 382-390.

169. Art. 2 of the Convention.

(a) design and construct sounding rocket payloads, satellites and space probes, carrying instruments provided by Member States or by the Organisation itself; (b) *procure launching vehicles and arrange for their launching;* ... (h) make contractual arrangements for the use of launching ranges for rockets and satellites and other facilities available in Member or other States".[170] (emph. add.)

Additionally, a separate provision on launchings stated:

"1. The programme of the Organisation shall provide for the launching of:
(a) sounding rockets;
(b) small satellites in near earth orbits and small space probes;
(c) large satellites and large space probes.
2. The number of launchings shall be decided by the Council with a view to providing reasonable opportunities for scientifically valuable experiments, devised by Member States or by the Organisation itself, to be carried out."[171]

It should be clear from the above that this scientific research organization was not meant to be involved in (the development of) launchers, except as a customer, for its satellites, and with the exception of its autonomous sounding rocket programme. Thus, where with for example ESRANGE in Northern Sweden ESRO had its own launching facilities for sounding rockets, it relied for the launch of its first scientific satellites on American Scout and Thor-Delta rockets launched by NASA under agreements concluded by the parties in 1964 and 1966 respectively.

The *ESRO-NASA Memorandum of Understanding* (MoU) of 1964 covered the launch of the ESRO I ("polar ionosphere") and II ("solar astronomy and cosmic ray") satellites under a cooperative arrangement between the parties, with each of them bearing the cost of its respective responsibilities and both of them exchanging all scientific information resulting from the program. In other words, under this arrangement, ESRO was not a launch customer but a partner in a cooperative program of space research, responsible for providing the experiment instrumentation, for delivering to the launch site two flight-qualified spacecraft for each mission and analyzing the scientific data, whereas NASA, on the other hand, provided the Scout launch vehicles and conducted the launch operations free of charge[172]

170. Art. 5 of the Convention.
171. Art. 7 of the Convention.
172. See *Memorandum of Understanding between the European Space Research Organization and the United States National Aeronautics and Space Administration* (Jul 8, 1964) in: NASA news release no 67-110 of May 10, 1967 (includes description of the ESRO II spacecraft and subsystems and of the experiments envisaged, and also of the four-stage Scout launch vehicle which at that time had successfully completed 22 of its last 23 flights). The first launch under this program, that of the ESRO-II A on May 29, 1967, was unsuccessful due to failure of the third stage of the Scout rocket, but the remaining three Scout launches did not fail: ESRO-II B, also known as Iris, was successfully put in orbit on May 17, 1968, as

On the other hand, the arrangement of 1966, also in the form of an M.o.U., was the first under which a foreign country or space organization would obtain launchings for its satellites from U.S. launch ranges on a reimbursable basis, in other words the first *sale* of U.S. launch services to a foreign customer. To implement the M.o.U. for each specific launch, separate contracts would be needed setting forth detailed arrangements covering the resposibilities of the agencies involved and - of course - the cost per individual launching.[173]
The first such contract was signed on March 8, 1967 and involved the purchase by ESRO of a Delta launch later that year for the HEOS-A1 "Highly Eccentric Orbit Satellite" at a cost of around US$ 4 million.[174]

In the same half-decennium in which ESRO reached operational status, another European organization was born and developed its first teething problems, to wit the *European Organisation for the Development and Construction of Space Vehicle Launchers*, also known as *ELDO*.
The history of this organization goes back to 1960, the year in which the British government, following a reappraisal of its strategic thinking, decided to terminate the development for military purposes of its 'Blue Streak' missile, and invited a number of European countries to consider the joint construction of heavy satellite launchers for peaceful space exploration, using 'Blue Streak' as a first stage. France, already at that time very much aware of the need for France and other European countries to have autonomous access to space, reacted with the offer of its 'Véronique' rocket, at that time close to completion and capable of launching light satellites, for the second stage of the proposed launcher. In early 1961, at a Conference in Strasbourg, a number of principles were agreed upon with respect to the organization's aims and purposes: thus, the first programme of the Organization would be the

the first European satellite in that lofty position, followed by ESRO-I A ("Aurorae") on Oct 3, 1968 and ESRO-I B ("Boreas") on Oct 1, 1969, see *Twenty years of cooperation in space '64-'84,* an ESA Report, Netherlands (1984), hereinafter referred to as ESA report 64-84, at 3-5.

173. See *Memorandum of Understanding between the European Space Research Organization and the National Aeronautics and Space Administration concerning the furnishing of satellite launching and associated services* (Dec 30, 1966) in: Yearbook of Air and Space Law 1967, Ed. in chief Rene H. Mankiewicz, McGill Institute of Air and Space Law, Canada (1970), at 346-348; NASA news release no 66-332 (Jan 4, 1967) ("ESRO plans purchase of launch services from Space Agency").

174. See NASA news release no 67-48 of Mar 8, 1967. On the politico-legal basis of the 1966 M.o.U. the following launches of ESRO satellites took place:
-December 5, 1968, successful launch of HEOS-1 by Delta rocket;
-January 21, 1972, successful launch of HEOS-A2 by Delta-rocket;
-March 12, 1972, successful launch of TD-1A by Delta rocket;
-November 22, 1972, successful launch of ESRO-4 by Scout rocket. In fact, in the absence of a European launcher, US Delta rockets would be used by ESRO and its successor ESA up to and including Jul 1978, and, because of the failure of the first operational flight of the all-European Ariane rocket in Sep 1982, a last Delta launch would be required in May 1983, to orbit the European Exosat satellite, see ESA report 64-84, supra note 112 *ibid.*

development of a three-stage launcher and an initial series of satellite test vehicles; the British and French governments would build the first and second stage respectively, and would offer the organization free of charge the know-how already acquired by them in this field; test firings of the rocket, dubbed "Europa 1", would take place at Woomera in Australia; the rocket would be used for peaceful purposes only;[175] all technical information, generated by the Organization's work would be freely available to all members; and close cooperation would be sought with the European Space Research Organization *in statu nascendi*.[176]
The ELDO Convention itself was signed one year later, in London on March 29, 1962 and entered into force on February 29, 1964.[177] The stated aim of ELDO was the development and construction of space vehicle launchers and their equipment suitable for practical, and explicitly only peaceful, applications and for supply to eventual users.[178]
The parties to the Convention, the United Kingdom, France, Germany, Italy, The Netherlands, Belgium and Australia committed themselves to participation in the so-called "initial programme", *i.e.*, according to art. 16 of the Convention, the "design, development and construction of a space vehicle launcher using as its first stage the [British] rocket "Blue Streak" and with a French rocket as its second stage".

The Organization, once officially established, was to continue the study of future possibilities and the need for launchers and ranges and to report on its studies to the ELDO Council after two years.

The preamble to the Convention conveyed both lofty principles and - in view of American and Soviet successes in the field - a sense of urgency with respect to the (coordination of the) activities as envisaged:

"The States parties to this Convention;

175. The notion of 'peaceful purposes', used in connection with outer space activities, had been introduced in United Nations parliance as early as November 14, 1957, when the General Assembly, inspired - and scared? - by the Sputnik launch one month earlier, adopted its Resolution 1148 (XII) on disarmament, which urged the States concerned to reach a disarmament agreement which, *inter alia*, would provide for the joint study of an inspection system "designed to ensure that the sending of objects through outer space shall be exclusively for peaceful and scientific purposes ...". The establishment of the U.N. Committee on the Peaceful Uses of Outer Space in 1959 and all resolutions and space-related treaties emanating from that body in the following years further confirmed and integrated the concept of 'peaceful uses of outer space' in international politico-legal thinking; see for an early discussion of (the interpretation of) 'peaceful purposes' Matte 1969, supra note 168, at 261-285; for the texts of the various U.N. resolutions adopted in the late fifties and early sixties on the subject, *see id.*, at 363-381.
176. See ESA report 64-84, *supra* note 172, at 114-115.
177. Text reprinted in Matte 1969, *supra* note 168, at 391-405.
178. Art. 2, ELDO Convention, *supra* note 177.

- conscious of the role which space activities are destined to play in the progress of science and technology;
- convinced that a common effort undertaken without delay holds the best promise of achievements in keeping with the creative capabilities of their countries;
- desiring to harmonise their policies in space matters with a view to common action for peaceful purposes;
- having decided to co-operate in the development of space vehicle launchers and to study their scientific and commercial application; (emph. add.) have agreed ..." etc.

Apart from a provision which granted the members the right to procure the launchers from the Organization for their own peaceful use at reasonable cost, the Convention, in its articles 10 and 11, paid some further attention to the commercial aspects of the venture:

"Member States which propose to exploit commercially, either alone or in conjunction with non-Member States, a space vehicle launcher jointly developed under a programme of the Organisation shall give to all Member States which have contributed to the cost of that programme an opportunity to participate in such exploitation on reasonable terms". (art. 10)

"The conditions for delivery to States which are not Members of the Organisation, or to international organisations, of launchers and equipment developed by the Organisation shall be decided by the Council in accordance with the provisions of Article 14 of this Convention" (art. 11)

Article 14 required a unanimous vote in the Council for a decision on the delivery of launchers and equipment to third parties, no doubt because of the military-strategic importance of these 'dual use' goods.

"Europa 1" was to be a truly international venture. Thus, where the Convention specified that for the execution of the 'initial programme' a British first stage and French second stage rocket would be used and the development firings of the first stage and of the complete launcher would be conducted at Woomera, Australia, a Protocol annexed to the Convention entrusted responsibility for the design, development and construction of the third stage of the launcher to Germany, the first series of satellite test vehicles, including the electronic equipment contained therein, to Italy, the down range ground guidance stations to Belgium, and the long-range telemetry links, including associated ground equipment to the Netherlands.[179]
The performance aims of the launch system to be developed, as proposed by the French and the British in 1961 and accepted for the Initial Programme, ranged from putting a large satellite of mass between 500 and 1000 kg into near-earth orbit, with the primary purpose of making astronomical observations

179. See ESA report 64-84, *supra* note 172, at 24.

above the earth's atmosphere, to launching a satellite of the order of 50kg mass, in a high eccentric orbit reaching out to about 170.000 km, to carry instruments for the study of the sun's atmosphere.[180] Although, as we saw earlier, close cooperation with ESRO was supposed to be one of its guiding principles, there is no indication that ELDO, for the purpose of meeting customer needs with the right launcher, at that early stage actually consulted - in any structural way - with the ESRO scientific community to ascertain what the latter's priorities were. (It is open for debate to what extent this lack of contact between the European launch provider-to-be and its potential European customer had its roots in the different backgrounds and frames of reference of the initiators, to wit military (ELDO) and scientific (ESRO)).

The Initial Programme aimed at launching a first satellite into orbit in 1968, but technical, organizational and financial difficulties caused delays right from the start, resulting in revisions of (parts of) the programme and of its execution schedule. Nevertheless, a number of successful firings of the 'Blue Streak' first stage took place in 1964 and 1965, followed by two equally successful launches of the complete three-stage launcher in 1966. In that same year, the first Conference of ELDO Ministers decided to redirect the programme towards the construction of a more powerful launcher, the "Europa II", capable of placing in geostationary orbit satellites of approximately 200 kg mass, which seemed better suited to future European requirements, particularly in telecommunications.[181]

It should be noted here that this shift from pure science programme oriented performance aims to ojectives related to application satellites was to a large extent influenced by the progress made in the United States in the field of communications satellites, and by Europe's involvement in the internationalization of the US system. Thus, when the United States, in 1962, proposed to create an international space telecommunications organization, Intelsat, their European counterparts felt the need to draw up a common European policy for the impending negotiations with the U.S. The ensuing European Conference on Satellite Communications (CETS), which held several meetings in 1963 and 1964 to coordinate the negotiating positions of the individual European countries, did indeed create a single European voice in the negotiations. These culminated, in August 1964, in the signing of the Washington Agreement, creating the Intelsat Consortium or Interim Intelsat which later, in 1971, became the definitive International Telecommunications Satellite Organization, after lengthy negotiations (in which CETS again tried, but with much less success, to play a coordinating and unifying role.[182]

180. *Id.*, at 115.
181. *Id.*, at 25.
182. See Michel Bourely, *l'Agence Spatiale Europeenne,* 1 Annals Air & Space L. 183-196 (1976), hereinafter referred to as Bourely, at 188.

After the conclusion of the Intelsat Interim Agreement, the European side realized that, given the technological monopoly of the United States and its understandably dominant position in the interim Intelsat Organization through its domestic company Comsat Corporation, the adoption of a European communications satellite *programme* would bring about European solidarity in this field and a stronger European position vis-à-vis its Intelsat partners. Thus, in 1966, CETS mandated ESRO to conduct a detailed technical study of the project and to collaborate with ELDO as far as the resulting launcher requirements were concerned. Various committees of CETS at the same time studied the institutional, technical and economic implications of the project.

As a consequence of the Europa II decision, the initial cost estimate (of Europa I) of US$ 210 million at 1962 rates, was raised to US$626 million.The Europa II mission - launching satellites into geostationary orbit - required a new launch base close to the Equator. For that purpose ELDO concluded an agreement with France to build such facilities in French Guyana.

The - only partially successful - test launchings in the following three years - 1967-1969 - brought ELDO further cost escalations and delays. The fact that each national government was responsible for its own contribution to the launcher and that the Secretariat of the Organization did not have clear overall managerial responsibility for the whole programme, undoubtedly contributed to the malaise.[183]

Still, in the face of growing European interest in an autonomous communications satellite programme, the ELDO Ministerial Conference decided in 1969 to undertake the definition phase of a new European launcher, capable of placing 750 kg into geostationary orbit, "Europa III". However the consecutive failures of the eighth test launch of Europa 1 in July 1969 and of the ninth one year later (the last launch from the Woomera base), and the failure of the first and only test launch of the Europa II rocket from the new launch base in Kourou, French Guyana, on November 5, 1971, gave further food to already existing doubts among a number of ELDO members about the wisdom of building launchers specifically for European use, particularly where

183. Much later, in 1988, ESA's Director of Space Transportation Systems put it this way: "The decision to build a three stage launcher using existing nationally developed rockets for the first two stages turned out, in retrospect, to be a flawed concept ... and from the demise of that concept, it was clear that the essential problem lay in the lack of an integrated approach to the development of a launcher rather than the lack of technical competence, within Europe", see Reaching for the skies, *supra* Ch. 2 note 142 at 1. In fact, already in 1966, the UK, under a sceptical labour government, made it clear that, for European launch needs, it favoured reliance on the U.S. 'Europe I', in the British view at the time, would be obsolescent and uncompetitive in cost and performance with launchers produced by the U.S. by the end of the decade, see ESA HSR-18, *supra* Ch. 2 note 7, at 12.

- in comparison - decently prized alternatives were apparently available across the Atlantic.
The United Kingdom in particular, in - as early as - 1968, appeared to have lost its interest in the progressive development of this venture beyond the first phase because of the level of (additional) expenditure required and the uncertainty of a reasonable economic return on its investment.[184]

With three European institutions, ESRO, ELDO and CETS, involved in - partially overlapping and financially competing - space activities, an understandable need for a form of coordination of both policies and programmes was felt and at first voiced at the 1966 Conference of ELDO Ministers.[185]

Two meetings of European ministers responsible for space matters, the *European Space Conference,* followed, and the latter one, attended by all members of the three institutions, in Rome, July 1967, passed two important resolutions concerning the future of the European space effort:

a) the European Space Conference (ESC) would become a permanent body and meet at least once a year at ministerial level to work out and ensure the implementation of a coordinated European space policy;[186]
b) a programme committee was established to draw up an inventory of European space programmes, resources and facilities and to draft proposals for the establishment of a coordinated European space policy.

However, in the four years that followed, it proved impossible for the ESC committees and ministers to agree on an overall European space programme;

184. See Matte 1969 *supra* note 168, at 146. The same author, observing that cooperation between the member states was not achieved without difficulty, also refers in this connection to the U.K.'s problems with the level of its - financial - participation in the Organization, *i.e.* 38.7 % at the outset, which was later reduced to 27%; as of June 10, 1966 the following shares - in percentages - were allotted to each of the participants: Germany 27, U.K. 27, France 25, Italy 12, Belgium and the Netherlands together 9, *ibid.*
185. An insider put this need for coordination substantially stronger, referring to "a total absence of institutionalized coordination between them" and asking the rhetorical questions "What's the use of making satellites without making sure that one has the means to launch them". What's the use of developing launchers without being concerned with finding payloads for them? And what's the use of trying to establish a European stand on world telecommunications as long as Europe hasnot demonstrated that she can make something herself in this field?" It was an illusion, according to the same author, to expect effective harmonization of the activities of the three institutions concerned with neither the same goals nor the same membership, unless the problem would be addressed on a political level, leading to a complete and coherent European space policy, see Bourely, *supra* note 182, at 189 (free translation from French).
186. See - for French text of the respective resolution - Tractatenblad van het Koninkrijk der Nederlanden (Netherlands Treaty Series), hereinafter referred to as NL Trb (1969), 51; participants in the ESC were: Australia, Belgium, Denmark, Germany, France, Italy, Netherlands, Norway, Spain, Vatican State, United Kingdom and Switzerland.

this was mainly due to disagreement on launchers, application satellites, and the extent to which Europe should accept an offer from the USA to participate in the so-called 'post-Apollo' programme.[187] The above coincided with the difficulties experienced *within* the three separate institutions on programmes, organizational matters and, particularly, financial issues, which all combined in making progress slow.

A particularly thorny question within ESRO turned out to be the wish of some member states to adapt the pure science orientation of the Organization to these countries' fresh interest in meteorological and communications satellites, both fields of space applications in which the USA had a clear headstart. The Convention's clear focus on science and science alone would in that case require a drastic revision of its provisions, particularly as, contrary to the existing framework, member states would then have the opportunity to participate only in such application programmes as they considered of interest to themselves.

On December 20, 1971, the ESRO Council adopted a resolution calling for an amendment of the Convention to reflect this reorientation (from Organization-wide, obligatory and purely scientific activities to the development of application satellites in the framework of 'special projects' or optional programmes), and in November 1972 the Council approved the revised Convention.

In the mean time, the European Space Conference, at its third meeting in 1968, concerned about the effect of the various CETS activities in the field of European communications satellites on the other European institutions, had decided to take this matter out of CETS' hands and refer it to ESRO and ELDO for concerted action. CETS consequently ceased all activity in 1970.[188]

The 1971 decisions of the ESRO Council on the Organization's reorientation removed one of the major stumbling blocks for ESC agreement on a European space programme and on 20 December 1972, the European Space Conference decided that a new organization should be formed by amalgamating ESRO and ELDO.

The need to integrate national space programmes into a *European* space programme and to strengthen European co-operation in space research and technology and their space applications and the high cost involved in any space activity of substance made the establishment of this single European space organization a logical step.

As for the European space programme, the following projects were selected:

187. See ESA report 64-84, *supra* note 172, at 28.
188. *Id.*, at 26-27.

- Spacelab, the European contribution to the U.S. post-Apollo programme
- a maritime navigation satellite project, later called Marots, and
- *a new European heavy-lift launcher project*, as proposed by the French government,[189] called *Ariane*,[190] to replace the Europa III project of ELDO.

These projects came on top of the programmes which ESRO in its new set-up had committed itself to, with a strong - though not exclusive - emphasis on application satellites, namely Aerosat (aeronautical navigation), Meteosat (meteorological services) and OTS (telecommunications). 'On top of', because, for many years to come the new European Space Agency (ESA) would *de iure* not come into existence, which left 'revised' ESRO, on which the ESA constitution was modelled, as the formal entity charged with executing all European space programmes decided upon by the European Space Conference.

Both from the political and the industrial/economic point of view the Ariane decision was a sensible one: if Europe was to ensure its independence from those nations that had a launch capability and take its share of the international applications satellite and launch services market, it needed to possess its own competitive launcher. As we saw above, in Chapter 2.1.1.2, the U.S attitude vis-à-vis Europe, and more in particular the conditions it continued to attach to the provision of American launch services (as the French and Germans experienced with their Symphonie project and the application of the U.S. launch assurance policy of 1972), had made it abundantly clear that, for 'assured access to space', Europe had to 'go-it-alone'.

The December 1972 decision of the ESC to approve the carrying out and management, within the - temporary - framework of ESRO, of the Ariane development project meant not only the end of the Europa III programme, but also of Europa II, which now - in isolation - didnot make much sense anymore; without these two programmes, ELDO thus lost it 'raison d'etre' and, for all practical purposes, ceased functioning, though the Organization formally continued to exist until the entry into force of the ESA Convention in 1980.

189. At the ESC meeting, the French minister responsible for space affairs had declared his Government's interest in a European launcher programme, proposing that France should provide the main part of the funding for, and assume the risks inherent in, the development of a launcher of the same capacity as the Europa III. France also suggested that the other partners in the ESC should fund at least 40% of the launcher development, see ESA BR-10, *supra* note 168, at 27.

190. Ariane derives its name form Ariadne, Ariane in French, who, in Greek mythology, was the daughter of King Minos of Crete. She feel in love with Theseus and provided him with the thread which he used to find his way out of the Minoan labyrinth after slaying the monstrous Minotaur. "The modern Ariane takes satellites beyond the clutches of Earth's gravity, and Europe out of the labyrinth of dependency on others for launches", as ESA's Director of Space Transportation Systems put it poetically in 1988. See Reaching for the skies, *supra* note 142, at 1.

A further ESC meeting in July 1973 cleared the way for the conclusion, on September 21, 1973, of the "*Arrangement between certain European Governments and the European Space Research Organisation concerning the execution of the Ariane Launcher Programme*".[191]

The Ariane 1973 Arrangement distinguished two phases in the execution of the programme, a *development* phase and a *production* phase, the latter to be decided upon at a later date.
The first phase, according to article 1 of the Arrangement, involved the development, including qualification, of launcher Ariane, "intended to place payloads of the order of 1500 kg in a transfer orbit and, with the assistance of a suitable apogee motor, to place satellites of the order of 750 kg in geostationary orbit".
The development phase was to be executed within the framework of ESA, but pending the official establishment of that Agency this phase would be undertaken within the framework of ESRO, and ESRO rules and procedures would apply to all activities concerned.
Through the medium of ESRO, the participants entrusted the French Space Agency, the Centre National d'Etudes Spatiales (*CNES*)[192] with the execution of the development phase, and ESRO with the control of this execution.

191. Hereinafter referred to as the (Ariane 1973) Arrangement, NL Trb (1974) Nr. 192. The Arrangement was, by virtue of its art. 16, open for signature by the Member States of the European Space Conference from Oct 15, 1973 to Nov 30, 1973. At the end of November the following governments had signed the Arrangement: Germany, Belgium, Denmark, France, Italy, Netherlands, Sweden, Switzerland and the Director-General of ESRO. By virtue of art. 16, the Arrangement entered into force on December 28, 1973 for Germany, France and ESRO, the former two participants representing more than 75% of the total weight of the votes based on the amount of - financial - participation in the programme (France 62.5, Germany 20.12%); Spain (participation 2%) acceded to the Arrangement om May 28, 1974, and ratifications by the following signatories formalized their participation: Sweden (1.10%) Jun 4, 1974, Switzerland (1.20%) Apr 29, 1975, Italy (1.74%) Oct 27, 1975, Netherlands (2.00%) Feb 6, 1979, followed by Belgium (5.00%) and Denmark (0.50%), see NL Trb (1974), Nr. 192, NL Trb (1979) Nr. 23 and NL Trb (1980) Nr. 4.
The exact date of the above ESC meeting, July 31, 1973 is considered - by ESA - the birthdate of Ariane, see (9) Reaching for the skies (1993), ESA's qua[r]terly publication on space transportation systems, hereinafter referred to as ESA transportation quarterly, editorial by the Director of space transportation systems, at 1: "On 30 July [1993], the 'Ariane Family' celebrated the 20th anniversary of the decision to embark on the Ariane programmes. This decision was made on 31 July 1973 in Brussels after a major struggle between the European ministers responsible for space".
192. A public scientific and technical establishment, CNES started its activities in 1962, and has since been responsible for implementing French space policy. CNES operates the Toulouse Space Centre (its main technical centre) and the Guyana Space Centre in Kourou. CNES has management responsibility for the major French space programmes in the industrial sector, acting as prime contractor for research and development projects and directing the operational systems, see *Ariane, the European launcher*, brochure Arianespace, 5th edition (1990).

The Arrangement created a Programme Board, composed of representatives of the participants, with overall responsibility for the programme.
The tasks of the Programme Board were to:
a) control the implementation of the programme,
b) monitor overall performance of the launcher,
c) be kept informed of the distribution of the work among participants, and act as an appeal body for unhappy participants in this connection,
d) approve the CNES launcher flight qualification report,
e) lay down terms/conditions for participation by non-member states, and
f) ensure that the Organisation establishes efficient coordination with the potential users of the launcher and defines the launcher and the payloads interface specifications.

As for the *production phase* of the programme, it was also the task of the Programme Board to establish the elements necessary for the decision by the participants to eventually proceed to that phase. The participants in *that* phase would have to conclude a new arrangement concerning content, financial aspects and work distribution.[193]

The nine participants, willing to contribute their (financial) resources to - at least the first phase of - the execution of the Ariane launcher programme, i.e. France (by far the main contributor), Germany, Belgium, Spain, Netherlands, Italy, Swizerland, Sweden, and Denmark, committed themselves to two main objectives:

1. "...to give Europe a capability on its own at the beginning of the 1980's for placing in orbit geostationary satellites [of the order of 750kg], developed within the framework of [ESRO] or of the European States".

With the Ariane launcher, the participants aimed at a potential market of 35 to 50 satellites that European studies at that time foresaw for the decade - to - come, consisting of purely European satellites, European satellites forming part of a world-wide system (the Intelsat Organization had ambitious goals for the attainment of which an extensive series of satellite launchings were a prerequisite!), and satellites for third-party requirements.

2. "... to define the launcher and organise its production in such a way as to achieve an economically competitive production cost".

These cost were estimated on the basis of (an assumption of) two launches per year and "reasonable grouping of orders"; to this cost had to be added the cost

193. See artt. 4 (Programme Board) and 5 (production phase) of the Arrangement. The new Arrangement took the form of a Declaration and was concluded in 1980, see *infra* (text to) note 199.

of transport to the Guyana launch base of propellants and of the launch team, whereas the portion of the maintenance costs of the Guyana Space Centre chargeable to the launch cost of a launcher would be the subject of a separate arrangement.[194]

The use of the Guyana Space Centre came under article 12 paragraph 2 of the Arrangement which provided:

"Participants that own facilities that could be used for the purposes of the Ariane programme undertake to make them available for the said programme, on financial conditions limited to marginal cost reimbursement".

To that effect France and ESA signed an agreement on May 5, 1976, which detailed the rules for the utilization of the said space centre and its launch pad.[195]

The planners saw a half year definition stage, beginning on July 1, 1973, followed by seven years for the actual development of the launcher, culminating in two development firings and two qualification firings.
Thus, in the period 1979 to 1981 four test flights were carried out, the last one in December 1981 successfully orbiting a maritime satellite; whereupon the Ariane Programme Board declared the launcher, Ariane 1, to be operational.[196] It was calculated that Arianespace would, provided it would have sufficient capital and maintain a reasonable pricing policy, make a profit if an average of 4 launches per year over a 7 year period ($\pm$ 30 launches from 1983-1990) could be attained.

Even before the first test flight had taken place, the Agency,[197] in April 1978, had decided to manufacture and launch a first series of operational launchers, known as the 'Promotion Series', this in order to avoid a hiatus between the end of the development phase and the operational launches.[198]

194. See Annex A to the Arrangement, *supra* note 191.
195. See ESA Council doc ESA/C (76) 39; this agreement, also known as the CSG Agreement,which also included provisions on the role CNES would play with respect to the management of the space centre, was to last until end 1980. Since then several protocols signed roughly every 2 years have extended the agreement to cover further periods.
196. The following test launches took place:
Dec 24, 1979, launch of the L 01 with the CAT Ariane technological capsule; May 23, 1980, launch (failure) of the L 02 with CAT, Oscar 9 and German Firewheel satellite; Jun 19, 1981, launch of the L 03 with CAT, Meteosat 2 and Indian Apple satellite; Dec 20, 1981, launch of L 04 with CAT and Marecs A satellite, see ESA report 64-84, *supra* note 172.
197. As from May 31, 1975, ESRO had adopted the new name of European Space Agency.
198. See ESA report 64-84, *supra* note 172, at 121. The manufacture of a 'complete' Ariane was a 3 year process, so to have launchers produced in time for the market in the early 1980's, a decision at the end of the 1970's was necessary. In fact, the talks started already in 1976,

Moreover, since it was felt that ESA's (development-)role did not make the Organization a suitable candidate for the actual manufacture, marketing and launch of the Arianes, the ESA Council also decided to entrust these activities, for operational launches *after* the Promotion Series, to a private company set up specifically for that purpose: *Arianespace.*

To implement the above decisions and clarify the envisaged relations between the Parties in the Ariane 1973 Arrangement (and other interested Governments), ESA and Arianespace in this 'production phase', the national Governments concerned, "the Participants", signed a *Declaration relating to the Ariane Launcher Production Phase in 1980*, detailing the commitments of the Participants vis-à-vis Arianespace, the mission they entrusted to ESA, and the obligations they expected Arianespace to accept in connection with its challenging role as a private company selling launch services on their behalf.[199]

The Convention for the establishment of the European Space Agency had in the mean time been opened for signature on May 30, 1975, and signed on that same date by Belgium, Germany, Denmark, France, Italy, Netherlands, Spain, United Kingdom, Sweden and Switzerland.
The Convention entered into force with the tenth ratification by France on October 30, 1980,[200] thereby *formally* establishing ESA, but this did not prevent the members of ESRO and ELDO during those five years to use ESA as the *de facto* single space organization of Europe and adhere, to the greatest extent practically possible, to the provisions of the ESA Convention. In fact, immediately after the above 1975 Conference, the ESRO Council decided to change the name of ESRO and to execute, as from May 31, 1975, its activities under the name 'European Space Agency'[201] and the Acting Director General

but proved very difficult for 2,5 years, mainly because several member states were not prepared to pre-pay for the production of the launch vehicles when there was no certainty that, some years later, there would be any outside customers.

199. The *Declaration by Certain European Governments relating to the Ariane launcher production phase*, hereinafter referred to as the Ariane Production Declaration of 1980, ESA Council doc. ESA/C (80) 8, was opened for signature on Jan 14, 1980; it was subsequently subscribed to by the following nine States: France Mar 19, 1980, Belgium Apr 9, 1980, Sweden Apr 10, 1980, Germany Apr 14, 1980, United Kingdom Apr 14, 1980, Italy May 9, 1980, Spain May 31, 1980, Denmark Mar 3, 1981, Netherlands Nov 17, 1982; by virtue of its art. 4.3 (a) it entered into force on Oct 30, 1980, the date on which the ESA Convention entered into force. See - also for French/Dutch text, incl Annexes on initial Ariane launch prices as per art. 1.5 (b) and on fees to be paid by Arianespace per launch for the use of the CSG as per art. 3.5 of the Declaration - NL Trb (1982), Nr. 1; see also for French/English text without Annexes, 6 Annals Air & Space L. 723-737 (1981).

200. The ratification process was slow as the following dates show: Sweden Apr 1976, Switzerland Nov 19, 1976, Germany Jul 26, 1977, Denmark Sep 15, 1977, Italy Feb 20, 1978, United Kingdom Mar 28, 1978, Belgium Oct 3, 1978, Netherlands Feb 6, 1979, Spain Feb 7, 1979, France Oct 30, 1980, see NL Trb (1980) Nr. 198.

201. For - French - text of this Council Decision of Apr 16, 1975, see NL Trb (1976) Nr. 33.

of ESRO was designated as the first Director General of ESA. Again, the ESRO Convention remained the legal basis for the *de facto* functioning of the new Agency until October 30, 1980.

On that date, by virtue of articles 19 and 21 of the ESA Convention, the Agency took over all rights and obligations of both ESRO and ELDO, which latter Organizations at the same time ceased to exist through the termination of the respective Conventions.

The 10 founding members of ESA were joined by Ireland and finally, in 1987, also by Austria and Norway. Finland, after many years of associate membership, became the Agency's 14 th member on March 22, 1994.

As for the purpose of ESA, we may quote article 2 of the Convention in full:

"The purpose of the Agency shall be to provide for and to promote, for exclusively peaceful purposes, co-operation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems:

(a) by elaborating and implementing a long-term European space policy, by recommending space objectives to the Member States, and by concerting the policies of the Member States with respect to other national and international organizations and institutions;

(b) by elaborating and implementing activities and programmes in the space field;

(c) by coordinating the European space programme and national programmes, and by integrating the latter progressively and as completely as possible into the European space programme, in particular as regards the development of applications satellites;

(d) by elaborating and implementing the industrial policy appropriate to its programme and by recommending a coherent industrial policy to the Member States".

### *3.4.2 ESA's European launcher policy*

By virtue of the above provision, ESA is responsible for research and development activities associated with space systems, including the development of launchers.
With respect to the latter, article VIII of the Convention defines the obligations of the Agency, within the framework of its programmes, and of the States participating in those programmes, with respect to the use of the European launchers or space transportation systems:

"1. When defining its missions, the Agency shall take into account the launchers or other space transport systems developed within the framework of its programmes, or by a

Member State, or with a significant Agency contribution, and *shall grant preference* to their utilisation for appropriate payloads if this does not present an unreasonable disadvantage compared with other launchers or space transport means available at the envisaged time, in respect of cost, reliability and mission suitability.

2. If activities or programmes under Article V include the use of launchers or other space transport systems, the participating State shall, when the programme in question is submitted for approval or acceptance, inform the Council of the launcher of space transport system envisaged. If during the execution of a programme the participating States wish to a launcher or space transport system other than the one originally adopted, the Council shall make a decision on this change in accordance with the same rules as those applied in respect of the initial approval or acceptance of the programme". (emph. add.)

This 'Ariane preference provision' continues, up to the present day, to be the backbone of European 'internal' launcher policy, aimed at safeguarding the means of Europe's autonomous access to space. Further, the States participating in Ariane, in an effort to ensure that Europeans buy - and influence others to use - European launchers, made the following commitment in the Ariane Production Declaration of 1980 on *preferential use*:

"[1.4.] (a) The participants declare that the Ariane launcher will be used for the Agency's activities in conformity with the provisions of article VIII.1 of the ESA Convention.

(b) The participants agree to take the Ariane launcher into account when defining and executing their national programmes and to grant preference to its utilisation except where such use compared to the use of other launchers or space transport facilities available at the envisaged time is unreasonably disadvantageous with regard to cost, reliability or mission compatibility.

(c) The participants will endeavour to support the use of the Ariane launcher within the framework of the international programmes in which they participate and shall consult together to that end".

On the assumption that the Participants' unilateral declaration under (a) above, though not directly committing *ESA* to act in conformity with article VIII.1 of the Convention as quoted, does oblige the *Participants* in their capacity of ESA members to make the Agency act accordingly, and given the relative inescapability of the use of Ariane launchers for national space programmes, taken together with the participants' commitment under suparagraph (c) with respect to other - potential - international Ariane users (such as Intelsat, Inmarsat, (Interim) Eutelsat and - later - Eumetsat), this provision opened in principle a world-wide client base to the - preferred - product of Arianespace.

In principle, because this 'buy European' clause does not *guarantee* that, where Europeans are involved, only Arianes will be used for 'their' national and international (including ESA) launches.

First, some Participants made reservations (re-)introducing an element of competition or at least taking away the suggestion of automatism in the granting - by or through Europeans - of launch contracts to Arianespace. The Unted Kingdom, for example, declared upon signature of the Declaration

"... that in the view of the United Kingdom in relation to paragraph 1.4 (a) of the Declaration there should be no commitment by the European Space Agency with regard to its programmes and activities to use Ariane where its price is more than 125% of the cheapest alternative launcher, and that before a launcher is chosen there will be a thorough assessment of the advantages and disadvantages of using Ariane compared with other launcher systems".[202]

It is believed that this latter approach, for a number of - early - years, was the tacitly agreed one within ESA.

And as for their commitments with respect to national programmes, both Germany and Spain made clear that these could only apply to *governmental* programmes, leaving in principle private national entities free to contract with Ariane's competitors. Germany said:

"... the Government ... confirms that with regard to the procurement of Ariane launchers by German users the preference for Ariane launchers will be exercised in the spirit that the [German] Government will do its best, subject to its legal possibilities".

And Spain declared:

"... The undertaking assumed in accordance with paragraph 1-4-b will be applicable only to those programmes under the responsibility of the Spanish Government".[203]

The above German reservation, and particularly the notion of the government's 'legal possibilities', was put to the test in 1991, when Germany's state-owned telecommunications agency *Telekom,* after a bidding contest which pitted Arianespace against McDonnell Douglas, finally choose the latter company for the launch of its DFS 3 Kopernikus communications satellite. Telekom, with - one must assume - the support of the German government, maintained that, though having a semi-governmental status, it could take the above decision as a privately run company and without government interference; the Delta launcher was chosen on the basis of its - apparently substantially - lower price. Arianespace's view was that Telekom's links to the Deutsche Bundespost, the official government communications entity, made the contract a governmental matter outside the scope of the private commercial satellite (launch) market, creating the expectation that the Ariane rocket would be chosen, particularly

202. See NL Trb (1982) Nr. 1, at 10.
203. *Id.*, at 10-11.

as two earlier DFS launches, in 1989 and 1990, had been Ariane launches. A Telekom spokesman at the time conceded that, as a general principle, with all things equal they would have chosen Ariane.[204]
The United Kingdom reportedly maintained the - even stricter - position that neither the provisions of the Convention nor the Ariane Production Declaration of 1980, could oblige its Ministry of Defense to chose Ariane for its own missions. Consequently, for the various launches of its Skynet military communications satellites, that Ministry felt free to choose between Ariane or its U.S. competitors on the basis of normal market criteria such as price, time and quality; both Ariane and U.S. launchers have been selected as a result. (For example, in 1990, a U.S. commercial Titan was used for the launch of a Skynet satellite). The fact that Skynet itself was part of the much larger U.S.-U.K military (technology) cooperation may have played a role in taking this approach.[205]

*Secondly*, the Participants' efforts to have other international space applications organizations in which they participate adopt the Ariane launchers for those organizations' launch requirements could be outvoted by other members and/or 'neutralized' by the procurement provisions or policies of the organizations concerned. Thus, in global organizations, such as Intelsat and Inmarsat, in which the U.S. have a sizeable interest and concomitant voting power, the commercial and political interests of that country may often prevail: in Congressional testimony in 1993, an official of Comsat Corporation, the U.S. representative in both organizations, stated: "... historically, Comsat has worked hard to deliver launch and satellite contracts to U.S. manufacturers ... For example, 71% of all Intelsat and Inmarsat contracts have gone to U.S. companies, along with 58% of the launches ...".[206]

These and the other space organizations have laws and by-laws which contain competition-oriented procurement provisions.

The Eutelsat Convention of 1982, for instance, provides in this respect:

"... the procurement policy of EUTELSAT shall be such as to encourage, in its interests and those of the Parties and Signatories, the widest possible competition in the supply of goods and services ...;

204. See 2 (34) Space News (Oct 1991) at 1, 20 and 2 (36) Space News (Oct 1991) at 4, 21; also 3 (21) Space News (Jun 1992) at 8.
205. And on Aug 27, 1989, the first U.S. commercially licensed orbital launch took place when a McDonnell Douglas Delta launched the British Marcopolo 1 broadcasting satellite, see *Commercial Space Launch Services: the U.S. competitive position*, Report prepared by the Congressional Research Service, Library of Congress to the Committee on Science, Space, and Technology, U.S. House of Representatives, 102nd Cong., 1st Sess. (Nov 1991), at XIII.
206. See Comsat statement, *supra* note 154, at 125.

... procurement of goods and services for EUTELSAT shall be effected by the awards of contracts, based on responses to open international invitations to tender ...;
Contracts shall be awarded in the best interest of EUTELSAT, to bidders offering the best combination of quality, price, delivery time and other important criteria of relevance to EUTELSAT, it being understood that, if there are bids offering a comparable combination of the above-mentioned criteria, contracts shall be awarded with due consideration to the general and industrial interests of the Parties".[207]

Obviously, in the light of the above provisions, Arianespace will have to offer competitive launch contracts to be considered for the job, the more so as the national representatives in the above organizations will receive their - among others *budgetary* - instructions and guidelines from ministries and departments which are not (necessarily) involved in ESA/Arianespace matters.

One may nevertheless assume, on the other hand, that neither Arianespace nor the French government will fail to prevail upon the European organizations involved and their European members to first and foremost chose European when it comes to selecting a launcher, this moral obligation only to be set aside if circumstances leave no other choice whatsoever. Seen in that light, any action considered by Eutelsat or Eumetsat which may be interpreted as a claim for 'free launcher choice' will be viewed (and acted upon) with grave concern on the part of Arianespace and its backers. But, again, circumstances may leave the parties little choice.
Thus, when Eutelsat, in early 1994, had to chose a launch vehicle for the launch in mid-1996 of its - yet to be built - "Hot Bird Plus" direct broadcast television satellite, it professed a strong Ariane preference, but was faced with a full 1996 Arianespace launch manifest; and although Arianespace did its utmost to accomodate Eutelsat, among others by increasing the monthly launch frequency, it was not able to offer Eutelsat a launch on the requested date, and the contract consequently went to General Dynamics; the cited reasons for this choice of the competing Atlas 2A rocket included "the schedule pressures of the Ariane manifest which cause delays and the highly competitive launch service contract offered by General Dynamics".[208]

207. See art. XIV, paras a, b and c, *Convention establishing the European Telecommunications Satellite Organization "EUTELSAT"*, NL Trb (1983) Nr. 96; art XII b ii of the same Convention gives the 'Board of Signatories' the task to adopt procurement procedures, regulations and contract terms and conditions, as well as to approve procurement contracts, whereas art.17 of the so-called 'Operating Agreement' further specifies the rights and obligations of the above Board, including *e.g.* an exception to the rule of open international tendering if "procurement is required urgently in an emergency affecting the operational viability of any activities of EUTELSAT".

208. See 5 (14) Space News (1994) at 3: "Eutelsat people are gnashing their teeth over the fact that if they cannot get an Ariane slot, they will have to use either Atlas, which is of course American, or Proton - for which they would have to sign with an American company, said a European Government official. "It bothers them that they should have to go to California [to LKE International] to buy a Russian rocket", see above Space News. See on Eutelsat's

Reportedly, Eumetsat showed unease over this 'buy European' pressure and, maintaining that it was in its own interest and that of its members to have free competition amongst launch service providers, visited China to talk about possible Long March launches of its meteorological satellites. In the beginning of 1994, they nevertheless committed themselves to have Meteosat 2 preferably launched with an Ariane.

And also ESA itself will not always choose an Ariane for its missions. Thus, in 1993, the Agency selected a Russian Proton for the launch of its Integral (astronomical) science satellite in 2002, as the budget for this science mission did not allow for an Ariane launch: where the Russians offered to launch Integral free of charge in return for Russian astronomers joining the Integral Science team and thus access to the mission's results, the decision was not difficult (although it reportedly drew sharp criticism from the French government).[209]

*"Exclusively peaceful purposes"*

As we saw earlier, by virtue of article 2 of the ESA Convention the Agency is required to limit itself in the pursuit of all its activities to "exclusively peaceful purposes".

The Ariane Production Declaration of 1980, in its article 1.2, specifies, under the heading "commitments of the Participants", the objective of the production phase, *i.e.*

"to meet the launch requirements of the world market subject only to: (a) the proviso that it is carried out for peaceful purposes in conformity with the obligations under the Convention and with the articles of the [Space Treaty of 1967] (b) ..."

choice also 5 (16) Space News (1994) at 2, and AW/ST (May 2, 1994) at 22.

209. See 5 (18) Space News (May 94) at 20, also for ESA science mission proposal involving use of a Taurus launcher in 2004. The agreement for the Integral launch was finally signed by the Russian Space Agency on Nov 18, 1997, see ESA bulletin No. 92 (Feb 1998). The Exosat launch with a Delta in 1983 could be listed as an other example, although ESA, at the time, had little choice as, due to an Ariane launch failure, a European launcher was simply not available on the planned launch date.
Further, the Cluster 2 mission, consisting of 4 satellites, will be launched in pairs by 2 Russian Soyuz launchers procured through the European-Russian STARSEM consortium. And an ESA-NASA agreement of March 7, 1997 provides for the launch of the Columbus Orbital Facility on the US space shuttle in exchange for ESA hardware and services for NASDA, for the international space station. Finally, by virtue of an ESA-NASA M.o.U. of April 18, 1997, NASDA will launch ESA's Artemis telecommunications satellite, which ESA pays for by providing NASDA with data relay capacity through Artemis, see ESA bulletin No. 90, (May 1997).

A Committee was set up to determine whether, in the case of sales to a non-member State or to a customer that does not come under the authority of an ESA Member State, any such projected sale would constitute use that runs counter to the above provision. A meeting of this Committee on a specific case could result in a prohibition of the sale which would be binding on Arianespace, with France, as the country which under the Space Treaty is responsible for assuring that national activities are carried out in conformity with the provisions of that treaty, being required to undertake the necessary steps to ensure the proper implementation of the prohibition decision taken by the Committee. (see art 1. 6 (a) of the Declaration).

Arianespace, the private company, was also requested to abide by this "peaceful purposes" objective, a commitment which was laid down in a separate Arianespace-ESA Convention of May 15, 1981:

"Arianespace undertakes to conduct this production phase for peaceful purposes in conformity with the obligations of the [ESA Convention] and in conformity with the articles of the [Space Treaty]".[210]

The renewed Declaration of 1990 contains identical provisions, and so does the new ESA/Arianespace Convention of September 24, 1992.

The application of the above provisions could limit Arianespace's acquisition efforts amongst non-ESA member customers to the extent the interpretation of "peaceful" dictates. If, for instance, peaceful would be interpreted as non-military, contracts for the launch by Arianespace of military communications, navigation and remote sensing (spy) satellites would not be allowed. In practice no such problems have arisen and the Committee never convened, because ESA follows the U.S. in interpreting peaceful as "*non-aggressive*", which allows for the launch of NATO and UK Skynet military communications satellites and *e.g.* the French Helios military observation satellite.

The ESA Council, in the course of the years, when discussing or deciding on (the future of) the "European space transportation capability", paid increasing attention to Arianespace's competitive position and - consequently - to both the 'preferential use' provisions on the one hand and the relations with its competitors on the other hand.

An example is the ESA Council of Ministers meeting at The Hague in November 1987, which adopted a resolution on the "European Long-Term Space Plan and Programmes".[211] The prime object of the plan, covering the

210. See art. 3. 1 of the Declaration and art 2 of the Arianespace-ESA Convention, doc ESA/C (81) 11 of 4 Feb 1981.

211. Another part of the resolution dealt with European participation in the U.S. Space Station

period 1987-2000, was for Europe to be able to send human beings into space. This so-called "manned space-capability" was to be built, according to the resolution, on an upgraded version of the Ariane rocket, on the Hermes reusable space vehicle and on participation in the U.S. Space Station.

As for Europe's competitive position in the launch field, the Council reaffirmed, among others, the objective agreed at its previous (Rome 1985) meeting

"to strengthen the European space transportation capability, meeting foreseeable future user requirements both inside and outside Europe *and remaining competitive with space transportation systems that exist or are planned elsewhere; ...*" (emph. add.)

The Council at the same time expressed its agreement in principle with the undertaking of the Ariane 5 development programme and approved the execution within the Agency of this programme, starting on 1 January 1988.

(The renewed Declaration of 1990, which entered into force May 1992, contains only one amendment to the 'preferential use' provision, *i.e.* the phrase "[t]he participant *will* endeavour to support the use of the Ariane launcher ..." was amended to read" ... *shall* endeavour", which is a correction in wording but not in meaning; the French and Dutch equivalents did not change, "s'efforcent" and "streven ernaar" respectively. In fact the draftsmen did not dare touch this provision because of its sensitivity: the French may have wanted to make the text stronger and more effective, but knew that others, *e.g.* the U.K. and Germany, would strongly resist such efforts.

The ESA Council meeting at Ministerial level in Munich in 1991, whilst - again - reaffirming the above 'space transportation capability' objective, and noting the success of the Ariane-4 operational launches and the progress made on Ariane-5 development, also paid attention to

"the need for a European launcher system, for continuing support to the corresponding production programmes and for *preferential use of this system by European user programmes, ...*" (emph. add.)

Concern over the launch-procurement policies of Eutelsat and Eumetsat, which, as we saw, do not automatically favour Ariane when it comes to choosing launchers for their satellites, but particularly *deep worries over the impending entry of Russia into the international launch market* made the ESA Council in July 1992 establish a "Working Group on Launch Services", which was to

Programme: Council Resolution 10 November 1987, reprinted in *European Space - on course for the 21st century*, ESA publ BR-39, France (1987), hereinafter referred to as ESA BR-39, at 9-13; also in (1) Space Policy 86-89 (1988).

recommend measures to deal with this threat and strengthen Arianespace's position in Europe.
When the Inmarsat Board, in early 1992, discussed the procurement of launchers for its satellites, the U.S. representative proposed to award a number of the launch contracts to Russia. Background for this proposal was - apart from the attractive price of the Russian Proton - the U.S. concern over a 'brain drain' of space technology in general and launch technology in particular from 'cash hungry' Russia to countries whose (thus) increased command of the technologies concerned would pose a security threat to the U.S. and its allies. The European representatives, unpleasantly surprised by this proposal - particularly as the remainder of the launches were to be performed by U.S. launch companies(!) - were able, with the assistance of a number of non-European 'votes', to get a compromise adopted which gave one launch to the Russians, one to a U.S. company and one to Arianespace. This, however, did not in any significant way allay the fears of the ESA countries for the impact Russian entry into the launch market would have on the position of Arianespace.

(It should be noted in this connection that with the advent of the Russians a second 'non-market economy' had entered the launch market: already in 1989 the Chinese had received U.S. blessing to launch a limited number of western communications satellites, and this to the dismay of the Europeans. Additionally already for some time Europe and the U.S. had been engaged in discussions on the establishment of so-called 'rules of the road' which, as far as ESA was concerned should (but didnot!) result in the opening up of the U.S. Government market sofar reserved for U.S. operators only. It was the much smaller, international commercial market in which Arianespace would face additional international competition; a market in which the latter company had to earn the major portion of its living and had obtained a more than 60% share; a market finally, in which the advent of a virtual limitless number of well-proven, powerful, reliable and - most of all - cheap Russian launchers would have a disastrous effect on the preparedness of both parties' international launch customers, the international organizations and individual countries such as Thailand or Saudi-Arabia, to stick to their usual U.S. or European launch providers).

The U.S. and its European counterparts therefore jointly agreed that this Russian entry had to be controlled in such a way that all parties concerned would have time to adjust to the new situation. The U.S took the lead and - as agreed by Yeltsin and Bush - started discussions with the Russians, while the ESA Working Group, with a sense of urgency, developed its findings and recommandations.

The above should be seen in the context of ESA's attitude vis-à-vis Russia in general: in 1991, at its Munich meeting, the Council had already taken account of the "changes that have taken place in the overall political environment in

Europe" and in "the world political context" and the "new financial constraints within the Member States" and had come to the conclusion that "a widened international cooperation with other space powers, in the first instance in Europe" would help ESA to achieve "the best possible relationship between cost and effectiveness requirements"; in other words, in a time of reduced ESA budgets, Russia was seen as a welcome, high-level, low-cost provider of space technology and hardware. And in early 1992, ESA had started discussions with the Russian Space Agency on the latter's participation in a number of joint programs, such as crewed spaceflight. It was logical that ESA's experience with the above Inmarsat/Proton example of Russian market entry brought the launch policy issue into these space cooperation talks.

The Working Group thus had to deal with, what one could call, both the 'internal' and 'external' launch policy. There is nog public report available on the results of its activities.

On October 23, 1992, the Council adopted a *Resolution on European space policy on launch services*.[212] Through this resolution the Council,

"*reaffirming* its conviction that an essential condition of an autonomous, reliable and economical access of Europe to Space is the full access of the European launcher to an international commercial market on which conditions of fair competition prevail, ...
*considering* that the appearance of factors likely to destabilise the world market for launch services, and in particular the advent of new governmental operators on conditions that do not meet the normal economic criteria of private sector operators, represent further difficulties that could seriously jeopardise the future of the Ariane launchers and their production,
*reaffirmed* a set of basic principles "which embody Europe's desire to have the means of autonomous access to space", on which European space policy on launch services is based, and
*invited* the member states to reaffirm these principles "by following a concerted policy and by jointly defining corresponding measures for putting them into effect".

These principles, in essence, boiled down to the following:
- the Ariane launchers constitute a strategic element for Europe's autonomous access to space;
- their availability at the lowest possible cost to ESA and its member states is best served by the widest possible marketing of Ariane around the world; in other words, the more launchers Arianespace sells at acceptable prices the cheaper they become for Europe;
- it is therefore important to ensure "the continued existence of a sufficiently large market" and Ariane's access to that market "on terms that do not penalise it in advance";

212. ESA/C/CIII/Res. 2 (Oct 23, 1992 (Final)).

- in that connection [Ariane 'participants'] grant preference to its utilisation for their national programmes, and
- try (jointly) to get Ariane used in international programmes in which they participate; and
- contribute to the funding of the Guyana Space Centre.

On November 10, 1992, the ESA Council meeting at Ministerial Level in Granada, adopted a *Resolution on the implementation of the European Long-Term Space Plan and Programmes*, which in its Chapter V, entitled "European Launcher Policy", repeated Ariane's status as a "strategic asset providing Europe with autonomous access to space", to be preserved as a "vital component of Europea space policy and of the Long-Term Space Plan", reaffirmed the above space launcher policy principles, invited the Member States to give preferential treatment to Ariane for their own missions and those of European and international bodies in which they participate, in accordance with the Ariane Declaration of May 21, 1992, and to encourage telecommunications satellite operators to do likewise.

The Council finally invited the Director General to contribute to the conclusion of an agreement with the governments of other space-faring nations to ensure fair conditions in the launcher market.

The result was not (yet) an agreement on 'rules of the road' with the U.S., but an EU-Russian launch trade agreement concluded in June 1993.[213]

Further action by the Council to reconfirm/ legally underpin the preferential use concept, in ESA parliance referred to as "European launcher policy", came in early 1994, when, at the SPC meeting of February 22, 1994, "the ESA Executive was asked to provide a brief summary of the Agency's launcher policy".
The issue remains a sensitive one, witness the conspicuous absence of any useful written or oral information on the subject since that year.

### *3.4.3 U.S.-European 'rules of the road'*

Efforts by both parties to arrive at a common understanding on (non-)permissible government involvement in commercial launch activities go back to the TCI case of 1984 in which USTR investigated allegations that Arianespace, through various kinds of subsidization by the European (ESA)

213. See *Commission Proposal for a Council Decision concerning the conclusion of an Agreement between the [EEC] and the Russian Federation on space launch services*, COM(93) 355 final (Jul 22, 1993); on this agreement see Chapter 3.4.3 *infra*.

governments, had been able to 'dump' its launch services on the U.S. market to the detriment of the infant U.S. launch industry.

After that case had come to rest following the U.S. President's 1985 determination that the ESA members' treatment of Arianespace did not differ sufficiently from U.S. treatment of U.S. launchers (primarily the shuttle) to warrant action against the Europeans, both parties retained an interest in discussing each other's practices in order to determine whether these could form the subject of an arrangement curtailing excesses of the other side.[214] Attention focused at first primarily on the matter of subsidization, and, more in particular, on the areas in which and the extent to which such subsidization by the other party could be established, such as, for example, in R & D, launch bases and facilities, and insurance.

The main target on the part of ESA, in the first five years active in this field without asking for or being the beneficiary of European Commission intervention or interest, was the U.S. *civil and military government market* which, through its sheer size and its being off-limits to foreign launchers, in ESA's view was a perfect example of an indirect subsidy. The U.S., in return, continued to be more interested in establishing a pattern of unfair subsidization of Arianespace and, additionally, sought to obtain fair trade commitments from the ESA governments similar to the ones they would impose on China and Russia. (The important difference of course was that it was neither legally nor politically feasible for the U.S. to even try to use its export controls to force the ESA-countries to behave in accordance with U.S.-preferred standards.)

On-and-off contacts of an informational character (each party probably trying to find a weak spot in the defense of the other) did not yield much result, and were in the late eighties overtaken by a number of developments involving the threat of new non-market competitors. In chronological order, the following positions and initiatives were taken.

The Assembly of the Western European Union (WEU) reported in 1987:

"[The Europeans] reproach the U.S. that government launch facilities are put at marginal cost at the disposal of U.S. companies for commercial launches. ... The U.S. in turn have accused Europe of subsidizing launching costs. ESA retorts that in the case of Arianespace the cost of launches is proportionally shared between governments and commercial customers, including the cost of launching facilities. Already in 1985, Europe asked the

214. As USTR's Allgeier noted in testimony at the Congressional launch hearing of 1993, "[n]evertheless, the determination did not endorse European practices and did take note of the lack of international standards for government conduct in the launch services market and the problems which that absence caused", see Allgeier testimony, 1993 Launch hearing, *supra* note 152, at 16.

U.S. to start negotiations for defining new rules for commercial launch competition. No official answer has yet been given but the U.S. is now willing to start negotiations."[215]

And indeed, in June 1987 the USTR called for the opening of discussions to ascertain whether there was a basis for subsequent negotiation of an agreement on rules of the road with respect to launch services.
Europe responded positively, and, at the end of July, an initial consultative meeting was held in Washington and a second one in Paris in October of the same year. The WEU Assembly supported ESA with a recommandation to the WEU Council proposing that the Council:

"[f]acilitate as far as possible operations by the European Ariane launcher to ensure that it has at least a half share of the market for commercial launches, inter alia by:
- concluding without delay an agreement with the United States Government defining principles according to which the cost of commercial launches should take account of the costs borne by the governments, particularly those relating to launch sites;
- making arrangements to avoid having western satellites placed in orbit by Soviet launchers proposed on the world market if such offers continue to be made without reciprocity and at a cost which does not respect commercial principles";[215]

The talks were of a clearly exploratory nature. As an ESA official would later report:

"The talks which began with representatives of the U.S. Administration in 1987 (with the USTR in particular) on commercializing launch services have made it possible to become more familiar with the practices used on either side and to identify the bases for opening negotiations on a common code of conduct ...".[216]

In 1988, the U.S. informed ESA about its dealings with China and informally submitted its draft agreement on trade in launch services to the Europeans. Some discussion took place, not so much on the principle of a controlled entry of China into the international launch market, as on the effectiveness of the provisions embodying that control: for instance, ESA was not very happy with the high number of launches the U.S. was prepared to grant the Chinese and felt uneasy about the vagueness of the pricing provision ('on a par') and the ensuing difficulty to enforce it. Also the clauses on 'behaviour' in the market did not create much enthousiasm on the European side, where such provisions were considered as more appropriate between countries with the same basic market philosophies. ESA would have preferred a simple, low quota.
The Chinese agreement confronted ESA for the first time with the phenomenon of U.S. political expediency vis-à-vis a third country resulting in increased

215. See WEU Assembly Report 1987, at 80.
216. See G. Lafferanderie, *European Space Agency in 1988*, 14 Annals Air & Space L. 491-499 (1989), at 497.

competition for Arianespace in the market place. Its worst fears came true in this respect when, in 1990, Great Wall Industry of China had severely undercut its bids for the Arabsat launch contract and thus - in its view - violated the pricing provision of the U.S.-China Agreement. European protests lodged with USTR did not bring the swift and effective enforcement action on the part of the U.S. authorities which ESA and its members had hoped for. It also made them aware of the relative low place on the U.S. list of political priorities which the protection of the U.S. launch interests in the international commercial launch market occupied. And that put in perspective the reliability of the U.S. as a 'protector' of *common* commercial launch interests. It also made Europe aware of the necessity of having regular discussions with the U.S. Administration to arrive at a common stand in these matters.

Talks in 1990 and 1991 did bring more exchange of information, but no agreement on rules of the road between the U.S. and Europe. To a large extent, this was caused by the wide divergence of views on the purpose of such an agreement. But the waking up of the European Community authorities and their professional interest in trade in services, given its general mandate and the ongoing discussions on the subject in the GATT Uruguay round of negotiations, certainly played a role as well.

It took the European Commission and ESA some time to come to a workable understanding about their respective tasks and responsibilities. USTR noted:

> "A major effort to reach agreement on standards for government involvement in the commercial space launch market, begun in the summer and fall of 1990, faltered at the end of 1991 when the [ESA] and the European Community Commission were unable to resolve internal European differences over the responsibilities of these organizations for policies on commercial space launch".[217]

And ESA reported:

> "Throughout the year the [ESA Washington] office was also involved in the ongoing consultations with the USA aimed at establishing 'rules of the road' governing the type and level of support governments should provide to the fledgling commercial launch industry in Europe and the USA. These consultations would continue into 1992".[218]

Similar U.S. launch trade initiatives vis-à-vis the Russians in 1992 to some extent forced the issue, and, because of Arianespace's and ESA's concerns about the 'newcomers', changed the focus of the U.S.-European talks. As Arianespace observed,

217. See Allgeier testimony, *supra* note 214, at 17.
218. See ESA Annual Report 1991, at 191

"International trade concerns in space transportation, initially focused on the so-called 'rules of the road' discussions between the U.S. and Europe (represented by ESA ...), have necessarily been broadened to address the issues raised by the entry of the PRC and Russia into the space transportation market place. The question that must be faced today is whether the Western launch service providers are prepared, and properly supported by their respective governments, to meet this challenge".[219]

When the U.S. invited 'Europe' to join the talks and work on a *tri-partite* arrangement, the interest of the European Commission in joining the negotiations was regarded as a welcome increase of the political level and clout of the European team.
The down-side was twofold: the relationship between ESA and the EU, and the latter's mandate to represent these ESA (including non-EU members') interests needed urgent clarification; and the ESA launch interests would become part of the overall - bilateral and multilateral - trade interests of the EU and thereby subject to compromises, trade-offs and - in general - to the possibility of changing priorities.

The ESA Council at its 1992 Council meeting in Granada, reaffirmed Ariane's status as "a strategic asset providing Europe with autonomous access to space", to be preserved as a "vital component of European space policy", thus making clear that it would strongly resist and resent any threat to its continuity. As referred to earlier, the Council therefore invited the Director General

"to contribute in close cooperation with both the Member States and the competent bodies of [the] European Communities, to the conclusion of an agreement, ot other form of terms and conditions, with the governments of other space-faring nations to ensure fair conditions in the launcher market".[220]

And, also in 1992, the European Commission had made it clear again that it wished to play a role and take its political responsibilities in Europe's international (trade) relations, though it was intentionally vague on the way in which it would handle this task given ESA's traditional position as Europe's space policy spokesman.[221]

In the perception of the Americans, this joining of European forces did not really improve the latter's effectiveness in their bilateral talks and prevented

219. See Heydon, President, Arianespace Inc., USA, *European trade perspective*, at 4th Annual Symposium on the law & outer space, Georgetown University, Washington (Oct 16-17, 1992).
220. See Resolution on the implementation of the European long-term space plan and programmes, Chapter V ("European launcher policy"), ESA Council meeting at Ministerial level, Granada (Nov 10, 1992),
221. See *The European Community and space, challenges and opportunities*, COM (92) 360 final (Sep 23, 1992), and see *infra* on the Commission's role.

the trilateral discussions from getting off the ground. The USTR participant gave the following report to Congress, quoted here in full because of the clear presentation of the issues and divergencies involved, as perceived by the U.S.:

"Shortly after we [=the US] began our discussions with the Russians [*i.e.* around September 1992], our European counterparts in the EC and ESA reconciled their internal differences and expressed an interest in joining our talks with the Russians. We were hopeful that we had an opportunity to resume our efforts to achieve our goal of a multilateral agreement. We scheduled a preliminary round of discussions with the Europeans just before our December [1992] meetings with the Russians.
Unfortunately, those contacts with the Europeans revealed insufficient interest on their part in reaching an agreement that would address our central goal of establishing standards for government support during the various phases of launch activity-development, production and operations. The Europeans also linked agreement on "rules of the road" to access to government launch procurements in the U.S. ...
Our December [1992] discussions with the Europeans as well as consultations with them just prior to our most recent discussions with the Russians suggest that any interest Europe may have in a multilateral agreement is focused on strictly limiting Russian access to the market.
With regard to the general market principles of importance to us in any agreement with the EC and ESA, the Europeans urged us to eliminate those elements of our proposal to the Russians addressing the limitation of subsidies and adoption of other market - oriented disciplines as unacceptable to them. I regret to say that there does not appear to be any near-term prospect for a significant shift in this European position".[222]

A few words on the role of the European Commission in these bilateral talks.

From more than one side it had been suggested to get the European Commission, with its considerable political standing and experience in 'external' trade matters, involved in space matters in general and in launch trade matters more in particular.[223] In a 1991 report of a former ESA official

222. See Allgeier testimony, *supra* note 214, at 22-23. At a May 4, 1994 meeting in Washington, Richard Scott, DOT's Associate Director for Commercial Space Policy and International Affairs was quoted saying:
"[l]aunch trade talks with the Europeans are on hold ... pending a determination by the Europeans as to who should be the US counterpart in the talks, the European Union or the [ESA]", see 22 (1&2) J. Space L. (1994) at 35.

223. On Jun 18, 1987, the European parliament had adopted a Resolution on European space policy which called on the Commission "to initiate the process [of working out a coherent policy on space activities]" and supported ESA in its efforts to achieve autonomous space capabilities on behalf of Europe and concluded that "without autonomy in space operations Europe will be unable to derive full economic benefit from the scientific discoveries and technological innovations which it makes in this sector". See Resolution in 4(1) Space Policy 89-90. In response to this invitation, the Commission, on Jul 26, 1988, issued its first Communication on the subject, entitled "*The Community and Space: a coherent approach*", Commission Report, COM (88) 417 final (Jul 26, 1988).

it was stated that "[t]he sale of launch services is an area in which the EC must help to achieve fair international market conditions for European industry, in the current situation principally Arianespace".[224]

The European Commission's September 1992 (second) Communication to the Council on the matter showed a qualified willingness to play a more active role in space political matters, while at the same time being careful about ESA sensitivities with respect to its independence and traditional spokesmanship on all European space matters.
Particularly the French space establishment, which saw Arianespace very much as a French 'weapon' against U.S. space launch hegemony, and was - understandably - deeply worried about the U.S. introducing foreign low-cost competition into the market, pleaded for European Community assistance in launch trade matters. One of the French concerns was based on the experience ESA and Arianespace had with the 'relaxed' way in which the U.S. had reacted to Chinese violations of the pricing terms of the launch trade agreement. That failure to enforce conditions, which for Arianespace were important safeguards against unfair competition, was a not very reassuring indication of the way the U.S. would deal with the Russians. Hence, the French demand, taken over by the other ESA members, to ask the European Commission to negotiate a launch trade agreement with the Russians, imposing pricing and quantity restrictions, which would thus bind the Russians independent from (the validity of) any agreement concluded with the U.S. The Commission did not have the authority to use defense-related export

That Communication identified a number of weakness of Europe's space efforts up to 1988, one of which was dependence on the US in some areas: for example "we have not yet begun to develop very heavy or recoverable launch vehicles, a factor which may limit our future autonomy in the exploitation of space", said (then) vice-president of the Commission, Karl-Heinz Narjes in an article, *Space and the European Community*, 5 (1) Space Policy 59-64 (1989) at 59. The most important weakness the European Commission identified was "the lack of a cogent and comprehensive European space policy ..." (*id.* at 60). The Commission saw there an important role for itself to enhance the "political credibility" of Europe's space effort and "to ensure that the activities of those involved in the space industry remain consistent with Community law with regard to competition policy, *trade policy* ... and other areas of Community competence" (*ibid.*) (emph. add.).
As a consequence the Commission set up a coordination mechanism with ESA, in the form of joint working groups on, *inter alia*, telecommunications, industrial competitiveness and international relations (in which international launch services policies were reviewed and coordinated), see Madders & Thiebaut, *Two Europes in one space: the evolution of relations between the [ESA] and the [EC] in space affairs*, 20(2) J., Space L. 117-132 (1992) at 128.

224. See Gibson Report, Sep 1991, at 11. The author further argues that "... European would-be [space industry] exporters should ... be able to rely on some political support coordinated through the EC ... EC attention needs to be continuous and should cover the whole range of space activities, rather than being of the "fire brigade" variety, whenever there is a particularly inflamed international trade issue involving space ... The panel has been encouraged by the Commission to look for ways and means for the EC to complement the efforts of ESA and others in the space field", *id.*, at 26, 28.

regulations, such as MTCR controls, as a 'big stick' vis-à-vis the Russians, but where both ESA and the EC were engaged in important cooperation talks with Russia, there were sufficient 'incentives' for the latter to conclude an agreement with Europe with roughly similar provisions as the U.S. had demanded (and would formalize in September 1993).

In July 1993, Commissioner Leon Brittan of DG I, after negotiations with the Russians and consultations with the U.S. on the contents, submitted the resulting agreement to the Council of Ministers.[225] The Council, however, was, *inter alia* on the instigation of the French (!), for both political and legal reasons, unwilling to take action on the Commission's proposal, and the agreement was therefore never formalized.[226]

The European Commission continued to intensify its involvement in the strategic and economic aspects of space, though always treading carefully so as not to upset ESA. As it noted in its more recent (third) Communication to the Council and the European Parliament of December 1996:

"As space contributes both to the industrial competitiveness of Europe and to the improvement in the quality of life of its citizens, the European Union cannot be indifferent about space developments. This does not mean that the [EU] should substitute for relevant bodies, notably [ESA], in formulating the European space policy but the [EU] should contribute to the full development of the space policy and take into account the space dimension in the formulation and implementation of the policies mentioned in the Treaty [of Rome]".[227]

The Commission saw as one of its primary tasks to "work towards an open and competitive environment as the basis for a strong European industry ... [and] to use its competence to ensure a level playing field within Europe *and beyond*".[228] (emph. add.)

With respect to space launch services, the Commission noted the need to maintain Europe's leadership position in the commercial space launch market against increasing competition coming from both advanced U.S. launchers and

225. *Commission Proposal for a Council Decision concerning the conclusion of an Agreement between the [EEC] and the Russian Federation on space launch services*, COM (93) 355 final (Jul 22, 1993).
226. The legal argument was based on doubts as to the so-called "exclusive competence" of the Commission to conclude agreements concerning trade in services. In Dec 1994 the ECJ determined that this competence was not exclusive, but one shared with the member states, see Opinion 1/94 re the Uruguay Round Treaties (1995), 1 CMLR 205.
227. See Communication from the Commission to the Council and the European Parliament - *The European Union and space: Fostering applications, markets and industrial competitiveness*, COM (96) 617 final (Dec 4, 1996) hereinafter referred to as EC communication 1996, at 2.
228. See *id.*, at 10.

from (the entry into the market of) launch vehicles from Russia, Ukraine and China. Both this considerable increase in supply and the sometimes extremely low prices quoted threatened in the Commission's view to destabilize the market.

Of importance to our discussion in general and to the issues raised in this Chapter in particular, is the observation of the Commission, through which this body clearly submits its candidacy for leading further talks on rules of the road with both the U.S. and the other launch providing countries, and the two issues the Commission identifies as crucial to the European launch industry:

"A fundamental condition for the maintenance and further development of European space launch services is a degree of market access similar to that offered in the EU and the existence of fair trading conditions".[229]

As for the latter, the Commission expressed its conviction, shared by the European launch industry, that it should be in Europe's interest to start exploring the possibility to discuss and establish basic rules, 'rules of the road', for the conduct of open and fair competition among the most important launch providers. In the Commission's view this discussion (and the resulting rules) should include the issues of public support to this industry as well as balanced access to each country's *domestic* market.
The Commission clarified what it saw as one of its main targets when discussing the issue of 'public support':

"Such negotiations should include the US, whose industry benefits at an extraordinary and unequalled level of governmental support and military programmes, as well as emerging suppliers like Russia, Ukraine and China".[230]

(The Commission could safely assume that U.S. governmental support and military programmes far exceeded the level Arianespace was accustomed to or could hope for in Europe.)[231]
One of the problems the Commission still faced was to arrive at a common long term strategy with the EU member states and, in particular, "to reach a practical solution for the conduct of international negotiations". The Commission, obviously, had not yet come to terms with the member states on a workable negotiating mandate, and, for the sake of ensuring fair competition

229. *Id.*, at 24.
230. See *ibid.*
231. As the Communication elaborated, "[l]aunch systems and propulsion also benefit from important spill overs between the military and civilian sectors. The US industry has long benefited from such spillovers in the commercial markets, thanks to a military space budget which is over forty times Europe's", *id.*, at 25.

with third countries, therefore insisted that "an institutional compromise [be found] for the conduct of [such] international negotiations".[232]
That situation, until today, has remained unchanged.

As for the issue of market access, the Communication formulated the following more specific objective:

"... not only to ensure that there are no restrictions for space launch services provided for civilian uses, but also that there are no nationality conditions attached to space launch services provided to governmental entities. The latter are frequent in countries such as China and the USA, whereas the EU has an open market. This should be addressed primarily in WTO, where the GATT covers space launch services".

The question of 'nationality conditions' or the reservation of the government market to national launch companies, which prevents foreign comapnies from selling their services in that part of the market, partly already discussed in paragraph 3.4.2 above, deserved and will receive some further attention in the following paragraph. The question of the (possible) application of GATT, or rather GATS, to space launch services will be addressed in Chapter 4.

### *3.4.4 'Fly U.S.' versus 'fly Europe'*

The U.S. President's national space policy of February 1988 already directed the government agencies involved in space to purchase commercially available space goods and services to the fullest extent feasible. That the policy meant "U.S." goods and services followed from a provision in the same document dealing with the goals of the U.S. space transportation policy, one of which was "to encourage to the maximum extent feasible, the development and use of United States private sector space transportation capabilities ..." More specifically, the policy stated:

"Civil government agencies will encourage, to the maximum extent feasible, a domestic commercial launch industry by contracting for necessary ELV launch services directly from the private sector or with DOD."

Apart from the addition of the last three words which to some extent undermined the principle in the first part of this provision ("to some extent", because the private sector *built* the ELV's for DOD), it expressed the

232. See *id.*, at 28. In a "preliminary draft Council resolution" attached to the Communication. the Commission repeated its proposal on the two main issues: "The Council calls on the Commission to pinpoint and propose, in cooperation with the Member States and the partners concerned, activities to obtain the opening of the markets of the main third countries and to help establish a set of international rules to guarantee conditions for balanced competition in the market for spacecraft launching services", *id.*, draft res., operative para. 9.

assumption that, with a domestic launch service commercially available and meeting the mission requirements in a cost-effective manner, a government agency would have to choose that domestic service. (One may also assume that any deviation from that policy in practice would be quickly noted and assailed by the U.S. launch industry). But it should be realized that the policy primarily aimed at promoting the services of the domestic *commercial* launch industry (to replace government launches) rather than promoting *domestic* (as opposed to foreign) launch services; the resulting text, however, served both purposes.

An updated version of the national space policy was issued in November 1989; it repeated - often verbatim - the above guidelines.

But President Bush's commercial space launch policy of September 1990 went one step further. As one of the actions needed for dealing with international competition, and, more specifically, affecting the competitiveness of the U.S. launch industry "over approximately the next ten years", the policy identified (apart from launch trade agreements)

"the continued use of U.S. manufactured launch vehicles for launching U.S. Government satellites",

and the policy therefore ordered, as one of the implementing actions:

"U.S. government satellites will be launched on U.S.-manufactured launch vehicles unless specifically exempted by the President".[233]

The U.S. commercial space policy guidelines approved by President Bush on February 12, 1991, again affirmed the general policy of encouraging U.S. government agencies to purchase commercial space products and services to the fullest extent feasible, and reconfirmed the applicability of the 1989 National Space Policy and the 1990 Commercial Space Launch Policy (which contained the specific 'fly U.S.' clause).
In the meantime, in 1990, Congress had taken the initiative to adopt legislation to formalize the Administration's above commitment with respect to the use of U.S. commercial launch services. The Launch Services Purchase Act of 1990, after having praised the benefit for the U.S. commercial launch industry

233. The Policy was drafted at the time of the Cape York project, which involved Russian Protons launched from Northern-Australia's Cape York, with as U.S. firm's assistance. The Policy stated on this point that it (the policy) "is completely consistent with, and provided the policy framework for, the President's August 22, 1990, decision regarding participation by a U.S. firm in Australia's Cape York space launch project". The wording of the implementing action was chosen, one must assume, to allay any defense or national security driven fears that in the framework of the Cape York project 'sensitive' payloads would be launched with a Russian launch vehicle.

of Federal purchasing of U.S. private sector goods and services, including launch services, provided:

"Except as otherwise provided int his section, the [NASA] shall purchase launch services for its primary payloads from commercial providers whenever such services are required in the course of its activities".

NASA could get out of this requirement, on a case by case basis, if its Administrator determined that:

"(1) the payload requires the unique capabilities of the space shuttle;
(2) cost effective commercial launch services to meet specific mission requirements are not reasonably available and would not be available when required;
(3) the use of commercial launch services poses an unacceptable risk of loss of a unique scientific opportunity, or
(4) the payload serves national security or foreign policy purposes".[234]

Where the same Act also reiterated the ban on space shuttle launches of commercial payloads, it served the dual purpose of NASA henceforth using *commercial* launch services instead of its 'own' vehicle (the space shuttle) or DOD launchers, and using *domestic* instead of foreign services.

Obviously, the U.S. launch companies saw this policy as vital to their survival, and any exception to the rule was seen as (potentially) setting a threatening trend. The discussion that took place on the issue during the 1993 Congressional hearing on "international competition in launch services"[235], provided an illustration of that point.

A good example is the statement of the Martin Marietta Space Group President, which, apart from its demagogic aspects, reflected current thinking among the launch providers about the need of having a guaranteed business base:

"In order to assure our country's access to space for critical missions, we should continue the current policy which requires that U.S. government payloads, whether military or civil, be launched aboard U.S. launch vehicles. In this way, a sufficient and predictable business base will ensure the viability of our domestic launch industry. If we permit the erosion of that base, we risk a repetition of the Challenger aftermath, when our ability to launch key payloads was jeopardized by an unforeseen event. Can we assure our citizens and our

234. See Sec. 201-205, Pub. L. 101-611 (NASA Authorization Act 1991) (Nov 16, 1990), at Sec. 204(a)-(b).
235. See 1993 Launch hearing, *supra* note 152, at 34. See also the TCI claim of 1984 with USTR against the ESA-members' subsidization of Arianespace which inclued the issue of the latter's protected home market, in Chapter 2.2.2 *supra*.

military men and women overseas that we will always be able to use space, as we did in Operation Desert Storm, to multiply the effectiveness of our forces and save lives in the bargain? If we permit our access to space to become hostage to the goodwill of a foreign country, the answer to that question will not be affirmative."[236]

The Subcommittee on space, which organized the hearing, submitted written questions to all participants. Three related questions were: "Should the U.S. continue to uphold the policy that U.S. government payloads must fly on U.S. launch vehicles? Isn't this policy a form of entitlement program for the U.S. launch vehicle business? If not, why not? Should an exemption be granted to allow scientific research spacecraft to fly on foreign launch vehicles?" (one example of the latter mentioned involved an American scientific instrument launched on a Russian Tsyclon in the framework of U.S.-Russian scientific cooperation).

In the answers of the U.S. launch companies, frequently reference was made to the foreign practice (European, Russian, Chinese, Japanese) of reserving government loads to national launchers. No distinction was made between the European policy and practice on the one hand, and the policies of its competitors on the other hand. Nor was any reference made to the substantial difference *in size* of the respective government markets concerned. As McDonnell Douglas (MDD) stated in response to the above questions:

"There is no question that this is the only practical policy to assure a reasonable chance of survival against the highly subsized international competition. It is imperative that the U.S. not relax on this policy ... This is the standard by all international launch system players in the world. We cannot force the Europeans to require U.S. access to European government missions. The same applies to Japan, PRC, and the Russians ... The Europeans have a policy of flying government satellites only on Ariane. The Russians and Chinese don't make exceptions - they donot buy U.S. launch services for their government science missions ... [launching U.S. scientific research spacecraft on foreign launchers] should be done only on a fair basis and ... US launchers [should] continue to have the opportunity to place foreign science payloads into orbit."[237]

Lockheed, though also not afraid of a bit of demagoguery, gave a more nuanced view, which reflected its recent teaming up with the Russians in LKEI and, therefore, the need to make the market, available to 'its' foreign launcher Proton as large as possible. Apart from agreeing to exemptions for scientific payloads, Lockheed stated:

236. See *id.*, at 34.
237. See *id.*, at 157.

"Serious consideration should be given to payloads of national security import. All others should enjoy an unconstrained market economy, for the consequences of not doing so will force nations like Russia to sell their missile technology to "unfriendly" countries."[238]

General Dynamics, producer of the Atlas family of launchers, and very succesful in the government launch market, was as adamant as MDD, giving an 'absolutely' to the first question asked by the Sucommittee:

"Every other country in the world with launch capability restricts their government payloads to their launch vehicles whose development they have previously funded. The Arianespace Board of Trustees has requested recently that the European countries be required to use Ariane for all European satellites--both government and commercial".[239]

Fact is, as we saw earlier, that the ESA Council, in November 1992, had adopted a resolution *inviting* the member states to give preferential treatment to Ariane for their own missions and those of European and international bodies in which they participated. On the other hand, indeed, ESA, by virtue of the Convention that created the organization, was to give *preference*, when defining its missions, to using "launchers or other space transport systems developed within the framework of its programmes", though with an important escape clause: "... if this does not present an unreasonable disadvantage compared with other launchers or space transportation means available at the envisaged time, in respect of cost, reliability and mission suitability."[240]

Articles in the trade press at the same time, though literally correct, created a strong impression that it was at least practically unavoidable for the various European parties to use the Ariane:

"... ESA member states are *expected* to favour the European launcher for government-funded payloads ... Moreover, *pressure* is placed on European PTT's and international organizations such as Eumetsat and Eutelsat to use Ariane." (emph. add.).[241]

In this connection, it is interesting to see what happened in practice in this period. As Middleton notes in his knowledgeable article on the subject:

"... but in reality seventeen contracts [of the 20 payloads launched by Arianespace in 1992 and 1993] were won by Arianespace in international competition, a rather better record than the U.S. over this period [i.e. 28 of the 36 spacecraft launched in 1992 and 1993 were reserved for launch by American companies]."[242]

238. *Id.*, at 161.
239. *Id.*, at 173.
240. See art. VII (1) ESA Convention, and discussion in Chapter 3.4.2.
241. See 4 (25) Space News (Jul 1993) at 5, 10.
242. See Bruce Middleton, *The US commercial space launch industry: policies for survival*, 20th national space symposium, session competitive launch capabilities (April 1994), hereinafter

And, as the same trade press rightly noted two years later, though ESA used Ariane exclusively for its launches except for occasional science satellites developed bilaterally with the U.S. or Russian governments, the individual European governments and also the European telecom agencies were quite another matter: both simply looked for the best deal:

"European government authorities have no set of rules that *require* that they use Europe's Ariane rocket. By contrast, both NASA and [DOD] are *required* by law to use American vehicles." (emph. add.)[242a]

So, despite the 'invitation' of the Granada Council, countries like Norway and the U.K. followed the precedent set earlier (in 1992) by German Telekom, by contracting with MDD for the Delta launch of their government satellites.[243]

And, as we saw earlier, ESA itself, when confronted with financial or scheduling problems has, from time to time, chosen foreign launchers for its missions.[244]
It should be noted further in this connection that, where the U.S. government has more launch options with both the government vehicles, shuttle and DOD launch vehicles, and the private launch companies (as long as they use U.S.-built launchers, it is somewhat easier to maintain the principle of "fly U.S." The real test would be in a case of financial or scheduling handicaps as ESA has experienced and would appear to be more vulnerable to anyhow.

Clinton's 1994 National Space Transportation Policy's guidelines on the matter were both a confirmation of the prevailing policy and a reflection of the views expressed in the 1993 Congressional hearing. The two 'pillars' of the 'fly U.S.' policy were maintained.

"U.S. Government agencies shall purchase commercially available U.S. space transportation products and services to the fullest extent feasible that meet mission requirements and shall not conduct activities with commercial applications that preclude or deter commercial space activities, except for national security or public safety reasons.
...
For the foreseeable future, United States Government payloads will be launched on space launch vehicles manufactured in the United States, unless exempted by the President or his designated representative".[245]

referred to as Middleton, at 11, 12. And see Ch. 1.1 for some additional relevant figures.
242a See *infra*, note 243, *ibid*.
243. The UK Defense ministry's Skynet and Norwegian Telecom's Thor 2A direct broadcasting satellite, see 6 (44) Space News (Nov 1995) at 1. ("Ariane agrees to cut ESA's launch fares").
244. For examples, see (text to) note 209.
245. See paras IV ("Commercial space transportation guidelines") and VI ("Use of foreign launch vehicles, components and technologies") respectively, 1994 Space transportation policy,

The 'scientific cooperation' exemption already implicitly included in the above Launch Services Purchase Act of 1990 was further expanded:

"This policy does not apply to use of foreign launch vehicles on a no-exchange-of-funds basis to support the following: flight of scientific instruments on foreign spacecraft, international scientific programs, or other cooperative government-to-government programs. Such use will be subject to interagency coordination procedures."

President Clinton's 1996 National Space Policy still contains the provision that U.S. government agencies "shall purchase commercially available goods and services to the fullest extent feasible ...", but a specific 'fly U.S.' article is missing. This does not indicate a shift in policy (yet): a request on the part of Israel in 1997 to get an exemption from the 'fly U.S.' policy for its Shavit launcher was turned down,[246] and there is no indication that other requests would be honoured.

A more challenging proposition would be a similar request on the part of ILS or Sea Launch with respect to the use, for a government satellite launch, of the Proton or Zenit respectively. In so far as the policy is meant to protect the U.S. launch companies, a request form these same companies, Lockheed Martin or Boeing, as sellers, through the above joint ventures, of the respective foreign-built launchers, should not create insurmountable problems. Where the policy's purposes include the safeguarding of national security, these could form an obstacle depending on the character of the satellite and on the launch vehicle or launch facility used (with Sea Launch, operating from a platform on the high seas, being in a better position than ILS whose Protons are launched from Kazakh territory).

The chance of Arianespace getting an exemption from the policy in the near future would, in the light of the above, appear to be remote.

The Commercial Space Act of 1998, which was signed by President Clinton on October 28, 1998, also addresses the issue of federal acquisition of space transportation services.[247] Though it basically covers the same ground as the Launch Services Purchase Act of 1990, three elements in the most recent piece of legislation should be highlighted:

*supra* Ch. 2, note 307.

246. See AST Special Report 1997, *infra* Ch. 4, note 11, at 2; see also *supra* Ch. 1 (text to) note 23.

247. See Commercial Space Act of 1998, P.L. 105-303 (H.R. 1702, 105th Cong., 2nd Sess., House passed Oct 6, 1998, Senate passed Oct 9, 1998), Title 11 - Federal acquisition of space transportation services, Sec. 201-206.

1. the requirement that NASA purchase launch services from commercial providers is now extended to the Federal government as a whole, thereby also including DOD/USAF which - by pleading national security reasons - was so far allowed to use its own launch vehicles: it may continue to do so, but only on a case-by-case basis, if the Secretary of the Air Force determines that the use of U.S. commercial services "is inconsistent with national security objectives", in other words, as an exception to the rule;
2. NASA's concern that the legislation would limit its possibilities to freely cooperate in international scientific programs (which may involve one party building the scientific satellite and the other launching the spacecraft on a no-exchange-of-funds basis) was met by the adoption of language which is very much in line with (the exception to) Clinton's 1994 'fly U.S.' policy;
3. The Federal government has to acquire the necessary launch services from "United States commercial providers", which are defined as:

"A commercial provider, organized under the laws of the United States or of a State, which is (A) more than 50 percent owned by United States nationals; or (B) a subsidiary of a foreign company ..."

with category (B) subject to a number of specific stringent criteria.'[248]

Where the Act does not address the question of the country of *manufacture* of the launch vehicle, it does not infringe upon Clinton's 'fly U.S.' policy, which includes the President's freedom to exempt U.S. companies from the 'manufactured-in-the-U.S.' requirement. The U.S. President "or his designated representative" therefore retains the option to allow a U. S. company which offers services using foreign launch vehicles to contract for the launch of a U.S. government payload. The above definition's strictness makes it doubtful, however, whether Boeing-led Sea Launch or Lockheed Martin-led ILS would qualify.

248. Sec. 201 (a) reads: "In general. - Except as otherwise provided in this section, the Federal Government shall acquire space transportation services from United States commercial providers whenever such services are required in the course of its activities. To the maximum extent practicable, the Federal Government shall plan missions to accommodate the space transportation services capabilities of United States commercial providers." Sec.201 (b) lists a number of specific exceptions, and it is up to the NASA Administrator or the Secretary of the Air Force to determine that a specific case does indeed fall under any of those exceptions and allows for the use of another launch provider.
Sec. 2 (8) (B) subjects a subsidiary of a foreign company to the test that the Secretary of Transportation finds that such subsidiary has in the past evidenced a substantial commitment to the U.S. market through investments in the U.S. in, *inter alia*, R & D and through significant contributions to employment in the U.S., and that the country of incorporation of such a foreign company affords reciprocal treatment to the U.S. commercial providers, as evidenced by a number of criteria.

One may conclude that there remains a clear difference between the 'nationality conditions' prescribed, and applied in practice, by ESA and the Arianespace participants on the one hand, and those adhered to by the U.S. on the other hand.

'Fly U.S.' has, *de iure* and *de facto*, reserved a very substantial part of the total market, as described in Chapter 1, for U.S. launch providers, whereas 'fly Europe', lacking a comparable legal and political 'power' and government market, has had (and continues to have) a rather limited positive effect on the competitive position of Arianespace.

## 3.5 Liberalization of U.S. bilateral launch trade controls

Bush's Commercial Space Launch Policy of September 5, 1990 formulated the Administration's long-term goals with respect to the international trade in launch services in a way which showed both the U.S. government's traditional commitment to free trade principles, while on the other hand recognizing that neither the U.S. launch companies nor the trade environment in which they operated were ready yet for that freedom:

"The long-term goal of the United States is a *free and fair market in which U.S. industry can compete.*
To achieve this, a set of coordinated actions is needed for dealing with international competition in launch goods and services in a manner that is consistent with our nonproliferation and technology transfer objectives.
These actions must address both the short-term actions (which will affect competitiveness over approximately the next ten years) and those which will have their principal effect in the longer term (i.e. after approximately the year 2000).

In the *near term*, this includes trade agreements and enforcement of those agreements to limit unfair competition. It also includes the continued use of U.S.-manufactured launch vehicles for launching U.S. Government satellites.

For the *longer term*, the United States should take actions to encourage technical improvements to reduce the cost and increase the reliability of U.S. space launch vehicles." (emph. add.)

The above policy statements were made in a year in which:
- the U.S. had 3 main ELV-providers, General Dynamics, Martin Marietta, and McDonnell Douglas, which were not very successful yet in the international commercial launch market;
- Arianespace was the dominant foreign competitor, apparently acting in a way which the US considered not sufficiently in accordance with "principles of free and fair trade" (because, as the Policy announced as one of the implementing actions, the U.S. government "will enter into negotiations to

achieve agreement with the European Space Agency (ESA), ESA member states, and others as appropriate, which defines principles of free and fair trade." (As we saw earlier, the primary US complaint about ESA was the perceived subsidization of Arianespace);

- CGWIC, a so-called non-market launch provider had entered the market in 1989 through a bilateral launch trade agreement (a "special case because of the absence of market oriented pricing and cost structures" which needed "a transition period during which special conditions may be required");
- the USSR, Australia and USBI launched the Cape York project, also requiring a special agreement, though primarily to deal with security aspects.

In these circumstances it can be considered both farsighted of the Bush Administration and in keeping with U.S. traditional macro-economic principles to aim at the long-term goal of free and fair trade and to see the selected protective measures as only *temporary*.
The only real long-term solution in that free market thinking (if one wants the indigenous industry to survive) is, according to the Policy, cheaper and more reliable US launchers which can compete in a free and fair market. As direct subsidization did not belong to the government's 'tools', the Policy limited itself to requiring the government agencies to "actively consider commercial space launch needs and factor them into their decisions on improvements in launch infrastructure and launch vehicles aimed at reducing cost, and increasing responsiveness and reliability of space launch vehicles.", a form of support which in European eyes came in practice rather close to subsidization.
But the main message appeared to be: the U.S. government will liberalize, 'free' the launch market as soon as the U.S. launch companies are strong enough.

Clinton repeated the "long-term goal of the [US] to achieve free and fair trade" in his 1994 National Space Transportation Policy, and also appeared to make a distinction between non-market launch industries and 'other' (market) launch industries:

"A long term goal of the [US] is to achieve free and fair trade. In pursuit of this goal, the U.S. Government will seek to negotiate and implement agreements with other nations *that define principles of free and fair trade ..., limit certain government supports and unfair practices in the international market*, and establish criteria regarding participation by space launch industries in countries in transition from a non-market to a market economy." (emph. add.)[249]

249. See 1994 Space transportation policy, *supra* Ch. 2, note 307, para. V ("Trade in commercial space launch services").

The emphasized part of the quoted provision appeared to refer primarily to the market economy launch industries, *i.e.* Arianespace, which, in 1994, was both very successful, having captured about 60 percent of the international commercial launch trade market and (therefore?) suspected of being able to undercut U.S. launcher pricing because of the subsidies it had received from ESA.

Nevertheless, the U.S. launch companies had become considerably stronger since 1990 and further consolidation of the aerospace industry was underway.

At the same time, also the qualification of Russia and China had undergone a subtle change: both had been promoted from non-market economies/ launch providers to "countries in transition from a non-market to a market economy", which reflected the enormous changes in attitudes and/or economic performance in the two countries and higher, and therefore less threatening pricing of their launch companies.

When President Clinton, in September 1996, issued his new national space policy, U.S. launch companies had further strengthened their position, both by domestic mergers and acquisitions and by alliances with Russian companies. "Booming" business in both the GEO and the new and very promising LEO launch market combined with the right range of vehicles to cater for the resulting demands, coming on top of a still guaranteed and sizeable military and civil government launch market, created the expectation that the U.S. launch industry's share of the commercial market would increase at the expense of Arianespace. Moreover, the alliances concluded with the Russian and Ukrainian launch industries had turned the bilateral restrictions, though already considerably liberalized, into impediments for both the U.S. satellite manufacturing and the launch industry. (And the latter's main competitor continued to be Arianespace anyhow!)

In this environment, the Administration could conclude that the U.S. launch industry was strong enough or approaching that state fast enough to announce steps to move away from international launch quotas altogether. Thus, the national space policy stated:

"Free and fair trade in commercial space launch services is a goal of the United States. In support of this goal, the United States will implement, at the expiration of current space launch agreements, a strategy for transitioning from negotiated trade in launch services towards a trade environment characterized by the free and open interaction of market economies. The U.S. Trade Representative, in coordination with the Office of Science and Technology Policy and the National Economic Council, will develop a strategy to guide this implementation."[250]

250. See Clinton space policy, *supra* Ch. 2, note 352, at Commercial space guidelines, para (5).

Before we conclude on the basis of the above that, at the end of the year 2001, there will be free competition between the launch industries of the parties to the agreements, and including Europe and Japan, a closer look at the above text is warranted. It reveals a number of express or implicit *caveats* and conditions which have to be fulfilled:

- two *strategies* will have to be ready by 2001:
  the administration needs a strategy for *transition* to implement, and USTR has to develop a strategy to guide this implementation;
- the period for transition and the conditions applicable during the transition have - understandably - been left open;
- the goal is free and open interaction of *market economies*: if one of the countries concerned does not deserve that qualification, it may not deserve the promised free trade;
- if one of the countries concerned is found or suspected not to practice fair trade principles itself, it may not deserve the promised free trade either;
- as the U.S. government has repeatedly expressed its preference for multilateral rules of the road, it may insist on having these in place before the launch trade agreements are permitted to lapse;
- where the parties to the launch trade agreements are already subject to and accustomed to the rules of the road embodied in those agreements, and would probably accept the same general rules (though obviously without specific pricing or quantity restraints) in a new, multilateral form, Europe has never showed any inclination to subject themselves to similar behavioral guidelines (And Europe's attitude would undoubtedly influence Japan's position);
- Europe's acceptance of any rules of the road would probably be linked to two conditions, first, that the present practices of - indirect or direct - support to Arianespace are accepted as a matter of fact, and secondly, that the U.S. government market is opened to Arianespace, in other words the withdrawal or substantial relaxation of the 'fly U.S.' policy;
- it is highly unlikely that the U.S. would open this large and lucrative market to its most important competitor in return for the kind of fair trade commitments now found in the launch trade agreements, a *quid-pro-quo* that not only the U.S. launch industry but also Congress would probably brandish as an unprecedented and one-sided sell-out of U.S. interests (and which the security community would insist on limiting to non-national security related government payloads);
- this U.S. attitude would hardly be influenced by the prospect of full access for U.S. launchers to the government markets of Europe: the difference in size and importance is simply too large to make such a 'swap' an acceptable proposition;
- an additional impediment would be that, in a multilateral 'rules of the road' arrangement the same opening awarded to Europe would have to be given to - and would anyhow be claimed by - the other countries' launch companies.

It would appear that any steps/measures in the coming years in the direction of the policy's goal will continue to depend on the uninterrupted good performance of the U.S. launch companies, which in turn depends on a combination of continued U.S. government preferential treatment, a growing satellite (LEO and GEO) launch market, reliable and competitively priced U.S. launchers and 'good behaviour' on the part of the competitors.

The commitment is there and the Administration has already been working on a post-launch trade agreements regulatory regime,[251] but the road to liberalization of the launch market through the complete removal of the above bilateral constraints is still a long - and, as a result of the 'China affair', twisted - one and may not take the international launch industry home until way after 2001.

This brings us to a broader question, to be addressed in the next Chapter, *i.e.* once the launch trade agreements have been terminated, may the international launch providers, to the presumed benefit of their clients (the satellite manufacturers and the satellite owners/users) expect to operate in a "trade environment characterized by the free and open interaction of market economies", in other words, will there be "free and fair trade in commercial space launch services"? That is both a matter of definition, of perception and of the realities of remaining laws, policies and practices affecting the freedom of the trade in launch services of present and prospective launch providers.

251. See 9 (29) Space News (Jul 1998) at 2. The Administration's response to the May 1998 'China affair' in Congress has kept the offices concerned too busy to produce a first draft of this new regime in 1998 or in the first half of 1999.

CHAPTER 4

# "Free and fair" trade in launch services: requirements and prospects

The primary question to be addressed here may well be: who decides on the content or meaning and the required extent of 'freedom and fairness'? If one believes in the adage "where you stand on the matter depends on where you sit", it makes sense to first have a look at the U.S. (parties') perspective, because of the U.S. authorship of the above expression as well as in view of its strong, if not decisive, role in the establishment of the regulatory framework of the international launch industry. A distinction will be made between, on the one hand, the main industry parties or commercial interests, such as the satellite owners/operators, the satellite manufacturers, the launch providers and the private spaceport operators, and, on the other hand, the regulators and policy makers, *i.e.* the U.S. Administration and Congress. Further, the position of the main non-U.S. launch providers will be reviewed, followed by a brief discussion of possible legal remedies available to U.S. and foreign parties.

## 4.1 U.S. parties' views and perspectives

### *4.1.1 U.S. industry*

#### *4.1.1.1 Satellite operators*

Among the satellite operators one finds *e.g.* international (global) organizations like Intelsat and Inmarsat, regional organizations like Eumetsat or Eutelsat, private international consortia like US-led Iridium, Globalstar or Teledesic, domestic government telecommunications agencies or domestic private satellite companies. They:

1. buy a satellite from a manufacturer and, separately, buy the launch service from a launch company, or
2. buy a satellite-in-orbit from the manufacturer (the manufacturer builds and sells the satellite, *including* transportation into orbit which the manufacturer arranges with the launch company, *or* they

3. lease the whole or part of the transponder capacity of a satellite, orbited by or on behalf of another owner or user, who makes an arrangement as under 1 or 2.

Only in case 1, does the satellite operator find himself in a direct contractual relationship with the launch company. In the other two cases, the performance of the launch company is the concern of others, though obviously the outcome of the latter's negotiations with the launch companies will affect *inter alia* the price the satellite operator has to pay.

The demands, hopes and concerns of these users of launch services do not differ in principle from the users of *e.g.* banking, air transportation or telecommunication services.
They all demand availability, quality at a decent price, performance reliability, predictability of services and related conditions in the future,
they hope for anticipation, thinking along, innovation, on the part of the launch service providers, and
they are concerned about a (possible) lack of the above.

Though one should not totally exclude the possibility that a monopolist transport company whether subsidized or not consistently meets these expectations, there is abundant evidence in economic theory and practice (and in human nature) that competition between transport companies (as between companies in other (service) industries), providing choice for the customers (and thus a risk for the companies concerned to lose those customers) substantially increases the likelihood that the customers' expectations will be met, or at least that efforts to that end will be more consistent and determined. Customers, therefore, in principle prefer competition among their service providers.

Satellite operators contracting for the launch of their satellites will prefer a choice of launch companies to find the optimal mix of quality and price, so they can provide their own customers with, what the latter perceive as, an optimal mix of quality and price.

On the assumption that competition is good for the consumers of the service branch concerned, a satellite operator would not be happy with a - mono - or oligopolistic situation in the launch branch, which may result when

- there are more launch companies, but each of them occupies a specific segment of the market (*e.g.* one GEO launch company, one LEO launch company, one for polar orbit launches, one for heavy satellites, one for small satellites), and/or
- there are more launch companies which, however, do not really compete.

The preferred situation is then: 'real' competition in each segment of the market.

Has that been achieved to the satisfaction of the users in their capacity as direct contract partners with the launch industry? The U.S. satellite manufacturers, the traditional counterparts of the launch industry, may provide some answers. (An additional reason for looking at the manufacturers' position is the blurring of lines between the latter and the satellite (system) operators, with *e.g.* Loral Space and Communications, for 42 percent, co-owning Globalstar, Motorola participating for 25 percent in Iridium and Hughes owning 81 percent of PanAmSat and fully owning its own proposed Spaceway satellite system).

#### *4.1.1.2 Satellite manufacturers*

The above expectations of the satellite operators as users of launch services are shared by the manufacturers. And, as, apart from the large satellite owner conglomerates, such as Inmarsat or Iridium, many individual clients will opt for a satellite-in-orbit contract with the satellite manufacturer, the latter has traditionally been, and still is, a major contract partner of the launch companies. The views and actions of the U.S. manufacturers, *inter alia* because of their economic clout and high tech/innovation image, have been and continue to be of vital importance to the development of the launch industry and to the way policy makers and regulators deal with the latter industry. And where, as observed above, there is a growing tendency of manufacturers also to develop or participate in satellite telecommunications services industries and consortia, there is added reason to pay serious attention to the views of this high profile growth industry.

As we saw in the previous chapters, the U.S. manufacturers, and in particular Hughes Space and Communications and Space Systems/Loral, have been very critical in the past decade of the limited availability of launch services.

Because of their unhappiness about quality, performance, consumer orientation, cost, and sophistication of available launchers and also in view of their commercial vulnerability, priority being given at government launch facilities to U.S. government (national security and/or foreign policy) launches, they (1) put pressure on U.S. launch companies to modernize/upgrade their products, (2) put pressure on the U.S. Administration to assist in the development of new launchers through public/private partnerships, NASA/DOD led research and development, and/or 'anchor tenancy', and (3) turned to foreign launch companies: European, Russian, Chinese and, more recently Ukranian. Apparently, Arianespace was not sufficiently available, so the U.S. manufacturers saw with relief China and Russia also offering their launch products (even though it was largely uncharted territory they were entering).

Apart from thus, in principle, having more launch options available, and at - at least initially - substantially lower prices, the manufacturers also confronted the U.S. launch companies, at a vulnerable stage of their development with low-cost competitors and with additional concerns about their competitive position. This, in the manufacturers' view, had the added advantage of 'jump-starting' U.S. launcher innovation.[1]

But the introduction of *foreign* companies into the game brought also a major handicap, *i.e.* the unavoidable entry into the equation of national security and foreign policy elements in the form of laws, policies and practices, both on the part of the Administration (State Department, Commerce, DOD) and of Congress.

The Administration, as we saw earlier, had, and continues to have, *inter alia* the following national security concerns:
- satellites are defense articles or 'dual use' goods and should in principle not be exported to Russia and China for use or for launch;
- using foreign launchers is indirectly making them more efficient and, where launchers and missiles share the same technology, there is an, at least indirect, proliferatory element involved;
- the use of foreign launchers undermines US companies' competitive position and may affect 'assured access to space', a military-strategic, national security and foreign policy goal of the U.S.

But there were also important national security (*e.g.* non-proliferation) and foreign policy (*e.g.* 'engagement') considerations *favouring* the use of these countries' launch services.

Congressional concerns concentrated on the potential effects on the U.S. industry and related U.S. (regional) economic activity and the ensuing loss of U.S. launch-related jobs on the one hand and on old or more recent 'bad behaviour' on the part of China and Russia on the other hand, with a tendency to punish these countries, or at least not reward them by allowing exports of high tech satellites, and resulting launch revenues, to these countries.

As a result, the U.S. manufacturers' launch contracts with these foreign companies have been subjected to and restricted by 'payload controls' in the form of launch trade agreements, export regulations requiring specific licenses, existing laws which require the Administration to sanction the Chinese and the Russians for various forms of bad behaviour by restricting export of satellites,

1. According to a Hughes official in an October 1998 address, "one of our hopes in launching from countries overseas has been that we could help wake up the American launch industry. They have not been competitive. In the last 15 years, while the cost of satellites has come down by a factor of 30 or more, the cost of U.S. satellite launches has risen", see Michael T. Smith, Chairman and CEO, Hughes Electronics Corporation, *Deregulation: the key to realizing the promise in satellite communications*, luncheon address (Oct 28, 1998) <http://www.hughes.com/speeches/smith/smith_98_10_28_itp.html> hereinafter referred to as Smith Deregulation 1998.

and *ad hoc* Congressional sanctions, usually affecting export of high tech products, including satellites and satellite components to these countries.

In the mean time, *inter alia* as a result of intense and continuous lobbying and pressuring on the part of the manufacturers:
- the launch trade agreements have been progressively liberalized,
- the Administration has made a commitment (in 1996) to terminate these agreements altogether,
- commercial communications satellite export licensing was transferred to Commerce (in 1996), and
- *unilateral* export controls and sanctions received bad publicity as - in many cases - ineffective and damaging to the U.S. industry. As a result, there seems to be a movement in Congress to reconsider the effectiveness of unilateral sanctions as a policy tool.[2]

At the same time, the U.S. launch industry has gone through a major restructuring exercise resulting in a small number of powerful players, 'fit, willing and able' to confront foreign competition.

Additionally, impressive satellite orders from the satellite operators, both incumbent and new (LEO) satellite system operators, and the long term confidence this expansionist and 'up-beat' behaviour of the operators has given to the manufacturing industry, have resulted in turn in a demand on the latter's part for guaranteed future launch capacity. Hughes Space and Communications (and to a lesser extent Space Systems/Loral) has thus been able to play a crucial anchor tenant's role with respect to the development of three new launcher systems, the Delta 3 and the Zenit, both Boeing-led projects and the Japanese H-2A. In all three cases, a sizeable order for future launches created the necessary financial basis and 'official' customer backing necessary to confidently proceed with the launcher manufacturing process and attract other clients, and thus make the new launch product a viable undertaking.

With these 'investment' actions, the manufacturing industry has played an important role in creating more choice of launchers, a more diverse product range and more competition.
But if, in fact, the launch trade agreements are on the way out, *will there be real competition* in each segment of the market to the satisfaction of the manufacturers?

If the answer is affirmative, but only because of *foreign* launcher availability, the question then is whether the present U.S. laws, policies and practices are sufficiently conducive to, or at least not interfering with, the use of foreign launches to make the latter a real alternative for the satellite manufacturers' launch needs. Put more bluntly: do the Administration and Congress assist (or

2. As reported in Smith Deregulation 1998 *supra* note 1.

'back off'!) sufficiently to make the foreign component of competition in all launch market segments work?

This latter question addresses the extent to which the manufacturer may limit his criteria for selecting the launch company to quality, price and schedule only, *whether the launcher is domestic or foreign*.
Secondly it addresses (through the measure of predictability, consistency and efficiency of the government's policies and practices) his reliability vis-à-vis his clients: can for instance Hughes Space and Communications (and its client) count on the agreed execution of the Long March, Proton or Zenit launch of the client's satellite with the same confidence as a competing foreign satellite manufacturer like Aerospatiale or DASA when it concerns the agreed Ariane (or Long March) launch of its client's satellite?
Finally, the above question also concerns the extent to which the U.S. government permits the (further) development of foreign launchers (to be) used by U.S. clients.

In fact, the answer to the question, based on the evidence we have reviewed so far, appears to be: *no*.
*First*, the export control laws have been liberalized towards China, Russia and Ukraine, but the Export Administration Act and the Arms Export Control Act still cover the export of launch vehicle components and technology, satellites and important satellite components, and, though all commercial satellites were transferred to Commerce for export licensing purposes, this did not remove national security and foreign policy considerations from the licensing process. And the 1998 decision of Congress to - again - put the State Department in charge of this licensing and impose special, restrictive conditions on exports to China, turns back the clock altogether.
These controls in their present form, do affect the reliability and effectiveness of the manufacturer in the latter's deals with its customers.
*Secondly*, the various 'semi-automatic' sanctions laws, such as the Jackson-Vannick amendment or the Tiananmen-related sanctions do create (potentially competition-distorting) elements of uncertainty and unpredictability in a U.S. satellite manufacturer's 'life of a salesman'.
*Thirdly*, sanctions spontaneously imposed by Congress on, what one could frivolously call, the 'rogue country of the month' (and/or directed at other interests of a regional-economic, parochial, partisan or even xenophobic nature) are a handicap for the satellite manufacturing industry. The considerable - satellite and launch technology transfer related - Congressional excitement which erupted in May 1998 and the ensuing draft legislation intended to forbid or restrict satellite exports (for launch or use) to China and even to prevent U.S. contributions to the safety and reliability of the Long March - for *inter alia* U.S. satellites! - is a case in point.
*Finally* existing foreign launch companies continue to be prevented from improving their products through MTCR-based U.S. export restrictions.

In an April 1997 speech, a Hughes official, citing the dramatic (real and projected) growth of civil, military and commercial satellite systems in all orbits, stated that "it is imperative that America increase its access to all types of launch vehicles and to new launch sites."[3]

Hughes saw a major role for the U.S. government in growing global launch vehicle supply, and credited the government for a number of related positive actions in this connection, such as the transfer of commercial satellite export licensing from State to Commerce, which the official believed, would "significantly speed and boost foreign sales."

But he also mentioned several U.S. government policies and practices regarding launch vehicles which "continue[d] to threaten America's supremacy in commercial space."

Under the heading "[a]bolish antiquated technology transfer restrictions", two examples were mentioned. One concerned the delay in the development of the Japanese H2A launch vehicle caused by the State Department holding up, for MTCR-related reasons, the export to Japan of U.S. Thiokol solid rocket boosters. As the same official had stated half a year earlier, "[i]ndustry desperately needs the H2A."[4]

Apart from the Thiokol issue, which had been solved in the meantime, Hughes mentioned a USD 2.4 billion contract with ICO Global Communications of London to build a 12-satellite MEO system for global handheld mobile telephony, "a major win, especially in the face of tough European competition from companies like Aerospatiale, Alenia, DASA and Matra Marconi." But, in stead of celebrating the win, the company now had to "tackle the policies and bureaucracies at Defense, Congress, and State. For example", observed the Hughes official, "the Technical Assistance Agreement we applied for last September still hasn't come through. As a result, our ICO customer can't even attend the design meetings where we discuss how their satellites will interface

3. See John S. Perkins, Vice President, Launch services acquisition, Hughes Space and Communications International, Inc., *Achieving the promise of space by increasing the world's supply of commercial launch vehicles* (Apr 2, 1997)<http://www.hughes.com/speeches/perkins/perkins_97_05_promise.html>, hereinafter referred to as Perkins 1997.

4. See John S. Perkins, *Launch vehicles: keeping the U.S. satellite industry competitive* (Oct 8, 1996) <http://www.hughes.com/speeches/perkins/perkins_10_8_96.html> hereinafter referred to as Perkins launch vehicles 1996. The speaker had earlier explained that the Ariane 4 and the Proton were the only heavy-lift launch vehicles available to Hughes: "With its near-monopoly, Ariane is able to keep its prices high.", and access to Proton was still limited by the launch trade agreements. As for the reasons for needing the H2A, he said: "First, with its heavy-lift capacity, maximum payload lift to GEO would double from about four tons to eight. Second, industry needs Japan's Tanegashima spaceport to relieve our launch facility gridlock. And, finally, the H2A will make the commercial satellite launch market more competitive. By going outside its own country for components to America's Thiokol, in fact Japan can give us a lower cost launch vehicle."

with their launch vehicles." And he ended: "But how likely is it that foreign customers will buy American satellites and launches when our government imposes such stringent controls?"

In that connection, Hughes repeated a plea for full access to all launch vehicles and launch sites and expressed his concern about U.S. policies limiting American access to many foreign launch vehicles, both for technology transfer reasons and to protect the U.S. launch vehicle market: "[a]ll such policies are out of date and counterproductive ... Today, market demand argues loudly against foreign launch vehicle quotas of any kind ... these quotas should be removed immediately."

Where the satellite manufacturer knows that the various policies will not change overnight, if at all, he addresses the domestic offer of launches and launch pads. As for the latter, there is severe criticism of for instance the availability of Cape Canaveral for commercial launches. To quote Hughes again:

"For example, competition for pad time from a growing number of defense and NASA launches. Lack of sufficient launch pad capacity, stemming primarily from too much time spent on pad for each launch. Plus range exercises and Shuttle landings that preclude concurrent launches. Excessive turnaround time. And, most importantly, an immobile site that lacks much-needed flexibility for fuel-efficient equatorial launches as well as launches into inclined orbits ... I was ... surprised to hear ... that the government is contemplating whether to charge industry for the upkeep of launch facilities. Now, it seems, we may be expected to pay for maintaining facilities that not only are inefficient and outdated, but that also disadvantage us by their low throughput and high costs related to their unfavourable location ...

America's ability to compete successfully in the world's fast-growing commercial satellite launch marketplace will depend on how quickly and how appropriately it can adapt to the unprecedented changes already well underway in the global comsat environment. Today, hundreds of new commercial LEO's are being constructed on assembly lines. At Hughes, construction time for our HS 601 model has gone from 36 months to less than 18. What this means is that turnaround time on the launch pad will need to be measured in days rather than weeks. Also, greater versatility in launch sites is a must, so that all orbital planes can be accessed with maximum cost- and fuel-efficiency."[5]

On the *credit* side of the Cape Canaveral ledger, the manufacturer lists, apart from a long and successful history of operations, two factors of a regulatory nature: location in a politically stable country, and for U.S. satellite manufacturers, "a much easier time obtaining export licenses".

5. See Perkins launch vehicles 1996, *supra* note 4, at 1 and 2.

It must be obvious by now that, as a result of the above laws, policies and practices, the preferred situation for the U.S. manufacturer is a full array of competitively priced, 'fit, willing and able' *U.S.* launchers and launch sites to choose from, and available independent from national security and foreign policy-inspired government interference.
As far as launch *sites* in the U.S. is concerned, as we saw in Chapter 1, there is a promising development of, on the one hand, a more private launch industry focused attitude on the part of the Federal launch sites; and, on the other hand, of the establishment of new commercial spaceports primarily competing for commercial launch activities.
Though most of these projects have been and are being (partially) supported, financially or in kind by the USAF and/or NASA and/or state governments, as far as management and launch priorities is concerned they are nevertheless private enterprise-oriented and cater to all clients, both from the private sector, the manufacturers and satellite operators, and from the government, without specific preferences or priorities.
On the other hand, these projects, with the possible exception of Spaceport Florida, are not destined for the use of heavy launchers of the Atlas or Proton type, and therefore for the time being offer only an indirect relief for the users as, once in full operation, they take away other traffic from, and thus create more room at, the government launch sites for GEO launches with heavy launch vehicles.

As for increased choice of domestic launch vehicles in the medium to heavy lift range, one project promises a measure of relief for - also - the commercial launch customers, *i.e.* the government (USAF) paid launch vehicle modernization program called EELV (Evolved Expendable Launch Vehicle).[6]

Hughes, in April 1997, did not see the EELV - which is intended to be the Federal government's only medium-, intermediate and heavy-lift ELV launch system for years to come - "as currently conceived" (*i.e.* before USAF's decision to have two competing launch companies share the contract) as an adequate solution to its launcher needs: "In fact, it could prove detrimental. But there is still time for Washington to re-think the EELV".[7] Apart from asking for (more) assured funding, a quick and steady development, a design and manufacture enabling horizontal processing to minimize on-pad and turn around time, and more launch pads, the Hughes spokesman particularly attacked the plan to use the EELV to *replace* (most) Atlas, Delta and Titan rockets for government launches in the early 2000s:

"Satellite customers who contract with U.S. manufacturers often do so because of our access to such proven launch vehicles as Delta, Atlas, and Titan. By enhancing our large

6. See Chapter 1, *supra*.
7. See Perkins 1997, *supra* note 3.

complement of these existing launch vehicles with the addition of EELV and related infrastructure, we could more quickly launch the world's LEOs, MEOs, and GEOs. This would give U.S. industry an even greater marketing edge".[8]

The demands (or hopes) of the manufacturer are understandable: don't throw away the old ELV's because the more reliable launchers there are available for the launch market, the better it is for the clients (or, at least, don't stop producing the old launchers before the new ones have fully proven themselves). This approach would require parallel developments and continued production of old and new launch vehicles, probably both logistically and financially unrealistic for any length of time. The transition from the current fleet to the evolved version is of course the most risky part of the operation, not only for the Air Force, but for the private customers as well: the latter would be hard hit by the termination of the production of the current launch vehicles if there is not a seamless transition to the new generation of launchers, the more so as, in such a case, pressing national security-driven launch requirements on the part of the governmental customers would probably lead to the latter requisitioning any remaining domestic launch capacity to the detriment of the commercial customers.

Mid-1998 program adjustments appear to largely meet the wishes of Hughes, as far as capacity and flexibility are concerned.

With the original USAF requirements for the three vehicles of each family of launchers in the order of 1.845 kg (small), 3.860 kg (medium/intermediate) and 11.000 kg (heavy), both Boeing and Lockheed Martin planned to produce medium/intermediate launchers with a lift not exceeding about 5.000 kg; this however would not be sufficient to cater for the newest 5.000-6.500 kg commercial satellites being envisaged for production after the year 2000.

Encouraged by the satellite manufactures and driven by the ambitious plans of their foreign competitors (including the Russian and Ukrainian partners they represent (!)) Boeing and Lockheed Martin have in the meantime decided to increase the capacity of their medium, intermediate launchers with (solid-propellant) strap-on motors, to serve adequately this upper end of the commercial market.[9]

Although the heavy-lift vehicle may still be needed for the largest military satellites, and could also be designed to carry a dual load of lighter satellites, the effect of the above intermediate launcher adaption on the need for two competing heavy-lift vehicles (and the reaction of the two companies thereto) is unsure at this stage. But the U.S. satellite manufacturers will feel more comfortable with the revised plans, also because it will reduce their

8. *Id.*
9. See Space News Online (Sep 7, 1998) at 1 ("Firms revise plans for Eelvs/Redesigns could allow for large commercial payloads") <http://www.spacenews.members/sarch/sarch98/sn0907m.htm>

dependence on foreign-built vehicles (whether marketed by U.S. companies or not).

The program does provide a (long-overdue) modernization to the domestic launch product through a (long-wished) government sponsorship and anchor-tenancy. And it does seem to bring to the manufacturers the preferred situation of real domestic competition in at least the most important segment of the market. But, apart from creating apprehension on the part of the remaining non-subsidized U.S. launch companies (to-be), this government sponsorship also brings government demands and priorities and government dependence which is one of the things the private customers would prefer to stay away from because of the uncertainties it entails.

*Foreign* launch competition thus continues to be vital for the interests of the U.S. satellite manufacturers. As a consequence, the feasibility of their preferred form of 'free and fair trade in launch services', *i.e.* the freedom to sell satellites and to choose launch providers both within and outside the U.S., will continue to be dependent on the way the U.S. government treats the manufacturers' foreign customers and their foreign launch providers.

#### *4.1.1.3 Launch providers*

Not only have the lines between U.S. satellite manufacturers and satellite system operators blurred, also the two remaining major U.S. launch companies, *Boeing* and *Lockheed Martin*, are aerospace conglomerates which also manufacture satellites and participate in satellite systems.

Boeing produced the highly successful Global Positioning System (GPS) satellites for the Air Force, and will take advantage of its experience with that project (encompassing up to 33 satellites including spares, at a potential value of approximately USD 1.3 billion) when it designs and builds (and co-invests in) the new 17 satellite Ellipso global satellite communication system for mobile telephone and data transmission.
Lockheed Martin also produces satellites and has recently acquired Comsat Corporation.

Both companies have an interest in making their launch businesses profitable. At the same time 'their' satellites have to reach orbit within the preferred time frame. This situation creates already a more 'nuanced' attitude vis-à-vis each other and towards their competitors: as manufacturers or operators they may need the services of those same competitors to get their own satellites into orbit, particularly if their EELV launch families become (partly) complementary instead of fully competitive. With the fierceness of domestic competition to some extent mitigated by joint projects such as the co-management of the space shuttle and co-production of the USAF EELV, and because both Boeing and Lockheed Martin have concluded partnerships with Russian and Ukrainian competitors respectively, serious competition will be primarily limited to the Chinese GWIC's Long March, the European Ariane 5 and the Japanese H2A. These will all be capable of putting tomorrow's heaviest satellites into geostationary transfer orbit (GTO).

As we saw earlier, Hughes' order of Delta 3, Sea Launch Zenit 3 SL and Japanese H2A launchers, and its hopes for a soonest operational status of the Ariane 5, are intended to cover its future launch needs, in particular for the newest generation of bigger and heavier communications satellites, such as the HS 702, weighing up to 5.200 kg/11,464 lb, which is too heavy for the Ariane 4 and for the present Atlas, Delta, Long March and Japanese H2 launch vehicles.
The GTO clients demand heavier lift and, given the importance of that market, they will get the launch vehicles they demand.[10]

The newest and most promising market for all launch providers is that of the LEO satellite constellations. In 1997, both Iridium and Orbcomm began full-scale deployment of their respective systems, with 46 satellites of the 66 Iridium satellites and 8 of the 28 Orbcomm constellation launched. Iridium used six Delta 2 launches for a total of 30 satellites, two Protons for 14 satellites and one Long March for 2 satellites. Orbcomm used its 'mother's' (Orbital Sciences Corporation's) Pegasus launcher. At the end of 1998 both systems had reached full operational status with all satellites functioning in their planned orbits. With hundreds of satellites in the coming years waiting to be launched into LEO orbit, both for initial start-up of the various satellite constellations and to replace satellites which have served out their useful life or malfunction, this is the booming (non-government!) market in which both the heavy-lift launch providers and their light-to-medium-lift vehicle colleagues will be competing.

It is this market which has prompted both the above established launch firms and a number of newcomers to autonomously develop dedicated launch vehicles or to conclude alliances with companies who have those launch vehicles already available. Thus, in the U.S., Orbital Sciences developed the air-launched *Pegasus* for max. 1,000 lb LEO satellites and Lockheed Martin the *Athena 1* (1,760 lb). In the same league, Russia produced the *START* (1,500 lb). And also Kistler and its RLV colleagues will eventually be active in this market.

10. With a (FAA-COMSTAC) scenario of some 25 GEO/GTO and 15 other medium-to-heavy launch vehicle launches per year over the next 12 years, it would be commercially suicidal for the launch providers not to comply, see Ch. 1, (text to) note 3a.

For the medium-sized satellites destined for that orbit, Starsem, sells the Russian *Soyuz* launch vehicle. And the Russian-German joint venture Eurorokot will market the Russian *Rockot* launcher based on an SS-19 missile. Japan and India will be active in this market too (though the latter will continue to be severely hampered in its sales efforts by its strained relations with the U.S.).

The existence of this still relatively modest number of large, medium-sized and small launch providers in the LEO satellite market and the competitive picture resulting therefrom begs the question of the regulatory regime which the U.S. launch companies concerned would like to have applied thereto in the context of 'free and fair trade in international launch services'. Domestically, the gap between the "big two" and (most of) the other U.S. (prospective) launch providers has widened as a result of the generous EELV grants given to the former. The latter are 'not amused'; in testimony before the Senate Committee on Commerce, Science, and Transportation, the following comment was made:

"By funding programs such as the ... (EELV), and threatening to fund a commercial Venture Star, the government is actually impeding progress in the commercial launch industry.

...

The private capital markets perceive EELV and Venture Star as government-funded competitors to any private launch venture. That dries up investment capital for companies such as Kelly Space & Technology, Kistler, Rotary Rocket, Pioneer Rocketplane, and others.

...

The government should not fund development of a new launch vehicle if it is to be used for commercial purposes".[11]

And an editorial in a leading aerospace journal, highly critical of the government's policy to let these major companies compete for government launch service contracts with the small - unsubsidized - U.S. launch companies without taking into account the subsidies awarded to the former, called it

"a declaration of war on the small U.S. companies that are trying independently to develop new commercial boosters ... it looks like the government is trying to run the little guys off the road".[12]

The days of launch quota would seem to be almost over and it will be difficult, with the number, diversity and international character of the launch providers,

11. See Michael S. Kelly, testimony before the Subcommittee on Science, Technology, and Space, Senate Committee on Commerce, Science, and Transportation (Mar 5, 1998).
12. See AW/ST (Jul 20, 1998) at 66 ("Stacking the deck against innovative launch companies").

to establish defensible normative prices which would have to be taken into account when contracting for such LEO launches.
The two large U.S. launch operators, given their solid competitive position, may be expected, in the absence of bilateral launch trade agreements, to raise the issue of 'rules of the road' only if confronted with particularly aggressive sales efforts on the part of the Japanese or of a European-Chinese alliance yet to be established. The smaller players may want to strictly limit the number of missiles-turned-launcher entering the market, whether domestic or foreign owned or - like the large launch operators - prevent foreign competitors (in their 'league') from using cheap, subsidized U.S. launch facilities. But they will not be in a position to demand bilateral constraints of the type that is now slowly on the way out. To the extent the smaller players occupy rewarding and promising niche markets they may be expected to be taken over eventually by the established major aerospace firms.

The U.S. launch firms are well-positioned to take advantage of the present international and domestic regulatory environment governing the trade in launch services. Their only problem at this stage would appear to be the way Congress views the national security aspects of their alliances with foreign launch providers (*e.g.* Sea Launch) and the strict controls the Administration, as a consequence, has been forced to apply thereto.

#### *4.1.1.4 Spaceport operators*

Government launch sites or spaceports have - traditionally - been primarily oriented towards government needs and government priorities.
When - during the ELV commercialization drive of the mid-1980s - they were made available to private launch providers, DOT was able to slowly increase the private enterprise focus of the two government launch site operators, NASA and DOD. However, where the government *pricing* policy was a generous one, with only incremental costs charged to the new users, the government agencies operating the launch sites continued to put a higher priority on 'their' (often) national security and foreign policy driven launches than on meeting the expectations of the private customers which they were asked (in the absence of private spaceports) to accommodate as well.

This somewhat uncomfortable dual government role, the governmental launch site monopoly and the increasing needs of the launch service providers caused by the substantial growth (forecasts) of the satellite launch market all combined to give the impetus to private spaceport development initiatives in the U.S. and/or by U.S. interests abroad. (The Cape York project involving a U.S. managed Australian launch base for Russian Proton launches was probably the first such move of a U.S. firm, but its background was not so much unhappiness with the available U.S. launch sites or with the launch priorities of the government agencies concerned, but rather the lack of sufficient launch

providers and the wish of Australia to be involved in the launch business, joined by Russians looking for a non-Russian launch site to avoid or mitigate U.S. export restrictions)
The Commercial Space Launch Act of 1984 foresaw and provided for this development, and, as we saw in Chapter 1, DOT in the mean time has issued commercial launch operator's licenses to the operators of four such spaceports as required by that Act.

Although from the point of view of an optimal use of available resources one may wonder whether a combined government/private customer base would not be preferable, a separation of launch pads avoids the complications of an operator trying to please two masters with different requirements and priorities, and is, apparently, as unavoidable as the separate existence of military airbases and commercial airports.

Commercially operated private U.S. spaceports (will) have a straightforward and simple mission: to become (and remain) profitable and provide shareholders value, which means attracting as many U.S. *and foreign* launch companies as possible.
Understandably, the U.S. spaceports are the U.S. launch companies' natural allies when it comes to preventing, or at least limiting, launches of U.S. satellites by foreign companies from foreign launch sites (at least in so far as the U.S. launch firms concerned do not have a financial stake in their respective foreign competitors).
But the U.S. launch companies will be less than happy with a situation where they compete with foreign launch providers which, by using *U.S.* commercial spaceports, have levelled the playing field to an uncomfortable extent.

Orbital Sciences Corporation (OSC) in the past has objected to foreign, *i.e.* Israeli, use of U.S. spaceports because this would amount to U.S. tax payers (through the Federal support of the government launch site involved) assisting foreigners in competing with U.S. launch companies.[13]
Obviously the U.S. government has the freedom to approve or disapprove, for national security, foreign policy or other (budgetary/federal support) reasons, this foreign use of its own launch sites. But the government's arguments for rejecting foreign use of *private* spaceports will have to be of a different nature

13. See 8 Space News (Feb 17-23, 1997) at 1 ("Israel spurs policy debate with bid for U.S. launches"). As the FAA-AST notes in a 1997 report on newly emerging space nations, "[c]urrent United States law calls for commercial users to pay only the marginal cost of [US] launch ranges. The rest of the expense of maintaining these sites is borne by the taxpayer and ultimately, in part, by commercial entities like OSC. Foreign users would not bear these additional expenses.", see *The worldwide growth of launch vehicle technology and services*, Special Report, 2nd Quarter 1997 Report, [DOT-FAA-AST], hereinafter referred to as AST Special Report 1997 <http://www.ast.faa.gov/bulletin/quarterly/9702/special.html>.

and will not fail to draw sharp reactions from the 'client-starved' spaceports concerned (whose FAA licences do not address the nationality of the - potential - users).[14]
One may anyhow expect the private spaceports to vigorously defend their case as a logical consequence of their version of 'free and fair trade' in launch services.

### *4.1.2 U.S. Government*

#### *4.1.2.1 Administration*

The U.S. administration is both a regulator and a customer of the U.S. launch industry's services. That dual role creates diverging and sometimes conflicting interests.
A U.S. government agency acting as a customer will share most of the above expectations of the manufacturers and operators. When it comes to flexibility of the launch provider they will even be more demanding than the commercial customer. A sudden regional conflict, disaster or activity of a military, national security or foreign policy related nature (*e.g.* Tsjernobyl, Gulf war, Indian nuclear tests, Kosovo etc.) may require the immediate launching of additional remote sensing, intelligence and other communications satellites. The government's launch services demands, both planned (long term), and *ad hoc* (short term), have to be met by the space shuttle, DOD's own launch vehicles and the private sector. With the current and projected shortages of heavy-lift launch vehicles, which the government needs for its various GEO satellites, it shares the above parties' concerns about the availability of efficient, low-cost launch capability, and it has one additional handicap, *i.e.* the self-imposed obligation to only use U.S.-built launch vehicles and the 1998 Commercial Space Act's insistence on the use of U.S. operators.
As a customer the government believes in competition, both domestic and foreign, to get the required quality at a decent price and all the other benefits brought about by free trade.
But the ultimate consequence of free trade and free competition, *i.e.* the survival of the fittest producer(s), is only acceptable to the U.S. if *a* U.S. launch industry belongs to the survivors. This is the consequence of another role of the administration, *i.e.* that of the guardian of national security. The

14. According to the FAA-AST, groups concerned with the Florida Spaceport have pushed for both Shavit and Proton launches from Florida in the hope of raising the number of launches from Florida sites, see above AST Special Report 1997, at 3. They could refer to the agreement signed between Russia's STC Complex with SpacePort Canada which provided for launches of the former's Start launchers from a new spaceport in Churchill, Manitoba, see *ibid*. (The difference with the US situation is off course that Canada does not have an indigenous launch industry that could be threatened by the Start operations).

latter role requires assured access to space, which means access controlled by the U.S. and thus provided by government entities and/or U.S. citizens.
The U.S. launch companies are an established part of and play a crucial role in providing this assured access to space. That limits the government's application of traditional economic concepts to this industry. Yes, the launch companies should not have a monopoly. They should be subject to the rigors of the market to keep them on their toes, quality and cost/price-wise. In that connection, Arianespace is, as such, a welcome competitor, and so are the launch providers from Russia, China and Ukraine. Up to a point. The U.S. domestic launch industry's existence should not be seriously threatened, because assured access to space should not be compromised. Hence the launch trade agreements' quotas and price conditions.

The 'coming of age' of the U.S. launch industry in the past few years, the result of a combination of (government and private, domestic and international) customer demands, competition from Arianespace and the other foreign launch providers, and industry consolidation, has given the government sufficient confidence in the continuity of the private launch companies to yield to various pressures (from the foreign countries concerned, from the satellite manufacturers and from the U.S. launch companies which teamed up with affected foreign launch providers to jointly sell the latter's products) to liberalize and, at the beginning of the next century, not to renew the agreements in their present restrictive form. The two private U.S. companies on which the administration now relies for (part of) its launch needs, Lockheed Martin and Boeing, are both high tech aerospace conglomerates of such strength and financial resilience that they can be trusted to be and remain fit, willing and able to compete with the foreign launch companies and continue to provide assured access to space to the U.S. government. Their joint activities for the government, both as operational managers of the Space Shuttle (the United Space Alliance) for NASA and as EELV developers/manufacturers for the Air Force, combined with their assured government launch business under the 'fly U.S.' policy, further strengthen their position and make the U.S. government's steps towards a liberal launch trade regime both philosophically right and commercially and strategically (practically) risk-free. An additional reason for the administration to feel reasonably relaxed about the consequences of this liberalization is the existence of the U.S.-Russian and U.S.-Ukrainian launch alliances which, as long as they last, channel part of the benefits of liberalization back to the U.S.

What remains for the U.S. administration to decide on as a regulator is the regime that should produce or induce 'fair trade' behaviour on the part of the above countries' launch providers after the termination of the agreements. Little is known about the work that has been done so far by USTR, the State Department, Commerce, DOT and the White House OSTP on the matter. One must assume that the principles that should be adhered to will not be materially different from those already embodied in the launch trade agreements and discussed in the respective paragraphs. (The 'big sticks' to enforce adherence will remain the Trade Act and, though not meant for that purpose and therefore ultimately counter-productive, the export control legislation.)

The problem at this stage is probably one of a more domestic nature, *i.e.* the sharpened awareness of Congress of the various issues involved (U.S. satellite and launch know how and non-proliferation, U.S. jobs, the export regulatory roles of State versus Commerce, and the influence of the manufacturers on the administration's policy making in this area) in the wake of the May 1998 China affair discussed earlier (and further explored hereafter). As a result of the sometimes heated and, at least partially, partisan discussions on the advisability of having U.S. satellites launched by the Chinese, there will likely be little or no progress on the matter of the post-launch trade agreements regulatory regime for some time to come.

#### *4.1.2.2 The U.S. GATS approach*

This leaves the relations with Europe to be dealt with in a way which produces or does not prevent a 'free and fair trade' in launch services. Apart from bilateral 'rules of the road' discussed earlier, the possibility of liberalization of launch services through the General Agreement on Trade in Services (*GATS*) has been envisaged in the past.

GATS is a set of multilateral, legally-enforceable rules covering international trade in services. It was negotiated during the Uruguay Round of world trade negotiations (1986-1994). The Uruguay Round led to the creation of the World Trade Organization (WTO), an intergovernmental organization which aims at free(er) world trade. Another result of the Uruguay Round was a set of agreements, *viz.* the Multilateral Agreements on Trade in Goods (which includes the GATT and other agreements such as those on agriculture, textiles, subsidies etc.), the above GATS and the Agreement on Trade-Related Intellectual Property Rights (TRIPS). Apart from those agreements, to which all WTO members are parties, there exists a separate set of 4 agreements to which *not* all WTO members are parties, *i.e.* the so-called Plurilateral Trade Agreements; one of these latter agreements is the *Agreement on Government Procurement.*

GATS covers all service sectors and services. The Agreement operates on three levels: the main text containing general principles and obligations; annexes dealing with rules for specific sectors; and individual countries' specific commitments to provide access to their markets.

The main principles of the Agreement include (but are not limited to):
- *Most-Favoured-Nation* (MFN) treatment, which means treating one's trade partners equally. In other words, if a country allows foreign competition in

a sector, equal opportunities in that sector should be given to service providers from all other WTO members. This applies even if the country has made no specific commitment to provide foreign companies access to its markets. MFN applies to all services, but WTO members have been allowed, be it only once (at the time of the GATS finalization), to list specific exemptions to the principle vis-à-vis certain (groups of) trade partners; these exemptions are temporary: they will be reviewed after five years (in 2000) and will normally last no more than 10 years.The exemption lists are part of the GATS agreement.
- *national treatment*, giving foreign service providers the same treatment as one's own national service providers, is only applicable (in GATS) where a country has made a specific commitment to provide access to its own market. Exceptions to *c.q.* limitations of the principle are allowed.
(Other principles require for example that governments must publish all relevant laws and regulations and that these regulations be objective and reasonable).

Individual countries' commitments to open markets in specific service sectors are the result of multilateral negotiations (which will often include, or be preceded by, bilateral talks on specific conditions). The commitments, once agreed upon, are listed in so-called "schedules", which contain also the exceptions and limitations to the market access thus granted.

After the U.S. government, in 1996, had deregulated the domestic telecommunications market for U.S. telecommunications providers ('carriers'), it started to push for adoption of the same pro-competitive principles in the international telecommunications market. The worldwide acceptance of these principles through a WTO agreement would on the one hand open up the U.S. (satellite) telecommunications market to foreign operators, and thus expand choices, stimulate innovation and lower prices for the benefit of the U.S. consumers; it would on the other hand open protected foreign domestic markets to eager U.S. telecommunications and satellite industries.

When, on February 15, 1997, the U.S. and 68 other countries, together representing more than 90 percent of the $600 billion global telecommunications market did reach agreement on the opening of this market, this *WTO Agreement on Basic Telecommunications Services* (WTO Basic Telecom Agreement) was greeted as a victory of the principles of free competition, fair rules and effective enforcement as enacted in the above U.S. Telecommunications Act of 1996.[15]

15. See statement of FCC Chairman Reed Hundt concerning WTO agreement on telecom services (Feb 15, 1997) <http://www.fcc.gov/Speeches/Hundt/st021597.html> The FCC, in November 1997, adopted new rules to liberalize market access for foreign telecommunications providers, incl. in particular foreign satellite systems licensed by WTO

The WTO Basic Telecom Agreement entered into force on February 5, 1998 for, *inter alia* the U.S. , the European Communities (and the individual member states), Japan, India, Brazil and Israel.[16]
The momentum created by the agreement has also led to the development of the so-called Global Mobile Personal Communications by Satellite (GMPCS) Memorandum of Understanding (MoU) and Arrangements, designed to ensure that terminals associated with GMPCS systems will be able to transit borders and "roam" freely. At the end of 1998, more than 100 administrations and industry members had already signed the MoU.[17]

The ensuing liberalization of global telecommunications through the opening of national markets to international competition has gone hand in hand with a convergence of domestic telecommunications companies with those of other nations to form multinational alliances, in order to enlist additional capabilities, create synergies and share the risks and - huge - costs involved.

The result of this regulatory and strategic revolution is a phenomenal growth of the global telecommunications industry (with a strong U.S. presence), an increasing need for sophisticated and reliable communications satellite systems and - unavoidably - *a corresponding requirement for sufficient, reliable, decently-priced, on-time transportation services to get the satellites into their proper orbits.*

Which brings us to the - possible - application of the above GATS principles to the trade in launch services.
First, in the *absence* of a specific commitment to provide foreign launch companies access to its satellite launch market, the U.S. will still be bound by the MFN principle.

members, consistent with the U.S. commitments in the above WTO agreement, see *Commission liberalizes foreign participation in the U.S. telecommunications market* (IB Docket Nos. 97-142 and 95-22), Report No. IN 97-36 (Nov 25, 1997) and *Commission adopts procompetitive market opening policies for foreign satellites* (IB Docket 97-111, CC Docket 93-23), Report No. IN 97-37 (According to the latter doc, in Feb 1997, the U.S. and 49 other nations made binding commitments in the WTO Basic Telecom Agreement to open satellite markets to competition) <http://www.fcc.gov/Bureaus/International/News_Releases/1997/nrin7041and 7042.html>.
The two above FCC orders entered into force in early Feb 1998.

16. See for text <http://www.wto.org/wto/services/tel2.htm>. And see Schedules of Commitments and Lists of Article II Exemptions to be annexed to the Fourth Protocol of the General Agreement on Trade in Services (Jan 29, 1998)<http://www.wto.org/new/gbtoff.htm>. Fourth Protocol to GATS, 33 ILM 1167 (1994).
17. See <http://dettifos.fcc.gov:8080/beta/doc-search/opasrchV2.cgi>. And see FCC News, *International Bureau reports on developments in international telecommunications markets*, Report no. IN 98-58 (Nov 19, 1998) <http://www.fcc.gov/Bureaus/International/News_Releases/ 1998/nrin8041.txt>.

This provides the WTO members' launch companies with equal opportunities to offer their services in the U.S. launch market. "Equal" is to be read here as equally good or equally bad.
MFN thus obliges the U.S. government to treat the launch companies of WTO members India, Israel and Japan in the same way as Arianespace *or vice versa*. A launch trade agreement concluded with any one of these WTO members would not stand if it meant a less favourable treatment of the respective member as compared to the other WTO members; conversely, it would have to be extended to all other WTO members if considered more favourable than the treatment the latter were accustomed to.

MFN also means that, if non-WTO members such as China, Russia or Ukraine receive a better U.S. treatment - in the sense of more opportunities to offer their launch services in the U.S. market - than a WTO member, *e.g.* India, the latter may claim the same better treatment from the U.S.
And, finally, China, Russia and Ukraine, in view of their non-membership at present lacking the legal means to invoke the MFN principle vis-à-vis the U.S., would, upon becoming a member, be able to benefit from this GATS principle and expect equal opportunities in the U.S. launch market.

In 1994, the above, seen in the context of the existing launch trade agreements with the latter three countries and possibly in view of similar agreements the U.S. may have envisaged concluding with the European Union and Japan, was sufficient reason for the U.S. government to make an MFN exemption for "space transportation".
In its filing, the U.S. government referred to the quota and price restrictions embodied in - unspecified, *i.e.* also future - bilateral launch trade agreements and, as to the condition creating the need for the exemption, mentioned the "need to prevent disruption of competition in the international space launch market".[18]

The U.S. thus made clear that it wished to remain free to discriminate in this field between its trade partners, in this case between WTO and non-WTO members. As the MFN exemption was clearly meant to maintain the validity of the launch trade agreements with the latter, the MFN treatment of the former, with whom no launch trade agreements had been concluded, remained unaffected.

18. The U.S. filed an exemption for "Transport Services; Space Transportation", and, under the heading "Description of measure indicating its inconsistency with Article II' described its launch trade agreements as "[q]uantitative restrictions and price disciplines in certain bilateral agreements on the launch of satellites in the international commercial space launch market", see Final List of Article II (MFN) Exemptions (U.S.) (Apr 15, 1994). Europe did not take an MFN exemption because, as we saw earlier, it had not formalized its launch trade agreement with Russia. Japan, as a matter of principle, did not take a MFN exemption either, info Eur. Commission, DG I (Dec 11, 1998).

Before one concludes that India is entitled to demand the same treatment as Arianespace and Japan in the U.S. market, it should be realized that the GATS provides for a *security exception* which the U.S. could - and probably would - invoke in case of such a demand (or complaint).[19]
In the past, the GATT/GATS panels have been treating this exception with caution, generally retreating whenever it was invoked.

Secondly, for France/Arianespace to be able to invoke *e.g.* the *national treatment* principle, an explicit commitment on the part of the U.S. to provide foreign access to its launch market would be required.

Such a commitment would provide equal access to the U.S. market for all WTO members with launch companies, automatically including new WTO members: thus, if China would join WTO, the then existing commitment would apply and override the MFN exemption and the more restrictive arrangements which that exemption covers.
An additional benefit of *national treatment* would be the - possible - availability of high quality U.S. spaceports, both federal and private ones, to all respective foreign launch companies. This would be of particular interest to WTO members with launch capabilities but limited ground facilities, such as Israel and Japan. It must be assumed, however, that the U.S. would hesitate opening up the subsidized federal launch sites to foreign competitors, and would phrase its commitment accordingly.

During the Uruguay Round, the European Union, in bilateral discussions with the U.S., raised the issue of liberalization of commercial space launch services through the application of GATS, and suggested that the U.S. (and of course also Europe and the other space launching countries) make a commitment as referred to above. The U.S. reaction was far from enthusiastic, reportedly because the U.S., *inter alia,* felt uneasy about the effect their commitment and the ensuing application of all GATS general principles and specific provisions would have on their position with respect to the policy of reserving the government market for U.S. launch providers ('fly U.S.' policy).

19. See GATS, art. XIV bis ("Security exemptions"): 1. "Nothing in this Agreement shall be construed:
(a) to require any Member to furnish any information, the disclosure of which it considers contrary to its essential security interests; or
(b) to prevent any Member from taking any action which it considers necessary for the protection of its essential security interests: (i) relating to the supply of services as carried out directly or indirectly for the purpose of provisioning a military establishment; (ii) relating to fissionable and fusionable materials or the materials from which they are derived; (iii) taken in time of war or other emergency in international relations; or
(c) to prevent any Member from taking any action in pursuance of its obligations under the United Nations Charter for the maintenance of international peace and security. 2 ...". GATS text at <http:www.wto.org/wto/services/gatsintr.htm>.

This may or may not be a valid worry; the fact is that the GATS Agreement specifically provides that the provisions on MFN, market access commitments and national treatment do *not* apply to "government procurement".[20]
(In fact, government procurement has always been omitted from the scope of the GATT, but was dealt with in separate agreements with effect from 1981.) In parallel with the Uruguay Round discussions, talks on this issue took place as well, and resulted in a separate plurilateral *Agreement on Government Procurement* of 1994 (GPA) which entered into force on January 1, 1996 for *inter alia* the U.S., the European Community and its (15) individual member states, Japan, Israel and about 10 other WTO members.[21]

As a consequence, for the U.S., the national treatment and non-discrimination principles to be found in art. III of the GPA, apply to - in principle - all U.S. government agencies' procurements. The "core" provision reads as follows:

"1. With respect to all laws, regulations, procedures and practices regarding government procurement covered by this Agreement, each Party shall provide immediately and unconditionally to the products, services and suppliers of other Parties offering products or services of the Parties, treatment no less favourable than:
(a) that accorded to domestic products, services and suppliers; and
(b) that accorded to products, services and suppliers of any other Party."[22]

Among the many government agencies which have been listed by the U.S. as entities which procure in accordance with the provisions of the GPA, both NASA and DOD are mentioned.[23]

20. See art. XIII: "1. Articles II, XVI and XVII shall not apply to laws, regulations or rquirements governing the procurement by governmental agencies of services purchased for governmental purposes and not with a view to commercial resale or with a view to use in the supply of services for commercial sale.
2. There shall be multilateral negotiations on government procurement in services under this Agreement within two years from the date of entry into force of the WTO Agreement".
21. For the text of the Agreement, see WTO, Government Procurement <http://www.wto.org/wto/govt/agreem.htm> hereinafter referred to as WTO government procurement. In the U.S., the Uruguay Round Agreements Act (Pub. L. 103-465, 19 U.S.C. Sec.3501 et seq.), through amendments to the Trade Agreements Act (TAA) of 1979 (19 U.S.C. Sec. 2511 et seq.), authorizes the President to implement US obligations under the GPA. As a consequence, a number of laws and regulations, e.g. the Federal Acquisition Regulation (48 CFR parts 1-99) have been amended to implement the GPA principles, see *Notification of national implementating legislation*, communication from the US, WTO, Committee on government procurement, GPA/23 (Jul 15, 1998), hereinafter referred to as US GPA notification.
22. See WTO government procurement, *supra* note 21 Para. 2 of the same art. requires the same treatment for locally-established suppliers irrespective of the degree of their foreign affiliation or ownership or the country of production of the good or service.
23. See US GPA notification, *supra* note 21, Appendix 1, Annex 1 ("Central government entities which procure in accordance with the provisions of this Agreement"), GPA/LLS/1 (May 15, 1998).

However, the U.S. has explicitly excluded from the application of the Agreement:

"[a]ll transportation services, including Launching Services".[24]

The "fly U.S." laws, policies and practices of the U.S. government are thus not affected by the above Agreement on Government Procurement. Similarly, neither the European Commission nor Israel nor Japan have included launch services in their lists of services for GPA application.[25]

As the U.S. government showed no inclination whatsoever to either reconsider the exclusion of launch services from the GPA, or to make a GATS commitment with respect to access to its commercial (non-governmental) launch market or to withdraw its GATS MFN exemption, the EU did not pursue the matter. (ESA/Arianespace, for whose benefit the EU initiative was taken, was of course primarily interested in the 'fly U.S.' part of the story).

What then are the implications of the above for the prospects for a free and fair trade in launch services?

After the U.S. launch trade agreements with China, Russia and Ukraine have lapsed, the question remains whether the U.S. wants to grant these countries' launch companies access to the U.S. commercial non-government launch market to the same extent as - traditionally - provided to Arianespace. There are two reasons why this is an unlikely scenario: first, because of the non-market economy 'label' of the countries concerned, the U.S. is less than confident in their 'fair market behaviour'. Secondly, the national security element continues to play a very important role in the U.S. (trade-)relations with these countries and requires specific (*ad hoc*) controls to which the European trade partners do not have to be subjected. This will remain so even after the present Congressional excitement about the security aspects of Chinese launches (of U.S. satellites) has subsided.
This makes any general liberalization of launch services through a U.S. GATS commitment unlikely for some years to come for WTO membership of the three countries concerned would then in principle open the U.S. market to these countries in a way comparable to Europe's access. And, on the European side, it would add a number of important GATS principles but no additional markets, such as the government market Arianespace is after.

24. See *id*, Appendix 1, Annex 4 ("Services")(the transport services concerned are further identified as Central Product Classification Categories (CPC) 71, 72, 73, 74, 8859, 8868, Universal List of Services, doc. MTN.GNS/W/120), GPA/LLS/1 (May 15, 1998); a note extends this exclusion to "[t]ransportation services, where incidental to a contract for the procurement of supplies".
25. See WTO doc GPA/W/35 (Feb 5, 1997) ("Loose-leaf system for the appendices to the Agreement") at EC, Japan and Israel, Annex 4 respectively.

Europe/ESA/Arianespace's wish to have access to the U.S. government launch market is also unlikely to be met through withdrawal of the U.S. 'launching services' exclusion from the GPA. As we have seen, the U.S. government (both Administration and Congress) and the launch companies attach great importance to 'fly U.S.' for national security, economic (jobs!) and commercial reasons. This in itself is already sufficient justification for the U.S. to keep the *status quo*. Additionally, the corresponding full availability of the European government market is of much more limited commercial value for U.S. launch companies and therefore provides little incentive for agreement on mutual access.

One may conclude at this stage that - in the absence of specific developments or initiatives - liberalization of the trade in launch services through the GATS/GPA mechanism is unlikely to materialize for some time to come as it provides the main player in the game, the U.S., with few benefits which could compensate for the ensuing loss of the national security and commercial controls they are now able to exercise in this field.

A final word on the Administration's attitude towards new non-U.S. entrants. There appears to be no intention whatsoever on the part of the Administration to lower the technological threshold to entry of the launch market by relaxing the MTCR controls on the export of launcher technology. As we have seen in the cases of Brazil and Japan, even membership of the MTCR group does not imply (increased) access to the technology required to create or improve an indigenous launch capability. U.S. and international MTCR controls are credited (by the Administration) with having slowed down the development of launch industries in India, Israel and Brazil. The reasons for this policy have been discussed. The effect thereof is that the number of 'players' will not increase until either the U.S. or other MTCR members relax their controls or, alternatively, until launcher technology has been so popularized that the controls have become ineffective. One could imagine the latter to happen in connection with a further increase in the use of small, further miniaturized LEO satellites requiring small launchers for initial launch and replacement purposes. The economies of such an endeavour would however remain doubtful as long as sufficient operators are available and satellite export controls can be used to deny a new operator the payloads for his launcher.

The concept of 'free and fair trade' in international launch services, in the U.S. Administration's view, clearly applies to the current, conveniently small, 'stable' of domestic and foreign launch providers for years to come.[26]

26. A re-emergence of the space shuttle as a commercial player has been briefly considered recently, but the idea was shelved, and, in the light of the history of the ELV development as discussed above, quite rightly so (unless the shuttle is totally privatized). For the same reason, a sizeable (commercial) use of converted missiles by the U.S. government is not to

### *4.1.2.3 Congress*

Both the House of Representatives and the Senate have, through the years, paid serious and constructive attention to the development of the U.S. private commercial launch industry.
The Committees and Subcommittees dealing with space matters have repeatedly reviewed the various domestic and international aspects of the launching business, and, through hearings at various stages of the industry's development, have collected (and challenged) the views of the government agencies concerned and of (other) experts from the industry, in order to put their mandated or voluntary stamp on laws, policies and practices which, domestically, have an effect on jobs and the economy and internationally involve countries and entities which may already have attracted Congressional attention for other reasons.
The Arms Export Control Act prescribes which export license applications submitted to the State Department require Congressional notification for possible (dis-)approval. The Tiananmen crackdown brought Congressional sanction legislation which continues to require the U.S. President to notify Congress in each individual case that he waives, in the national interest, the prohibition to export U.S.-built satellites to China for the purpose of launching. Congress supported the launch industry by creating legislation to formalize the DOT's responsibilities with respect to the regulation and supervision of the launch companies (the Commercial Space Launch Act of 1984) and to limit liability of the industry vis-à-vis the government and third parties (the 1988 amendments to that Act). Moreover it created additional government (NASA) business for the launch industry through the adoption of the Launch Services Purchase Act of 1990. And, finally, in July 1998, Congress approved a new Commercial Space Act (H.R. 1702) which *inter alia* provides the FAA with licensing authority (which it lacked so far) over the next generation private reusable launch vehicles (RLV's), including in particular their *reentry* into the earth's atmosphere. The bill was introduced in the House by the Chairman of the House Science Committee with the following remark:

"... this legislation, if enacted, will create a stable business environment in which the commercial sector can raise capital, develop a business plan, hire employees, and offer a space good or service *with the expectation that the government bureaucracy won't keep changing the rules.*" (emph. add.).[27]

Similarly, the Senate Report on the same bill, endorsing the President's National Space Policy of 1996 particularly where it referred to the government's role to create a stable and predictable environment for the U.S.

be expected.
27. See The Insider news, AIAA (Jun 1998) ("Space commercialization: pushing ahead in Congress") <http://www.aiaa.org/bulletin/june98-space-comm.html>.

commercial space industry, justified the enactment of the legislation *inter alia* as follows:

"Like any young industry, the commercial space industry is vulnerable to the sudden changes of government policy. H.R. 1702 is necessary to ensure consistency in government policy so that commercial space business can grow with the relatively reliable assurance that government policy will not change".[28]

But the same Congress is also quick to impose or require the imposition of sanctions on countries which have violated standards of conduct which Congress considers appropriate or desirable.
Such sanctions may interfere with the business of both the satellite manufacturers and the U.S. launch providers; in the short term, because a specific contract may be affected by a specific sanction, and in the long run, because the U.S. companies' reliability as a contracting party may be undermined, resulting in their clients going elsewhere for the same product.
In a more general way these sanctions may also interfere with the Administration's foreign policy vis-à-vis a specific country or group of countries. In all these cases the imposition of a sanction or the threat to do so creates an element of unpredictability and uncertainty as to both commercial dealings and official policies.
Finally, these sanctions may share the fate of similar actions on the part of the Administration, *i.e.* that, because of their unilateral character they are not only ineffective, but also endanger the competitive position of U.S. industry and - depending on the cause and the target - risk alienating trade partners or allies asked to support a cause they don't believe in or join a sanction they consider inappropriate or uncalled for.

In Chapter 2.3.4 *supra* some attention was given to the detonation of nuclear devices by India and Pakistan in May 1998 and the sanctions the U.S. imposed in response thereto. These sanctions were mandated by Sec. 102 of the Arms Export Control Act, the so-called Glenn Amendment, which, upon determination by the President, as reported to Congress, that India and Pakistan violated the Act, *required* the President to implement seven specific sanctions:

- terminate bilateral assistance
- terminate all foreign military sales and financing
- terminate Munitions List licenses
- deny credit guarantees and financial assistance by inter alia Ex-Im Bank financing
- prohibit U.S. banks from making any loan or providing any credit to the government of India or Pakistan, and

28. See Commercial Space Act of 1997, Senate Report 105-198 105th Cong., 2nd Sess. (Jun 2, 1998).

- prohibit exports of specific goods and technology subject to export licensing.

As a result, both the State Department and Commerce implemented changes in U.S. export control policy for India and Pakistan. Thus, the State Department revoked all licenses and approvals for the export (and temporary import) of all defense articles and defense services on the USML to or from India and Pakistan, including licenses/authorizations for manufacturing, technical assistance and distribution agreements.[29] The Commerce Department's Bureau of Export Administration (BXA) for example, on June 22, 1998, published a list of sanctions which included the following restrictions on exports:

"For nuclear and missile-related items and entities of concern:
- BXA will deny all export and reexport applications for dual-use items controlled for nuclear or missile nonproliferation reasons under the Export Administration Regulations [(EAR)] to all end users in India and Pakistan.
- Under the Enhanced Proliferation Control Initiative (EPCI), BXA will publish a list of Indian and Pakistani government and private entities involved in nuclear and missile activities. All exports and reexports of all items subject to the EAR will be prohibited to these listed entities."[30]

The restrictions included a 'presumption of denial', because of their broad commercial and possible proliferation applications, of exports of computers exceeding a certain capacity to (non-)government entities involved in nuclear, missile or military programs and of all controlled U.S.-origin dual-use items to Indian and Pakistani government entities involved in military activities.

A BXA official, in a July 1998 speech, called the Glenn amendment

"a rather rigid, pre-determined legislative mandate ... [which] gave us very little flexibility to tailor these sanctions to the circumstances ... Although we did our best to both fulfil the legislative requirements and avoid making these sanctions counterproductive (only time will tell if we succeeded), the Glenn amendment is certainly an example of the faults of predetermined mandatory sanctions."[31]

29. Bureau of Political-Military Affairs, Public notice 2825, *Revocation of munitions exports licenses and other approvals for India*, eff. May 13, 1999, Fed. Reg. Vol 63, No 97 (May 20, 1998) at 27781; and Public Notice 2835, *Revocation of munitions exports licenses and other approvals for Pakistan*, eff. May 30, 1998, Fed. Reg. Vol 63, No 116 (Jun 17, 1998) at 33122.
30. See U.S. sanctions on the export of dual-use goods to India and Pakistan, U.S. [DOC, BXA] (Jun 22, 1998) <http://www.bxa.doc.gov/ind-pak.htm>.
31. See Update 98 remarks, Roger Majak, Ass. Secretary for Export Administration, DOC (Jul 7, 1998) hereinafter referred to as Majak Update 98 remarks<http://www.bxa.doc.gov/press/98/RogerUPDS.html>.

This remark reflected a sentiment also heard in other Commerce statements, some of which have been quoted already. From a speech held in the same period for the same industry audience, one could distil remarks such as:

"[We should focus controls on ... choke-point technologies [only] ... That is why Congressional action last year [in 1997] imposing new constraints on the export of high performance computers is so frustrating ... Congress is missing the point of export controls ...

Some of you may see the bill [*i.e.* the new Export Administration Act] as a cap on your ability to make further progress in a more hospitable Congress. I'd urge you to see it instead as a floor that will build in protection against a less friendly Administration and Congress. That such protection is needed is illustrated by the Congressional attack on our computer policy.

...

... other issues we continue to face [such as] ... the periodic surprises Congress puts on the table.

...

[we should] better coordinate our sanctions policy. We are driven to sanctions in cases like Cuba and Iran, often because of the Congress, but also by our determination to condemn and modify, if we can, behaviour we find unacceptable."[32]

Noting that there would undoubtedly be further efforts to impose sanctions, Commerce reported that several additional measures were currently pending in Congress, the most far-reaching of which, the so-called religious persecution legislation promoted by the Christian Coalition and primarily directed at China, would impose expanded export restrictions on governments declared to be engaged in such activities. In the meantime, a bill which would have imposed mandatory sanctions on Russia because of weapons-related sales to Iran was vetoed by the President. In a press briefing at the State Department, a spokesman harshly criticized the legislation:

"We think the bill's rigidity, inflexibility and lowering of the standard for what would require sanctioning ... would open the door to a whole series of sanctions at the very time that the Secretary and the President are trying to make clear and hope Congress understands that these series of sanctions proposals coming out of the Congress harm our ability to conduct foreign policy, tie the Secretary's and the President's hands behind their back and make it harder to achieve the objective."[33]

32. See Reinsch, Update West 98, *supra* Ch. 2 note 262.
33. See U.S. Department of State, daily press briefing, DPB#76 (Jun 24, 1998) <http://secretary.state.gov/www/briefings/9806/980624db.html>.

### 4.1.2.4 *The 'China affair' and the Strom Thurmond Act on satellite export controls*

The most recent Congressional actions in this connection concern (again) China. As briefly alluded to in Chapter 2.3.4, the Congressional storm involves a number of issues, some of which are interrelated:

1. In February 1996, the failure of a Long March launch resulted in the destruction of a Loral-built Intelsat 708 satellite; (a) one of the circuit boards containing encryption information, considered sensitive, was not recovered from the remains and may have ended up in Chinese hands; (b) (the conclusions of) the report of a committee of experts assisting the insurance company in determining the cause of the failure fell into Chinese hands through the Loral expert in that committee, which was cause for a criminal investigation against that company into possible violation of the Arms Export Control Act (for illegal transfer of sensitive technology; The New York Times (NYT), in April 1998, cited a classified Pentagon report that reportedly concluded in May 1997 that American expertise was transferred to China that significantly enhanced the reliability of its ballistic missiles and that U.S. national security was harmed.
   (In a similar case involving Hughes, the latter shared with the Chinese its analysis of a 1995 crash of a Long March carrying the Hughes-made Apstar 2 satellite. Hughes had cleared this assistance (amounting to a transfer of technology) with Commerce but not with State, which should have been the proper procedure);
2. In February 1998, with the criminal investigation still under way, Loral obtained again a license for the export to China (for Long March launch) of a Chinasat-8 satellite (through a Presidential waiver of the Tiananmen sanctions). Some Republicans questioned the appropriateness of granting the license at this stage and, following NYT suggestions to that effect, saw a link between this license and donations to the Democratic party on the part of Loral's Chairman;
3. In 1996, the Clinton Administration approved the sale of an advanced Hughes satellite system to Singapore-based but Chinese (co-)owned Asia Pacific Mobile Telecommunications (APMT), including an export license for the first two satellites. Given the characteristics of the satellites, (Chinese) military use of the satellites is possible raising the question whether that sale should have been approved at all. Should the license be renewed after the satellites, in the meantime, have been made more powerful/sophisticated through the addition of an improved antenna with special characteristics?
4. In November 1996, the Clinton Administration transferred the licensing of commercial communications satellites from State to Commerce. Has this change resulted in a degradation of the protection for U.S. national security, and was this transfer 'encouraged' by Chinese and U.S. satellite industry 'offers which the U.S. President could not refuse'?

5. Was the 1988 decision to grant export licenses for U.S. satellites to China for Long March launches, thus providing the Chinese access to the commercial launch market, a sensible decision, given (a) the loss of USD hundreds of millions, if not billions, in launch revenues for the U.S. launch companies as a result thereof, (b) the improvement of the Long March performance and reliability, and (c) the possible use of that know-how for the improvement of China's ballistic missiles.

Congressional hearings on the totality of these issues showed on the one hand the difficulty to reconcile proponents of the U.S. commercial interests and those giving priority to national security and non-proliferation, with very little real debate between the two sides. On the other hand, the various parochial and (more and more) partisan dividing lines made for heated and less than constructive debates, frustrating both to the Administration and the satellite manufacturing industry.
Two pieces of legislation were introduced in the House, both seen as a serious threat to the latter industry and as dangerous and counterproductive sanctions, interfering with foreign policy, by the Administration: one would impose an outright ban on the shipment of any U.S.-built satellite to China, the other would reverse Clinton's decision of 1996 and transfer the licensing of satellites back to the State Department.
In October 1998, Congress decided to indeed return, with effect from March 15, 1999, commercial communications satellites to the Munitions List for export licensing by the State Department,[34] with tightened national security controls and reporting requirements.

Section 1513 of this *Strom Thurmond Act* provides:

"(a) Control of satellites on the United States Munitions List -
Notwithstanding any other provision of law, all satellites and related items that are on the Commerce Control List of dual-use items in the Export Administration Regulations (15 CFR part 730 *et seq.*) on the date of enactment of this Act shall be transferred to the United States Munitions List and controlled under section 38 of the Arms Export Control Act (22 U.S.C.2778).
...
(c)Effective date-
(1) Subsection (a) shall take effect on March 15, 1999, and shall not apply to any export license issued before such effective date or to any export license application made under the Export Administration Regulations before such effective date."[35]

34. See Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (H.R. 3616), signed by Pres. Clinton on Oct 17, 1998, Pub. L. 105-261, hereinafter referred to as Strom Thurmond Act, Sec. 1513.
35. See Title XV - *Matters relating to arms control, export controls, and counterproliferation*, Subtitle B - *Satellite export controls*, Sec. 1513. *Satellite controls under the United States Munitions List.*

President Clinton, in a statement on the day of signature of the Act, expressed strong opposition to this provision, and argued:

"This change is not necessary to ensure effective control of U.S. export of satellites and could hamper the U.S. satellite industry. The Congress repeatedly supported the transfer of satellite licensing jurisdiction to the Department of Commerce long before I ordered the transfer in 1996. I strongly urge the Congress to demonstrate its support for a strong domestic satellite industry by passing remedial legislation to halt this transfer of jurisdiction prior to its effective date."[36]

The President, in fact, said two things:
first, that the national security and foreign policy focus of the State Department would *not* result in more effective satellite export controls, but *would* affect the competitive position of the U.S. satellite industry;
secondly, that this regulatory change came about because Congress, rather unexpectedly, changed its long-held views on the matter: a hardly veiled presidential accusation of unpredictability of Congress.

Comments on the part of the U.S. aerospace industry centred on the cost of red tape resulting from these and other possible tightened high-tech sales rules. For example, the American Electronics Association and the Satellite Industry Association (SIA) argued that "tougher rules, along with lengthy license-approval procedures, will cost U.S. companies huge amounts of business. And in the end ... sales will go to European companies over which the U.S. has no control."[37] The added time resulting from the State Department handling the licensing of satellite exports would come from the limited staff available for the new task, but could also be attributed to the much more active role of Congress in overseeing items on the Munitions List. This could add two to six months to the process and, according to SIA, could cost the operator of a USD 100 million satellite as much as USD 9 million a month in lost revenue.[38]

The American Aerospace Industries Association, in a statement on the transfer, expressed extreme disappointment, particularly since the Congressional reviews on the 'China question' had not yet been completed, and added the following comment on behalf of the U.S. companies concerned:

36. Statement by the President, The White House, Office of the Press Secretary (Oct 17, 1998) <http://www.pub.whitehouse.gov/uri-res/I2R?urn:pdi://oma.eop.gov.us/1998/10/19/10.text.1>.
37. See WSJ (Dec 18, 1998) at 1 ("House Panel may urge tighter rules for exports of high-technology gear").
38. *Ibid.* In a "white paper" sent to administration officials and lawmakers in the same period, ISA spelled out some of the other cost incurred in the new system, such as a less favourable tax treatment, *i.e.* a reduction of the tax break from 5.2% to 2.6%.

"Commercial satellites are not weapons systems and there are numerous safe guards in place to protect U.S. technology during the pre-launch and launch process. State, Defense and Commerce are all involved in any decisions under the current procedure, as they should be, and the new law will not change this. What it will do is preclude U.S. companies from selling communications satellites to any country to which the law prohibits the sale of weapons systems, even if a U.S. launcher is used. It will also delay the licensing process, as Congress will have to be notified of any foreign launch of a U.S. satellite, even by the Europeans, which have launched U.S. satellites for many years.

...

It is extremely poor policy to restrict the sale of commercial products by treating them as though they were banned weapon systems."[39]

A few months *after* the adoption of the above legislation, DOD submitted a report to the Senate on Hughes' technical exchanges with the Chinese. The December 7, 1998 document alleged that Hughes, in an effort to prove that not its satellite but the Long March launch vehicle had caused the 1995 launch failure, "with the blessing of the Commerce Dept., may have passed sensitive technical information or know-how to the Chinese during its investigation of the Apstar accident."[40] The investigation's conclusions were reported, *inter alia*, to have identified the need for modifications in the Chinese launch vehicle fairing design and launch operations, to have provided China with details about the satellite design and some manufacturing/inspection practices and with insight into U.S. diagnostic techniques for assessing defects and launch vehicle satellite design. The DOD report placed significant responsibility for any improper technology transfer on the Commerce Department which apparently had not imposed any limits on the Hughes/Chinese investigation and had failed to consult with DOD on whether the documents shared by Hughes with China contained information that should not be released to the Chinese.

39. Statement by John W. Douglas, AIA President, on the transfer of licensing authority of commercial communications satellites to the State Department's munitions list (Sep 18, 1998) <http://aia-aerospace.org/homepage/jwdstmt2.html> When Clinton, in 1996, transferred the export controls from State to Commerce, the AIA supported these changes for the following reasons: "First, the EAA does not require notifying Congress of specific major transactions, while the AECA does - a process that can involve considerable delays. Second, there are export control sanctions geared toward defense articles, which catch any dual-use items on the AECA list. Finally, under the old regulations - where some commercial [aircraft] engines and satellites were controlled by Commerce and others by State - companies that worked with the same countries and similar technologies found themselves controlled by two different bureaucracies and two sets of regulations. The new regulations should eliminate this problem.", see 1 (4) AIA Update (Oct 1996) ("President clarifies export control jurisdiction for aerospace products") <http://aia-aerospace.org/homepage/nu1_4.html>.

40. See AW/ST (Dec 14, 1998) at 38 ("Pentagon plans new look at China tech transfer").

The DOD report however concluded that the possible benefits to Chinese missile programs resulting from the above exchange of information "did not likely alter the strategic military balance between the U.S. and China."[41]
At the same time, the Pentagon noted that the available documentation, on which it based its report, had not been complete, and that definitive judgement on the matter had to await a further thorough study conducted together with the State Department. The latter concluded in early February 1999 that "the 1995 'tutorial' by Hughes resulted in significant improvement to China's rocket program and that the lessons were inherently applicable to their missile programs as well."[42]

The above Administration action was overtaken by a report approved by a select House Committee (a bi-partisan committee of Representatives with - mostly - a national security background, which had been instituted in May 1998 after the above New York Times article had disclosed details on Hughes' and Loral's 'high tech' assistance to the Chinese). Although the classified contents of the January 1999 report, the 'Cox Report', were not released, it was confirmed by witnesses and intelligence officials who worked with the Committee that the report agreed with the above assessments by the Pentagon and the State Department that information shared with Chinese scientists by Hughes and Loral had improved Beijing's ability to launch satellites and ballistic missiles.[43]

41. *Ibid.* In fact, according to the Washington Post of Jun 7, 1998, already in March 1997 the USAF's National Air Intelligence Center (NAIC) concluded in a classified report that Loral and Hughes provided expertise that helped China to improve the guidance systems on its ballistic missiles and that U.S. national security was damaged. The NAIC report was supported by the State Department's Intelligence and Research Bureau (INR) and sent to DOD's Defense Technology Security Administration (DTSA), the State Department and the Justice Department. A classified DTSA report of May 1997 on the issue reportedly concluded that Loral and Hughes had illegally transferred expertise to China that significantly enhanced the reliability of its nuclear ballistic missiles and "United States national security had been harmed". In September 1997 the Department of Justice began an investigation into these allegations; in 1998, the Department also started a preliminary inquiry into whether political donations influenced Pres. Clinton's approval of the export of (Loral) satellites to China, see *China: possible missile technology transfers from U.S. satellite export policy - background and chronology*, CRS Report for Congress, 98-485 F (Aug 13, 1998) at 6, 23 and 27 resp.
42. See WSJ (Feb 23, 1999) ("Bipartisan rocket security report").
43. *Ibid.* In May 1999, an unclassified, redacted version of the Cox Report was released: *U.S. national security and military/commercial concerns with the People's Republic of China* <http://www.house.gov/coxreport/>. The text of the relevant 'Overview' part of the Report (sub D) reads as follows: "In the aftermath of the three failed satellite launches since 1992, U.S. satellite manufacturers transferred missile design information and know-how to the PRC without obtaining the legally required licenses. This information has improved the reliability of PRC rockets useful for civilian and military purposes. The illegally transmitted information is useful for the design and improved reliability of future PRC ballistic missiles as well". The Committee, whose full name is the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China, chaired by

In this atmosphere, it is not surprising that the Administration decided, on February 22, 1999, to disapprove the sale of the Hughes commercial communications satellite to the APMT consortium. This took the form of a notice of intent on the part of Commerce dated February 24, to deny the export licenses necessary for the deal to go through. Though the Commerce Department was still in charge of licensing the export of these satellites, and favored the sale, both Defense and State, and other (intelligence) agencies concerned, objected both to the *launch* by the Chinese and to the *control* of the satellite in orbit by the Chinese, the latter because of the commercial and technological benefits that would alledgedly accrue to the Chinese military, through its use of the satellite.

As a result, APMT, in April 1999, cancelled its contract with Hughes.[44]

Rep. (R) Cox, in its 700-page report, also came with other, far more explosive revelations on Chinese military and economic espionnage, and the theft of military technology, including nuclear weapons design. The Committee held 33 closed hearings, taking testimony from intelligence officials, industry executives and nuclear-weapons experts. The Committee made 38 recommendations for legislation or executive orders to address the 'policy failures' of the Reagan, Bush and Clinton Administrations in this field, covering such policy categories as security at weapons laboratories, the handling of sensitive intelligence data and export controls. A February 1999 White House response to the Cox recommendations announced *inter alia* the establishment of end-to-end monitoring of launch campaigns (and failure investigations) and the collection, and distribution to State, DOD, Commerce and CIA, of all documents authorized for release to China. In addition, DOD will form a Space Launch Monitoring Division "with a cadre dedicated to make sure sensitive technology doesn't leak when U.S.-built satellites are launched from China", see AW/ST (Feb 15, 1999) at 21. In the meantime, the Senate Intelligence Committee is engaged in a similar investigation, and is already reported to also criticize Hughes for its dealings with China; this may lead to further Congressional suggestions to tighten export controls.

44. See Space News (Apr 26, 1999) at 26 ("Hughes struggles to avoid lay offs/tries to minimize effects of APMT satellite contract cancellation"); see also AW/ST (Mar 29, 1999) at 3, 27 ("Hughes races to save APMT deal"); the article quotes Majak, the assistant secretary of Commerce for export administration as saying that a change of launchers for the APMT satellite "might be a basis for revisiting the government decision." If correct, this would suggest that the government agencies concerned attach more importance to preventing a repetition of the original Hughes 'crime', *i.e.* the transfer of launcher-technology relevant know-how through the satellite-launcher interface, than to denying the Chinese military the benefits of sophisticated satellite communications through the use of the Hughes satellite. According to the same article, however, another government official had emphasized that the Chinese *launch* was just one of many factors in the decision not to approve the export license. A Hughes spokesman said in this connection that the choice of launchers remained up to the customer, *i.e.* APMT. Finally, a Congressional source was reported to have called a reversal of the denial "about as popular with Congress as the idea of inviting the president to be the keynote speaker at the Republican convention in 2000", see *ibid.* A related case is that of the Loral-built Chinasat-8 bought by China. The export of the satellite was approved on February 18, 1998 after President Clinton had waived the Tiananmen sanctions under P.L. 101-246 for this satellite. The delivery of the satellite in April 1999, as contractually agreed, is, notwithstanding that approval, being delayed because of new federal reviews based on the tightened 'high tech' export controls, see WSJ (Apr 2, 1999) ("Loral says reviews of sales to China delay new satellite").

On March 15 the State Department's amendments to the ITAR went into effect. These amendments, made necessary by the Strom Thurmond Act, re-designated commercial communications satellites and related items on the U.S. Munitions List (USML).
Briefly, the rule change provides for USML coverage of all spacecraft, except NASA's International Space Station, including

"... all satellites, and all spacecraft technical data, as well as all components, accessories, attachments, and related technical assistance, including without exception, all launch support activities (e.g. technical data provided to the launch provider on form, fit, function, mass, electrical, mechanical, dynamic, environmental, telemetry, safety, launch pad access, and launch parameters, as well as interfaces for mating and parameters for launch)."[45]

The amendment requires special additional export controls in the case of the export of any U.S.-origin satellite or related item or any controlled defence service "associated with the launch in, or by nationals of, a country that is *not* a member of [NATO] or a major non-NATO ally of the United States ..."[46]
These special controls are two-fold, *i.e.*
(1) all licenses and other requests for approval require a technology transfer control plan (TTCP) approved by DOD and an encryption control plan approved by the NSA. The TTCP must require any U.S. person or entity involved in the export to notify DOD in advance of all meetings and interactions with any foreign person or entity that is a party to the export;
(2) the U.S. person concerned must make arrangements with DOD for monitoring services (paid by the former and to be performed by the latter), which will cover all discussions on, and activities with respect to, the satellite 'from the cradle to the grave', in fact from the design phase up to and including the launch of the satellite and the possible launch failure.

As for the latter, for an investigation into, or an analysis of, a failure of a launch in a foreign country (including a post liftoff failure to reach proper orbit), a separate license is required and all special controls enumerated above apply.

45. See 22 CFR Parts 121 and 124 (Public Notice 3011), *Amendment to the International Traffic in Arms Regulations (ITAR): Control of commercial communications satellites on the United States Munitions List*, eff. Mar 15, 1999, Fed. Reg. Vol 64 No 54 (Mar 22, 1999) at 13679-13681, supplementary information.
46. The Public Notice mentions the 'established' NATO partners, (accidentally?) leaving out Poland, Hungary and the Czech Republic, which officially joined NATO on March 12, 1999. Under the heading "major non-NATO allies" the following countries are mentioned: Australia, Egypt, Israel, Japan, Republic of Korea, New Zealand, Jordan, and Argentina, see *ibid.*

Although the above special export controls do not apply when (nationals of) NATO members and major non-NATO allies launch U.S.-origin satellites and components (as the Act does not contain such a requirement),

"*such export controls may nonetheless be applied*, in addition to any other export controls required under this subchapter, *as appropriate in furtherance of the security and foreign policy of the United States.*"[47] (emph. add.)

Finally, the amended ITAR require a license for the export of technical data to insurance providers and underwriters in order to obtain or satisfy insurance requirements.

Both before and after the entry into force of the above amendments to ITAR, U.S. satellite (component) manufacturers and foreign companies alike expressed serious concerns about the effects of this legislation.
The U.S. companies predictably emphasized their worries about the absence of binding deadlines for the processing of the license applications combined with the significantly increased size of the commercial satellite market and a shortage of trained staff at the State Department to deal with all resulting applications; that and the requirement of Congressional notification for certain defence articles could significantly lengthen the licensing process and thus further hurt their competitive position vis-à-vis their foreign competitors.[48]
PanAmSat, a satellite service provider, complained that the increased export requirements were making it more difficult for the company to exchange technical data with its launch providers, provide satellite information to customers so they can make business decisions and work with international insurance underwriters.[49]
The latter aspect needs special attention as it will be difficult to obtain insurance coverage for satellites from insurers if the latter do not get a complete and timely insight into the technologies used. And the same applies to the post-accident investigations by or on behalf of the insurers for the settlement of claims. ITAR's requirement for a license for the export of technical data pertaining to the satellite to non-U.S. insurance underwriters complicates doing business with foreign - in practice mostly European - underwriters.[50]

47. See Sec 124.15 ("Special export controls for defense articles and services controlled under category XV: space systems and space launches"), at (a), (b), and (c).
48. See AW/ST (Feb 22, 1999) at 24-25 ("Satellite builders fear export nightmare"): "The timeliness of export license reviews could be the deciding factor in a non-U.S. customer's decision whether to purchase a satellite from an American or European supplier." (A chart, accompanying the article, showed that almost half of the commercial GEO satellites on order at Hughes, Lockheed Martin and Loral, 28 on a total of 60, were from non-U.S. customers).
49. *Ibid.*
50. See Space News (Apr 5, 1999) 1, 20 at 20 ("Satellite buyers blast U.S. rules - American firms face irate customers").

A point of major and obvious concern to the U.S industry is the exclusive 'national security and foreign policy' basis for the licensing decisions of the State Department, which, in the plans of that Department as submitted to Congress, would not be subject to review by Commerce.
And, of course, as a result of these tightened controls, the non-U.S. satellite builders, in particular the Europeans, would surely be the beneficiary, according to the U.S. companies concerned.[51] (That conclusion is being disputed as too simple by the European industry, in view of the fact that it is hard to find European satellites that do not have U.S. components in them, and these components are also subject to the stricter controls.[52])

But the most threatening aspect for the industry is not so much the legislation in itself, ill-advised and damaging as it may be, but the climate of uncertainty if not fear that has been created by the (handling of) the affair. Thus, in the Summer of 1998, the Administration was clearly intimidated by the above Congressional criticism and intent on refusing to give Congress further food for national security concerns, whether real or imagined. This resulted in embarrassing State Department actions preventing the Russian and Ukrainian Sea Launch partners from continuing technical talks with Boeing on the project and, as previously referred to, holding up Hughes Space and Communications' technical discussions with its customer APMT, and delaying approval of the sale.[53]

In a critical commentary, the trade press spoke of "the Clinton administration's overreaction to complaints from highranking members of Congress ...", and observed:

"The criticism has created a climate of fear so intense that officials at State, Defense and Commerce are scrutinizing even routine communication between U.S. companies and their customers in countries that are close U.S. allies, such as Canada and France."[54]

The result of this scrutiny, combined with a dispute between State and Congress about (lack of) funding for the Department's additional licensing staff, has been "an enormous backlog of applications that grows with each

51. See AW/ST (Feb 22, 1999) at 24-25.
52. See Space News (Mar 15, 1999) 4, 20, at 20 ("U.S. export rules draw fire - European Commission seeks evidence to lodge protest"), hereinafter referred to as European Commission protest.
53. See Space News Online (Jul 20, 1998) at 2 ("Russians, Ukrainians barred from Sea Launch") <http://www.spacenews..members/sarch/sarch98/sn0720r.htm>; also Space News Online (Aug 17, 1998) at 14 ("Sea Launch Snafu") <http://www.spacenews..members/sarch/sarch98/sn0817p.htm> and *id.* (Aug 24-30, 1998) ("Ouster of Hughes is painful APMT option") <http://www.spacenews.com/smembers/sweek/index.html>. And, in Winter 1998/1999, as a result of the above, even the - normally smooth - launch contacts between Hughes and Arianespace became more complicated.
54. See Space News (Apr 5, 1999) at 14 ("A bungled transition").

passing day." The whole situation, according to the same commentary, "paralyzes the U.S. satellite industry and makes it difficult for manufacturers to engage in any business activity that involves clients outside the United States." In fact, the industry sees the government measures and control practices as a general crackdown on space related exports. As a result, during April 1999 an increasing number of U.S. companies reportedly felt obliged to seek alternatives in the U.S. for their - originally - foreign launch plans and U.S. satellite (component) manufacturers refrained from bidding for contracts offered by foreign clients.[55]

Both Canada and Europe in the meantime voiced their concern about the effect of the ITAR changes and the accompanying tightening of controls and enforcement which were already noticable before the amendments entered into force.
Canada, thanks to its special defence economic relationship with the U.S., had been exempt from many of the provisions of the ITAR. Thus, for most defence articles and services no U.S. permits for export to Canada were required.
To the dismay of the Canadian Defence Industries Association (CDIA), which published an assessment of the proposed ITAR amendments, the new ITAR reflects an abrupt departure from that special relationship. According to that report,

"[t]he proposed changes to the ITAR will significantly increase the requirement for export licensing to Canada, negatively impact both US and Canadian defence firms, and present challenges to Canada-US relations on the national security, diplomatic, and international trade levels."[56]

More in particular, because of the inclusion of all spacecraft and commercial satellites, remote sensing satellites, Canada's speciality, will also be covered. As the report noted,

"Canada has developed a global expertise in the design, development, and operation of remote sensing satellites, but since there is a degree of US technology in the Canadian product, then that technology and everything related to it comes under the ITAR. Moreover,

55. See Space News Online (Apr 13, 1999): "Final Analysis Inc. is taking extra precautions [by checking into alternative launch plans using U.S. rockets] as it seeks a U.S. government license to export [LEO] communications satellites for launch on Russian Cosmos rockets."; "Ball Aerospace & Technologies Corp ... declined to bid on two recent opportunities to sell advanced satellite imaging systems [to South Korea] ... because of the ongoing government crackdown on space-related exports." And, as the same issue reported, U.S. RLV firms see benefits from the export clampdown: "As long as there is a perception of difficulty in getting export licenses to launch satellites outside the [U.S.], U.S. reusable launch vehicle (RLV) builders [such as Kelly Space and Technology] see a heightened opportunity to book launch orders."
56. *An assessment of the proposed changes to the International Traffic in Arms Regulations (ITAR)* (Feb 26, 1999), CDIA <http://www.cdia.can/assessment.htm>, at 1.

since the major shareholder of Canada's leading firm in this technology area is a US firm, then DOS could undertake to control the marketing of Canada's remote sensing technology and related products. The bottom line is that virtually all of Canada's space industry will be redefined as "military products and technology" and the control of a significant part of that industry assumed by the Department of State.""[57]

The report makes a number of other observations worth mentioning in the framework of an evaluation of the effects of U.S. laws, policies and practices on the (free) trade in launch services:
(1) it sees "a growing protectionist sentiment in the US" as a background contributing factor to the ITAR update;
(2) with its unilateral change of the rules of the export control game, the U.S. government introduces a risk factor in that Department of State approval for export permits for Canada cannot be accepted as a given. In fact, the resulting increased cost and delays may be so much of a hassle "that it will not be in the interest of the US firms to engage Canadian suppliers";
(3) finally, and maybe most importantly, an observation shared by other U.S. allies affected by the measures:

"... DOS action implies a determination that Canada cannot be trusted."[58]

Other companies outside the U.S., regular customers of the U.S. satellite manufacturers, voiced similar complaints. One European company, Société Européenne de Satellites (SES), the Luxembourg-based operator of the Astra direct-broadcasting satellite system, addressing a space insurance conference, said that he could not understand why the new U.S. procedures apply to NATO members and other U.S. allies in the same way as they apply to China:

"[t]he policy should not affect U.S. allies. There should be some differentation introduced into the way the law is enforced."[59]

The European Commission, raising the issue with the U.S. administration on behalf of the European satellite manufacturing industry, shared that view, but added a more thorny dimension, namely that of trade and protectionism. According to a Commission official,

57. *Id.*, at 2.
58. *Id.*, at 3. An article in Space News on the Canadian report explains that "State proposed stiff revisions to ITAR [affecting Canada] in response to growing concerns that Canadian policies governing the export of U.S. made equipmentand technology are lax. U.S. officials are particularly worried about exports of restricted American-made military products that end up in countries such as China, Iraq and Iran", and mentions two (foiled) attempts, see Space News (Mar 22, 1999) 1, 19, at 19 ("Export rules worry Canada") .
59. See Space News (Apr 5, 1999), at 20.

"*[i]f* it is strictly a national security issue in Washington, then *of course* European companies should not have to run a gantlet of restrictions."(emph. add.)[60]

Europe's suspicion that the rationale for this Congressional legislation is at least partially trade-related was fuelled by language of the Strom Thurmond Act, such as:

"It is the sense of Congress that--
... (7) the United States should pursue policies that protect and enhance the United States space launch industry ..."[61]

That trade-aspect is even more prevalent in the sections dealing with controls specifically directed at China.
For example, Sec. 1512 of the Act requires the President to certify to the Congress at least 15 days in advance of any export to China of U.S. *missile* equipment or technology that

"(1) such export is not detrimental to the United States space launch industry; and
(2) the missile equipment or technology, including any indirect technical benefit that could be derived from such export, will not measurably improve the missile or space launch capabilities of the People's Republic of China."

The interesting conclusion one can draw from this provision is that, not only is there a strong bias against China's GWIC becoming a safer, more efficient, and thus more competitive, launch provider (regardless of whether it has U.S. clients or not!), but also that the notion of (export of) *civil* launch equipment or technology is totally absent, which implies that, in the view of Congress, the latter simply does not exist as a good or service distinct from the military version. (The alternative interpretation, that the export of U.S.-made *civil* launch goods and services to China is not mentioned and is therefore possible without having to meet the above criteria, is less likely because of the above-noted bias against China becoming a better launch provider.)

Sec. 1515, entitled *Report on export of satellites for launch by People's Republic of China*, requires that any Presidential waiver of the Tiananmen satellite export restrictions to enable China to launch a satellite of U.S. origin or related items should be accompanied by a detailed justification setting forth, apart from a limited number of security-related items (such as "the reasons why the proposed satellite launch is in the national security interest of the

60. See European Commission protest, supra note 52, at 4.
61. Sec.1511. Sense of Congress, Strom Thurmond Act, *supra* note 34. Adding to their concern was the news that preparations for an Ariane launch of six Loral-made Globalstar satellites had to be halted because the required Technical Assistance Agreements, traditionally a rather routine matter for the European and American companies concerned, had not (yet) been approved by the State Dept., see Space News (Mar 1, 1999).

United States"(!)), the following, impressively exhaustive, amount of economy - and trade - related information:

"(5) The impact of the proposed export on employment in the United States, including the number of new jobs created in the United State, on a State-by-State basis, as a direct result of the proposed export.

(6) The number of existing jobs in the United States that would be lost, on a State-by-State basis, as adirect result of the proposed export not being licensed.

(7) The impact of the proposed export on the balance of trade between the United States and the People's Republic of China and on reducing the current United States trade deficit with the People's Republic of China.

(8) The impact of the proposed export on the transition of the People's Republic of China from a non-market economy to a market economy and the long-term economic benefit to the United States.

(9) The impact of the proposed export on opening new markets to United States-made products through the purchase by the People's Republic of China of United States-made goods and services not directly related to the proposed export.

(10) The impact of the proposed export on reducing acts, policies, and practices that constitute significant trade barriers to United States exports or foreign direct investment in the People's Republic of China by United States nationals.

(11) The increase that will result from the proposed export in the overall market share of the United States for goods and services in comparison to Japan, France, Germany, the United Kingdom, and Russia.

(12) The impact of the proposed export on the willingness of the People's Republic of China to modify its commercial and trade laws, practices, and regulations to make United States-made goods and services more accessible to that market.

(13) The impact of the proposed export on the willingness of the People's Republic of China to reduce formal and informal trade barriers and tariffs, duties, and other fees on United States-made goods and services entering that country."

It would be tempting to predict whether the President's report will succeed in providing a sufficiently satisfactory justification to prevent a Congressional rejection of a specific future U.S. satellite export to China. However, a detailed analysis per sub-heading clearly would fall outside the scope of this study. In any case, it would not change the overall conclusion the above provisions unavoidably lead to, namely that Congress, through the use of a veritable plethora of economic and trade-related criteria (in addition to national

security-based conditions) strongly discourages - and *wants* to discourage - the use of Chinese launch services for orbiting U.S.-made satellites.[62]
In fact, the Strom Thurmond Act has all the characteristics of a Congressional sanction imposed on the U.S. satellite manufacturers, the U.S. administration and the People's Republic of China.

An interesting question in this connection is whether the Act, whether seen as a sanction or not, will be effective. In other words, will it serve *e.g.* its national security-related purposes.
Part of the answer lies in the extent of *foreign availability* of the goods and technologies controlled by the Act. Another part lies in the export control behavior of the respective foreign authorities. For, as has been observed before, national controls of one country are basically only effective in two cases:
a) when other countries' companies can not deliver comparable goods and/or services,[63] or
b) when comparable goods are available in other countries, but the authorities concerned apply the same/comparable export controls as the first controlling country.

The first question is therefore whether China will be able to buy commercial communications satellites from other countries.
The answer is, in principle, yes: both European (*e.g.* DASA, Alenia and Aerospatiale) and Japanese companies (*e.g.* Mitsubishi, Toshiba, NEC) have the ability to manufacture these satellites. In fact, the U.S. commercial satellite industry now controls about 75% of the world market, and Europe (with between 20% and 25%)[64] and Japan share the remainder. As for sales to

62. The result of this Act may thus approach the purpose of a related bill which was (re-) introduced in the 106th Congress as H.R. 281 "[t]o prohibit the export to the [PRC] of satellites and related items" (Jan 6, 1999), Sec.1 of which read: "Notwithstanding any provision of subtitle B of title XV of the [Strom Thurmond Act], or section 902 of the Foreign Relations Authorizations Act, Fiscal Years 1990 and 1991 (22 U.S.C. 2151 note), *no satellite of United States origin or related items may be exported to the [PRC]."* (emph. add.) On the above date the bill was referred to the House Committee on international relations; until April 1999 no action had been taken. <http://thomas.loc.gov/cgi-bin/query etc.>.
63. A Commerce report mentions some measures which are not subject to foreign substitution such as denial of a U.S. quota, withdrawal of port privileges or landing rights, and actions in international financial institutions to withhold loans and assistance, which cannot be undone or overcome by the target country, see *1999 Report on foreign policy export controls, U.S. Dept of Commerce, Bureau of Export Administration* <http://www.bxa.doc.gov/PRESS/99/Repts/ForeignPolicyTOC.html> hereinafter referred to as BXA 1999 report, at 2.
64. The U.S. percentage comes from the US Satellite Industry Association, see Clayton Mowrey, USA Today Search (Feb 23, 1999) ("U.S. denies satellite sale to China") <http://www.usatoday.com/>; it tallies roughly with an - older - EC estimate which gave the European industry a 20-25% market share in the satellite manufacturing sector, see *The*

China, up to mid-1997, the U.S. accounted for 50% of all communications satellite and related equipment sales (with an estimated potential purchase by the Chinese of USD 3 billion over the next 10 years).[65]

The same affirmative answer should be given to the related question, namely whether other foreign buyers which choose an - uncertain - Chinese launch of their U.S. satellite will be able to, henceforce, buy non-U.S. satellites to avoid those launch uncertainties.
As a senior Commerce official said after the denial of the Hughes satellite sale to China,

"U.S. manufacturers could face difficulties in the worldwide market for commercial communications satellites if they cannot get licenses or if other countries perceive the [U.S.] companies will face trouble getting licenses."[66]

The Satellite Industry Association, at the same occasion, put it more bluntly:

"You're going to kill the golden goose ... You're creating a situation where the perception is you can't get a license or it's difficult to get a license[67]
...
There is no doubt it will benefit the European satellite manufacturing industry, because it's going to be easier for customers to procure satellites from European suppliers."[68]

*European Aerospace Industry - Meeting the global challenge*, COM (97) 466 fin., European Commission, Brussels (Sep 24, 1997), at 1. The Japanese companies so far mainly produced for the Japanese market. That global competition, mainly between U.S. and American companies, is stiff can be also be deduced from the Canadian satellite manufacturer Spar Aerospace's decision to leave the satellite business: "... Spar was not willing to make the investments necessary to bring its satellite divisions to the competitive level of the large U.S. and European companies", see Space News (Feb 15, 1999) at 16 ("Without satellites Spar expects profit in '99").

65. Statement by AIA President Don Fuqua at the occasion of the House vote on the renewal of China's MFN status (Jun 24, 1997), AIAA Legislative Update, Vol 3, No 2 (Jul 1997) <http://www.aiaa.org/policy/legupdate-07977.html> Another figure in this connection: of the 20 'Tiananmen waivers' granted by Presidents Bush and Clinton up to and including the February 18, 1998 waiver for the ChinaSat 8 manufactured by Loral, 15 concerned U.S.-built satellites and 5 foreign-built satellites (with U.S. components), see *Presidential satellite waivers and other related launch information*, AIA (Jun 8, 1998) <http://aia-aerospace.org/homepage/china_table 1.html> the latter figures donot distinguish between satellites bought by China on the one hand and launched by China for a foreign buyer on the other hand.

66. USA Today Search (Feb 23, 1999) ("U.S. denies satellite sale to China") <http://www.usatoday.com/>.

67. *Ibid.*

68. Space News (Mar 15, 1999) at 8 ("Industry officials fear repercussions of license denial"). In the same article, AIA vice president international affairs Johnson is quoted as follows: "Furthermore ... European satellite builders could benefit from the perception among potential customers that U.S. satellite builders are less reliable because they cannot be sure launch plans will stay intact. Customers with many millions of dollars tied up in a single

And an editorial comment in the trade press of mid-1998 stated:

"What sanctions will do is diminish U.S. influence over Chinese policy and help manufacturers in Europe and Japan sell satellites to China. U.S. sanctions aginst China would also mean higher launch prices throughout the world. Sanctions could also bring an end to U.S. dominance in satellite manufacturing."[69]

But a comment made by a senior administration official at the occasion of the official rejection of the Hughes satellite sale to China put the *foreign availability* issue in perspective. He speculated that

"... the Chinese would likely move quickly to obtain a similar satellite from Europe, in part to drive home their ability to circumvent American restrictions and reward non-American competitors. *However it appears unlikely that China could acquire technology as sophisticated as that offered by Hughes.*"[70] (emph. add.)

The question indeed is whether the products which are available in other countries are comparable, in quality/sophistication, price and delivery times with the U.S.-manufactured ones.
Other views appear to echo the above opinion that the U.S. manufacturers, in particular undisputed market leader Hughes, make superior satellites:

The Department of Commerce, reporting on the effectiveness of export controls, observes:

"Although the United States is *the world's leader*, other countries produce commercial communications satellites ..."[71] (emph. add.)

And, similarly, in the trade press:

"*Though the U.S. still holds an enviable lead in satellite technology*, Europe is pushing to catch up"[72] (emph. add.)

spacecraft cannot afford the uncertainty of not knowing when, or even if, a launch will be permitted by U.S. regulators.." And an Australian spacebusiness expert said: "Anything that damages their [i.e. European and Asian satellite manufacturers'] competitors helps them ... The history of the U.S. space industry is dotted with government decisions which have advantaged the United States ' competitors, and this would appear to be another one." (Middleton, Asia Pacific Aerospace Consultants).

69. Space News Online (Jun 8, 1998) at 18 ("The illusion of sanctions") <http://www.spacenews...members/sarch/sarch98/sn0608i.htm>.
70. WSJ (Feb 23, 1999) ("Citing security, U.S. spurns China on satellite deal").
71. See BXA 1999 report, *supra* note 63, at 96.
72. AW/ST (Jan 25, 1999) at 57.

In fact, non-American satellite producers are seen as lagging behind in all of the above three aspects, quality, price and delivery times, as illustrated by the following approximate 'grading' figures (based on a 'best buy' grade of 100 for the satellites built by U.S. companies):[73]

| | *U.S.* | *Europe* | *Japan* |
|---|---|---|---|
| -quality/sophistication | 100 | 80 | 65 |
| -price | 100 | 65 | 50 |
| -delivery time | 100 | 70 | 65 |

Though these figures suggest a less than complete foreign availability, it should be realized first, that not all foreign customers necessarily require - or can afford - the most sophisticated satellites, and secondly that the fast delivery time and other advantages of a U.S. satellite may be offset by the uncertainty about the delivery actually taking place within the agreed timeframe. In that sense, the Strom Thurmond Act brings a competitive advantage to the non-U.S. manufacturers, the more so, since an increase in orders for the latter will undoubtedly have a positive influence on both quality, price and delivery times of the satellites they build (and thus further increase foreign availability!).

Will the European manufacturers thus simply replace their U.S. competitors, thereby rendering the Strom Thurmond controls practically ineffective? A mere affirmative answer would ignore the fact that the countries concerned are signatories to both the Wassenaar Arrangement and the Missile Technology Control Regime which provide guidelines for national export controls on satellites and missile/launcher technology.

The question then is whether, and if so to what extent these countries will support this tightening of U.S. controls, in particular in respect of exports to China.
There are many reasons why that scenario is unlikely.
First, one should remember that in both Wassenaar and MTCR the traditional partners of cold war times, forming the nucleus of both regimes, have been joined by other countries not sharing that same background and having their own alliances or relations with other countries outside the membership. This complicates the task of identifying - new - common threats and determining - new - common answers thereto.

73. To avoid any misunderstanding, a lower grade means, per resp. category, a lower quality, a higher price and a longer delivery time. According to a RAND expert who provided the above grading on a non-attribution basis, the disparity is such that, in practice, "if not for U.S. export control delays, there would likely not be much of a contest in many cases", (Mar 4, 1999) (e-mail to author). A European and a Japanese satellite expert interviewed by the author both gave substantially higher grades for quality/sophistication to their own satellites.

Secondly, Wassenaar, like its predecessor CoCom, has always treated commercial communications satellites as 'dual-use' goods and technologies, irrespective of - changes in - U.S. national categorization.
Further, Wassenaar does not see or treat China as a country of special concern, and it is unlikely that the Hughes case as such will change that status.
A unanimous Wassenaar decision to tighten controls on those satellites or to treat China as a higher security risk would then only be feasible if the confidential parts of the Cox Committee report, made available for that purpose to at least the other satellite-selling Wassenaar members, would reveal that the sale to and/or the launch by China of Western communications satellites brought dramatic consequences in the field of regional/global security and/or missile proliferation. There is, at this stage, no indication that such information is contained in the report.
Obviously, the export self-interest of the members concerned, coupled with doubts on their side about the 'purity' of the national security rationale behind the legislation and suspicions about partizan and sinophobe (and trade!) considerations influencing its adoption, would also tend to discourage any Wassenaar-wide tightening of satellite export controls vis-à-vis China.[74]
Finally, coming back to the self-interest of the satellite-manufacturing Wassenaar members, U.S. military/intelligence information on the adverse effects of satellite sales to China or launches by China would have to be very convincing indeed to neutralize two crucial arguments favoring the continued use of Chinese launch services and the continued sale of satellites to China, namely

a) the size and importance of the Chinese market for communications satellites, which cannot be ignored by any serious satellite manufacturer, and
b) the limited availability of alternative launch capacity which would result in the disruption of satellite launch plans and delays of satellite-based telecommunications projects of both U.S. and foreign system operators.[75]

74. The U.S. administration is quite aware of the fact that, regardless of the China affair, members of the Wassenaar Arrangement do not necessarily share the same views on and/or interpretations of the obligations the regime entails. As the BXA 1999 report, *supra* note 63, observed, "[m]ost producers of commercial communications satellites ... are members of the Wassenaar Arrangement and are controlling these items as dual-use items *(albeit with widely divergent licensing policies)*." (emph. add.)

75. The AIA, responding to the bill which would have prohibited U.S. satellite launches on Chinese rockets altogether, said: "[a]s alternatives to the Chinese Long March rocket are not available for two to three years, launch plans for U.S. telecommunications satellite consortiums will be disrupted giving foreign competitors an advantage in controlling the skies", *Commercial satellite exports to China*, AIA (Jun 4, 1998) <http://aia-aerospace.org/homepage/china_exports.html> Mid-1998 U.S. companies had booked options for 10 Long March launches in addition to 4 U.S. satellites on backlog, see *Satellite launch fact sheet*, AIA (Jun 3, 1998) <http://aia-aerospace.org/homepage/china_facts.html>. In an editorial, Space News warned that, in addition to increasing launch prices throughout the world, "sanctions limiting Russian and Chinese commercial launch activity would create such a scarcity of launchers that some projects would have to be delayed, probably for years

Where multilateral and bilateral efforts vis-à-vis European co-members to support stricter U.S. controls on satellite exports will therefore probably fail, the U.S. administration has one 'big stick' left, *i.e.* the strict enforcement of export controls on key U.S.-made satellite *components* used by non-U.S. satellite manufacturers.
Earlier, reference was made to the Canadian Defence Industries Association's concern about the fact that the U.S. technology used in Canadian remote sensing satellites would bring the sale of those satellites under the - new - ITAR export controls.
A similar observation was made by the European satellite industry in reaction to the entry into force of the ITAR amendments:

"It is hard to find European satellites that do not have U.S. components in them, and these components are also subject to the stricter controls ... In some cases there are only two manufacturers of a given component and we need the U.S. companies to assure our supply chain. I suppose in a few years we could replace U.S. suppliers, and in a few years we could see extra business if U.S. exports are shut down. For now, we have a problem."[76]

Obviously, the extent to which the U.S. will, ot threatens to, make use of its component export controls affects the freedom the countries concerned have or perceive having to make their complete satellites available to buyers or launch providers of which the U.S. disapproves.
On the other hand, while such a measure could, in the short term, in principle be effective in making non-U.S. satellite manufacturers follow the strict U.S. approach, its use risks creating a major trade conflict with important trade partners and (NATO) allies such as Europe and Japan.

Additionally, it will only further strengthen the resolve of the foreign governments concerned, already fuelled by the uncertainties and ambiguities inherent in the present system, to become totally self-sufficient in satellite components or, to use the expression commonly used in this connection, to "design out" U.S. parts or components, a possibility recognized by both the U.S. industry and the administration.[77]

... [And t]here are only a handful of launch pads around the world and many of them are operating near capacity", Space News Online (Jun 8, 1998) at 18 ("The illusion of sanctions") <http://www.spacenews...members/sarch/sarch98/sn0608i.htm>.

76. Space News (Mar 15, 1999) at 4, 20 ("U.S. export rules draw fire - European Commission seeks evidence to lodge protest"). And see note 65 *supra* (Tiananmen waivers for 5 foreign-built satellites with U.S. components: these include DASA and Aerospatiale products).

77. AIA's vice president for international affairs Johnson was reported to have said that "European executives had told him they plan to design U.S.-made components out of their satellites to avoid the hassle of new restrictions", AW/ST (Mar 29, 1999) at 37. The BXA 1999 report, *supra* note 63, apart from seeing "conflicts with key allies" as part of the costs that come with unilateral sanctions, also remarks with regard to the recently imposed unilateral trade sanctions on India and Pakistan, that exporters have provided examples of Indian companies who have announced they will no longer do business with U.S. companies

One could conclude that the stricter, the more poorly targeted, broader or indiscriminately used or more doubtfully justified the unilateral controls turn out to be, the sooner they are undermined by the countries and companies affected, through 'go-it-alone' and independence-driven initiatives and the ensuing self-reliance. Unilateral controls thus dig their own graves.

Although the other non-U.S. launch service providers do not face the same draconic restrictions as China, there is sufficient evidence in the letter and spirit of the above provisions to conclude that, notwithstanding the national security origin and purpose of this piece of Congressional legislation, it discourages, as an accepted by-product, the use of any foreign launch services.

Whether the administration will relax the new export restrictions and, if so, vis-à-vis which countries, depends to a large extent on the (lobbying) activities of the victimized American and foreign companies and the latter's governments. Furthermore, the threat of another trade war with the EU or problems with the countries concerned in their capacity of NATO partners could influence the administration's thinking on the matter.
But most of all it will depend on how Congress's views on the real or perceived national security and economic threats evolve - this includes the distinction between the two -, which emanate from doing (space) business with foreign countries.

The main lesson to be drawn from the Congressional treatment of this issue is that the parochial, partisan and sometimes downright xenophobic character thereof leaves little room for compromise and reinforces the unpredictability of the laws, policies and practices with which the U.S. aerospace companies, whether engaged in the sale of satellites or launch services or in the procurement of launch services, have to cope.

Though Congress is the place where the various views, interests and priorities of the American people, companies and other entities, should be heard (whether on human rights, religion, WMD proliferation, minorities or other matters), it is the use of sanction legislation which, apart from its testimonial character and (possible) interference with Administration policies and strategies, has a strong 'rogue of the month' character which increases the

and are designing out U.S. parts and components. "This "designing out" phenomenon, as has been frequently noted, can damage the position of U.S. exporters beyond the loss of markets in the sanctioned country itself." Similarly, Stuart Eizenstat, Under Secretary of State, in 1997 testimony before a House Committee, quoted from studies which not only pointed to cases of 'designing out', but also to reports "that foreign firms have intentionally switched R & D away from the U.S. to Europe because of a desire to avoid sanctions problems", see Remarks before the U.S. [H.R.] Ways and Means Trade Subcommittee (Oct 23, 1997) <http://www.state.gov/www/policy_remarks/971023_eizen_house.html>, hereinafter referred to as Eizenstat 1997.

uncertainties U.S. exporters in general and high tech aerospace companies in particular have to face.

Congress, on the one hand endorsing a "stable and predictable environment for the U.S. commercial space industry", in its actions appears to move into a direction opposite to liberalization and thus constitutes a barrier to increased 'free and fair trade' in international launch services as the concept is seen by the Administration and by the customers.

A few final words on the increasing use of the sanctions 'weapon' as such. According to the President's Export Council, sanctions have been imposed more than 60 times since 1993 alone, more than in the preceding 80 years since World War I. This does not include nearly 100 state and local sanctions measures that are pending or already in force, creating additional complexity and obstacles for exporters.[78]
In a recent article on sanctions, appropriately headed "Addicted to sanctions - At this rate, the whole world will face U.S. penalties", the author submits that "[n]o other country on Earth opts for sanctions as often as America ... [they] currently affect more than 70 countries, home to two thirds of humanity ..."[79] The author continues with the following observation:

"... in city councils as in Congress, it is often emotion and short-term political calculation that drive the action, rather than confidence in the long-term success of sanctions."

And he quotes a Representative trying to reform the sanctions process:

"A wave comes over this institution ... You get a kind of rage here that develops over some conduct, and economic sanctions are the result."[80]

As observed before, the danger lies in other countries refusing to join (because of 'sanctions fatigue'), resulting in only U.S. suppliers getting a reputation for unreliability and losing business to overseas competitors: "In 1995 alone, unilateral sanctions cost the U.S. economy an estimated $15 to $19 billion and up to 260.000 jobs", quotes the same author the Institute for International Economics, a non-profit Washington think tank.
But one of the most serious aspects in the framework of this study is not so much the ineffectiveness of unilateral sanctions (which have so far never been submitted to a cost-benefit analysis), but the way these are used by Congress

78. See Majak, Update 98 remarks, *supra* note 31. According to Smith, Hughes' CEO, probably using the same source, since WW II, Congress has passed more than 100 pieces of legislation that include economic sanctions, 61 of which have passed during President Clinton's administration. "And 26 more unilateral sanction bills are pending in this Congress.", see Smith Deregulation 1998, *supra* note 1.
79. See U.S. News & World Report 30-31 (Jun 15, 1998) at 30.
80. See *ibid.*

to make or influence *ad hoc* foreign policy. As a spokesman for Senate Foreign Relations Committee Chairman Jesse Helms is quoted:

"All of these sanctions are essentially a vote of no confidence in the administration to achieve these [foreign policy] goals by other means."[81]

If we look again at the discussions in Congress about the Chinese launch issues, at the ensuing legislation and at the consequences thereof for the space (launch) industry, the above quote reflects a tendency which does not create much confidence in a constructive, predictable and even-handed approach towards the U.S. launch and satellite manufacturing industries' concerns and expectations with respect to their trade with foreign countries. The results of these Congressional actions seriously reduced prospects for a free(er) trade in launch services.

## 4.2 The position of the main foreign 'market economy' launch providers

To what extent does the free and fair trade 'à l'Americaine' provide an acceptable and workable environment for the U.S. launch companies' main foreign competitor, Arianespace?

### *4.2.1 Arianespace*

*First*, it should be recalled that it was primarily U.S. protectionism which led to the creation of Arianespace. If the U.S., in the early 1970's, had not attached restrictive conditions to the launch of European satellites, the incentive to 'go-it-alone' would have been much weaker, particularly as the European wish to have access to space was not so much based on overriding military or 'national' security considerations, but rather on the wish to be, also in the promising space (applications) field, economically and scientifically, and of course also politically, independent from other countries. A more forthcoming U.S. government attitude might have convinced Europe to stick to the - undoubtedly much cheaper - practice of buying launch services from the U.S.

*Second*, 'assured access to space' is now as much an article of faith in Europe as it is in the U.S. Whether based on a combination of the above considerations alone or also on 'national prestige' or perhaps even - originally - Americanophobic feelings, this principle will determine European policies and reactions to any threat to Arianespace's continued existence.

81. See *id.*, at 31.

*Third*, to the extent the U.S. laws, policies and practices have worked against the interests of *e.g.* the U.S. satellite manufacturers by limiting their choice of foreign - 'non-market economy' - launch companies and/or by imposing sanctions on (potential) foreign customers, they benefited Arianespace.
On the other hand, the controlled entry of the new launch providers from China, Russia and Ukraine, the increasing access of these companies to the international commercial launch market and the future termination by the U.S. of the capacity quota and price restrictions all mean extra competition for the U.S. launch companies, but much more so for Arianespace. This is partly because the U.S. companies have concluded alliances with Russian and Ukrainian counterparts which not only strengthen their competitive position in the commercial launch market but also return part of the liberalization benefits to the U.S. companies. And, where the U.S. companies have an assured 'captive' government market of substantial proportions, Arianespace operates and has to survive in the international commercial launch market, making that company more vulnerable to any new (U.S.-assisted) entrants.

*Fourth,* though the U.S. launch companies have the benefit of not only guaranteed government service contracts ('fly U.S.') but also government production contracts (EELV), this is not necessarily a permanent advantage. For one thing, to the extent the government has taken the initiative and pays a large part of the bills for EELV research and development it also 'calls the shots'. The launch companies rightly foresee important commercial benefits to be derived from the use of the EELV on the international market, but, both in the R&D stage and in the operational phase, they will have to please two masters, with priority understandably going to the Department of Defense. That in itself is not necessarily a major handicap, apart from the risk that either the Administration or Congress changes its priorities (with the yearly Authorization and Appropriation battles in the latter forum providing every opportunity for members of Congress to challenge or attach conditions to DOD's support for this program). And, conversely, where the market has been shifting more and more to the private commercial customers, meeting the demands of the latter with respect to the product becomes of crucial importance, and, consequently, possible adaptions to the design brought about by DOD demands will make the launch companies more vulnerable to (potential) consumer discontent and counter-demands.

The growing importance of the private commercial market, both for the GEO and MEO/LEO, has also the effect of diminishing the relative importance of the U.S. government market. This may not in the short term reduce European apprehension about a playing field which, because of the absence of a comparable military and civil government contract base, is far from level, but it does in the longer term tend to even out the differences, and, in so far as private customers are still more difficult to please, gives, in the meantime, Arianespace to some extent an advantage in the experience gained in that market.

*Fifth*, apart from having merged into aerospace conglomerates of considerable technological and financial strength, the U.S. companies have also broadened their product base and opened up additional markets through the alliances concluded with Russian and Ukrainian launch providers. Arianespace, by comparison, is a very small company, operating separately from - and without semi-automatic 'family support' of - the large European aerospace companies. The combination of its limited size and financial elbow-room on the one hand with the company's focus on the international commercial market on the other hand dictate that, in the short term, its product base can only be widened and its market access increased to any appreciable extent by the conclusion of alliances with foreign launch partners. Where Arianespace has so far concluded only arrangements of limited scope with Russian and Indian launch entities, the European company could consider concluding strategic cooperative agreements with another non-aligned launch provider, such as the China Great Wall Industry Corporation.

In the present China-related political environment in the U.S., a link-up of a U.S. launch company with CGWIC would be fraught with legal and political problems and uncertainties, affecting the U.S. company's continued freedom to do business with the government and with the U.S. satellite manufacturers and operators. And, with the major U.S. launch companies already engaged in joint ventures with Russian counterparts and thus possessing launch capabilities fit for all sectors of the market, there would be little inclination on the U.S. side to engage in this kind of politically sensitive partnership.

A company like Arianespace, owned by European interests and incorporated in France, is of course also subject to Wassenaar and MTCR-based controls. But, in practice, national security and foreign policy considerations will play a much less prominent role in the national interpretation and application of these controls than in the U.S. There is, consequently, - and apart from 'constitutional' differences - little chance that Europe will share the U.S. view based on these considerations that the launch of Western-made satellites by the Chinese should be discouraged to prevent the transfer of satellite and launcher know-how to the latter or that launcher cooperation with China is not an option because of its inherent relevance for missile development. Arianespace would therefore be in a much better position to establish an alliance with the Chinese launch company and to offer their combined respective products to the international market. And the Strom Thurmond Act surely provides some strong incentives to the Chinese to seriously consider this possibility.

It must be assumed, though, that the same Sinophobic attitude of Congress which presently affects both U.S. launch companies and the satellite manufacturers and operators, could also result in U.S. government challenges of Arianespace's position as a competitor in the U.S. market, at present still free to attract commercial (non-governmental) clients (though - at least temporarily - affected by the Strom Thurmond controls). The fact of a European-Chinese alliance as such would create misgivings on the part of the

U.S. government in view of the possibility of launch and/or satellite technology exchanges between the partners.
The joint *sale* of Long March vehicles along the lines of the U.S.-Russian joint ventures would, if involving U.S. satellites, of course face the full array of U.S. export control-related restrictions without the mitigating effect of U.S. company lobbying.
A possible way out of the latter problem, insofar as it is caused by launches taking place from Chinese territory, would be the Cape York inspired variant of having Long March launches performed from the Guyana space center, which, in the context of export controls, is more 'friendly' French territory. (One must assume that the absence of a direct U.S. company interest in such a set-up would reduce the U.S. government's interest in fostering the regulatory and practical viability of U.S. non-governmental payloads being launched through this arrangement. On the other hand, Arianespace could probably count on the support of the U.S. satellite manufacturing industry for an alliance which would introduce European quality control standards and sales (support) practices into the Chinese launch business, making the Long March a more feasible alternative to U.S. launches than it is at present.)

Is there a possibility for Arianespace to join forces with a U.S. launch company? Its most valuable asset (apart from the Ariane family of launchers and its international customer base) is the Kourou Equatorial launch base, which would be an attractive 'dowry' for any U.S. launch company engaging in, or aspiring to engage in, GEO launches. Given Boeing's equatorial launch opportunities through Sea Launch and Lockheed Martin's cooperation with the Russian Proton builders, this would appear to leave the various smaller (upcoming) launch companies as potential candidates for an alliance with Arianespace, possibly along the lines of the latter company's arrangements with ISRO/Antrix or with the Russian Soyuz manufacturers. One major aspect to be taken care of would be that a joint venture type of arrangement would have to provide for such ownership/control by the U.S. company concerned that the latter would not risk loosing its American 'nationality' which would have predictable consequences for its right to carry government payloads under the 'fly U.S.' policy and legislation.

*Sixth,* though at various occasions in the past, U.S. launch companies, with the support of members of Congress have made pleas for agreeing on rules of the road with Europe (read: curtailing Arianespace's successful competitive efforts), there is at present little inclination on the U.S. side to either start bilateral or multilateral talks to that end. Where subsidization would traditionally be one of the subjects brought on the table by the U.S. side, it would at this stage of the 'game' be rather counterproductive to initiate discussions on the issue, the more so as, in that context, the European side would undoubtedly raise not only the government subsidy aspects of the EELV program, but also, as it has done in the past, the issue of 'fly U.S.'.

*Finally*, the U.S. regulatory environment, though for the time being dominated by national security considerations which even affect European companies, will be more and more influenced by fast-growing, increasingly powerful, private satellite manufacturing and satellite system operators' and communications conglomerates, which, whether they are co-owner of U.S. launch companies or not, will have a higher priority than that of the protection of or restrictions on any specific 'national' or other launch company: the satellites have to get into orbit and start earning money, and timely and reliable transportation at a decent price therefore has to be assured. That, in the longer run, will determine, more than anything else, the U.S. government's regulatory approach towards 'free and fair trade in international launch services'.
Arianespace would appear to be well positioned to play a successful and profitable role in that environment.
The company's weakest point - apart from the lack of a large captive government market - is probably the fact that it does not (yet) form part of an aerospace conglomerate of a size, scope and financial clout comparable to Boeing and Lockheed Martin. It will undoubtedly require considerable time and (regulatory) effort for the European launch service provider to further level the playing field by allying with the European aerospace industry whose restructuring is *in statu nascendi* (and long overdue). That, and maintaining its commercial and operational flexibility during the process, will be its greatest challenge for the years to come. In the meantime, it will have to rely on the European Union's political clout and determination to fight those aspects and effects of U.S. export controls which are patently trade-related and/or competition distorting.

### 4.2.2 *Japan*

What is *Japan*'s position in this regulatory environment?
It has been noted before that, for many years, Japan's access to space was dependent on U.S. launch technology, with a corresponding U.S. say over its commercial use. The resulting limitations were sufficient reason for Japan to 'go-it-alone' and develop the H-2 launch vehicle, indigenously built, but very costly and therefore unfit for the commercial market. The urgently felt need for a stronger and cheaper version has led to the purchase of a U.S. engine to power the H-2A, resulting in a return to a measure of U.S. dependence in the form of - primarily non-proliferation related - export licence conditions. These conditions will not stand in the way of Japan's access to the international commercial launch market, but form nevertheless a possible means for the U.S. (Administration or Congress) to exert some influence on Japanese behaviour. With a 'national security-neutral' status comparable to Europe's, - with concomitant effects of Strom Thurmond type U.S. controls - Japan will probably only be faced with U.S. government measures if its competitive behaviour clashes with the U.S. concept of free and fair trade in launch services (which would imply a situation in which RSC consistently and

successfully underbids its U.S. competitors - both in the U.S., worldwide and in the Japanese market - and the U.S. satellite manufacturers and operators would have sufficient alternatives not to be unduly worried by trade sanctions involving restrictions of Japanese access to the U.S. launch market.)

Though there is a long history of U.S.-Japanese trade conflicts resulting from aggressive marketing of Japanese products, it falls outside the scope of this study to predict if and to what extent Japan's launch company, once the H-2A is fully operational, will show such sanction/retaliation-inviting behaviour *vis-à-vis* its U.S. competitors. Although in the mean time the Japanese have already concluded H-2A launch contracts with both Hughes and Loral, it still has to prove the operational and commercial viability of this launch vehicle, both domestically and abroad.

The delayed and limited availability of launchers and launch windows will, for some years to come, determine to a larger extent the level of impact of Japan on the international commercial launch market than the U.S. laws, policies and practices in this field.

### *4.2.3 India*

There is also *India*, a prime example of a country whose launch industry has been curbed in its development by national security and foreign policy-inspired U.S. restrictions and sanctions.

One must assume that, even after the Glenn amendment sanctions have been withdrawn, the U.S will continue to treat India as a proliferation hazard because of its missile program and its strained relations with Pakistan. MTCR-related controls may be expected to remain in place, affecting the development of India's launch industry. But, as we saw before, India's long-standing determination to 'go-it-alone' (with, at least in the past, a little help from its friend Russia), was actually strengthened by the restrictions on the transfer of foreign launch technology. To become self-supporting in both LEO and - in the near future - GEO satellite launches, in these circumstances, is nevertheless a major accomplishment. However, the rationale for both the MTCR controls (*i.e.* to prevent missile programs from getting 'off the ground') and for the restrictions on the export of other high tech goods such as satellites (*i.e.* to prevent certain countries from becoming smarter and better (militarily) equipped than considerations of national/regional security and foreign policy would dictate) will continue to result in the Indian launch industry's development being hampered by the forced lack of cooperation with foreign launch (technology) providers and will prevent U.S. satellite manufacturers and operators from concluding launch contracts with India's Antrix Corporation or with Arianespace for the use of the Indian PSLV (or, in the future, its GSLV).

The recent Congressional concerns about the national security aspects of Chinese launches of U.S. satellites and the adoption of the Strom Thurmond Act have made that abundantly clear.

### 4.3 Legal remedies against (the effects of) U.S. controls?

An interesting question at this - late - stage is that of the possible remedies against (the effects of) the U.S. laws, policies and practices.
The answer to this question is of interest to at least two distinct groups, the U.S. companies on the one hand and the foreign companies and countries concerned on the other hand, in other words the *domestic* and the *foreign* parties.

#### *4.3.1 U.S. law*

As for the former, though it is both interesting and challenging to investigate the national remedies available to the satellite manufacturers and launch companies vis-à-vis the U.S. government in connection with its laws, policies and practices as reviewed in the preceding chapters, it falls largely outside the scope of the present study and will, therefore, be treated in a limited way only. Chapter 2.3, which dealt with (U.S.) satellite and missile technology export controls, explained the regulatory framework within which U.S. companies, engaged in the manufacture and export of high tech aerospace products, have to function.
In fact, every U.S. citizen, whether a natural or juridical person, who concludes a contract which involves the export of 'arms', 'munitions', 'defense articles', dual use goods or technologies, knows - or is supposed to know - that the AECA and/or the EAA applies to his (intended) transactions. He also knows that those Acts give broad powers to the State Department and Commerce respectively to apply in full, or not to apply at all, *c.q.* to suspend or modify any or all of the export regulations concerned, on national security, foreign policy or other grounds. Moreover, certain categories of defense articles cannot be exported without prior notification to Congress, with the concomitant right of Congress to approve or disapprove the export, or approve subject to conditions. Additionally, the above Acts *require* the imposition of sanctions, *inter alia* in the field of high tech exports, on countries which have violated MTCR standards of behaviour.
That is why U.S. satellite manufacturers and U.S. launch service providers, whenever they conclude a contract which involves the export of their goods, technologies and services, will include a clause which emphasizes that the contract is subject to all U.S. laws and regulations relating to exports. Thus, for example, a Martin Marietta - Intelsat launch service contract of 1987 provided:

"This contract is subject to all United States laws and regulations relating to exports and to all administrative acts of the U.S. Government pursuant to such laws and regulations."[82]

82. See art. 22.1, *Contract for commercial launch services* of Aug 10, 1987 between Martin

Not only do the U.S. firms concerned know (and take into account) that these laws and regulations apply, they also have to accept the risk that the (application of the) regulations may be amended or suspended, either by Congressional intervention or by new Presidential policies. (Also in this regard the space business, because of its high political profile and its national security and foreign policy aspects, is a high risk activity, which U.S. companies nevertheless engage in because of the (potential for) high rewards). The above cited risk is usually handled, in more recent contracts, under an 'excusable delays' clause, which would exclude liability for delay in performance by either side arising from acts of any governmental authority (in its sovereign or contractual capacities), including inability to obtain any necessary export licenses, unavailability of launch ranges, requirements for clearance times between launches, inability to obtain necessary and appropriate third party liability insurance, etc.

In the above regulatory and political environment, there appears to be practically no room for challenging the legality of the U.S. government's regulatory measures, policies and practices in this field, or for demanding compensation for the adverse consequences thereof.
In fact, in the light of the above contractual provisions which discourage customers from suing their contractors, it is not surprising that it is difficult to find any suit in the U.S. arising from government action, such as the imposition of sanctions on foreign governments or companies, affecting the sale of satellites or other space hardware or the provision of launch services.[83]

Marietta Corp. and the International Telecommunications Satellite Organization Intelsat, text in Glenn H. Reynolds and Robert P. Merges, *Outer Space - Problems of law and policy* (2nd ed.) 310-319 (1997) at 319.

83. After the August 1994 expiration of the Export Administration Act (EAA), the administration proposed a revised EAA based on a number of principles which took account of the changes which had taken place in the world in the political, technological and security field since the adoption of the EAA of 1979. Particular emphasis was put on balancing the overall goal of the new act, namely the prevention of WMD proliferation, with "the growing dependence of our own military on strong high technology companies here at home developing state of the art products and, in turn, those companies' need to export to maintain their cutting edge." This, in the view of Commerce, required - apart from *inter alia* the establishment of a clear preference for export controls exercised in conjunction with the multilateral nonproliferation regimes - increased focus "on our own economic security by greater discipline on unilateral controls" and "*expanded rights [for exporters] to petition for relief from ineffective controls* ...", (emph. add.) a so-called "unfair impact provision". A Congressional bill of 1996, the Omnibus Export Administration Act of 1996, H.R. 361, was largely similar to the administration's proposal, and also contained an "unfair impact provision" which clarified exporters'rights to petition for relief from burdensome and ineffective export control requirements; however, unlike the administration's proposal, it failed to include ineffective controls and competitive disadvantage as grounds for such petitions, see *On reauthorization of the Export Administration Act*, William Reinsch, testimony before the House international relations committee, Subcommittee on international economic policy and trade (Mar 3, 1999)<http://www.bxa.doc.gov/PRESS/99/EAAReauth.

### *4.3.2 Space law*

As for the *foreign* parties, we will look beyond the U.S. -China, Russia and Ukraine launch trade agreements which all explicitly subject the rights and obligations contained therein to the U.S. export laws and regulations. The parties concerned know and have accepted that each individual case of a U.S. satellite export (for launch by any of the three countries concerned) will be dealt with in conformity with these laws and regulations and will only be licensed if the U.S. interpretation/application of these laws and regulations so allow.

To determine what remedies, in the non-contractual sphere, affected countries may have in the face of the above U.S. laws, policies and practices, one may consider first the relevant *lex specialis* of international law, *i.e.* the 1967 Outer Space Treaty.
The main provisions a 'victimized' country would find on the subject are the preamble and articles 1, 3 and 9. These provisions and some additional ones in the Treaty all emphasize two important guiding principles of space law as formalized by the Treaty, *i.e.* that of the the "common interest of all mankind" in the exploration and use of outer space, the equal right of all states to engage in such exploration and use and the requirement that such exploration and use should be carried out "for the benefit and in the interests of all countries", and, additionally, the principle of (international) cooperation. The 'core' provision is Article 1, which reads as follows:

"*The exploration and use of outer space*, including the moon and other celestial bodies, *shall be carried out for the benefit and in the interests of all countries*, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

There shall be freedom of scientific investigation in outer space, including the moon and other celestial bodies, and *States shall facilitate and encourage international cooperation in such investigation*".[84] (emph. add.)

html>. Neither of the two regulatory measures have become law so far, and the present Congress clearly does not give a high priority to the expansion of U.S. exporters' rights in the field of export controls.

84. The preamble of the Space Treaty reads, in part: ... "recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes, believing that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development, desiring to contribute to broad international cooperation both in the scientific as well as the legal aspects

The general question, which has been debated ever since the Space Treaty entered into force, revolves around the extent to which this provision *obliges* states with space capabilities and space programs to share the benefits derived there from with non-'space-faring' nations (in practice in particular the developing countries). The latter always maintained that the above provision was intended to go further than allowing every country and its citizens to buy space-derived products and services in the market place at a price determined freely by the space-power(s)' companies concerned. And that, being able to become a member of Intelsat, install satellite communications groundstations and buy mobile phones, navigation systems, or groundreceivers for remote sensing satellite pictures, or leak-proof space pens, or arrange for a space-burial, though undoubtedly amounting to a sharing in the benefit of space exploration and use, still did not reflect the letter and spirit of the above Treaty. Those countries believed "that the practical value of article 1 laid in international cooperation in space activities. It was only through such cooperation that the benefits of outer space activities could be realized by all States".[85]

The conclusion that article 1 *obliged* the space 'haves' to engage in space cooperation with the space 'have-nots' found no sympathy with the former, who maintained that such an interpretation of the 'benefits' provision would infringe upon their sovereign right to choose whether, with whom and how to cooperate. Since 1986, for some ten years, the members of the UN committee on the peaceful uses of outer space, and more in particular of its legal subcommittee, have discussed a set of principles which would give more 'teeth' to the above provision to the benefit of the developing countries, while still respecting the rights of the space 'haves' to decide in each specific case on the identity of the partner and the extent of the space cooperation.[86]

(This discussion, far from having a negative impact on space cooperation in practice, may in fact have contributed to an increase in cooperative ventures: through the years, the number, size and scope of bilateral and multilateral space cooperation programmes have been impressive.[87] From this very

of the exploration and use of outer space for peaceful purposes ..." Art. 3 provides: "States parties to the treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the [UN], in the interest of maintaining international peace and security and promoting international cooperation and understanding." Finally, art. 9 states: "In the exploration and use of outer space, including the moon and other celestial bodies, States parties to the Treaty shall be guided by the principle of cooperation and mutual assistance ..." Note that there is a certain emphasis on scientific cooperation, basically the only type of space cooperation between the Western world and the communist countries realistically possible in the 1960's.

85. See Jitendra S. Thaker, *The development of the outer space benefits declaration*, XXII-I Annals of Air and Space L. 537-558 (1997) hereinafter referred to as Thaker 1997, at 539.

86. See *id.*, *passim*.

87. See *e.g. Highlights in space - Progress in space science, technology and applications, international cooperation and space law 1997*, A.AC.105/691, U.N. Office for Outer Space

phenomenon the argument arose that the formulation of guiding (binding) principles on space cooperation was - apparently - superfluous).

The discussion on the contents of the principles also made clear that the 'space powers' do not see article 1 of the Space Treaty as creating a legal obligation to give, share or cooperate when it comes to their space goods, services and technologies. And the end-result, a Declaration adopted by the UN General Assembly, reflects two basic considerations of a French-German proposal to the Committee along that line, *i.e.* (1) States are free to determine all aspects of their cooperation, and (2) States will choose the most efficient and appropriate mode of cooperation in order to allocate resources efficiently.[88] The Declaration, also referred to as the "Outer space benefits declaration", does encourage States with space capabilities to share the benefits thereof through cooperation with interested countries, and more in particular with developing countries, but it does not create nor aim at creating a legal obligation to do so. In fact, its adoption reinforces the view supported by doctrine that article 1 of the Space Treaty does not create such an obligation either.[89]

Applied to launching, an activity covered by the term "exploration and use of outer space", the above position would result in a negative answer to the question whether the article imposes an undisputed *obligation* on the U.S. government to
(a) share its launch technology with other countries ("all countries"), and/or
(b) permit such other countries to launch U.S. satellites, and/or
(c) permit any of those countries to perform launches from U.S. spaceports.

(And, for all practical purposes, 'other countries' would include, *a fortiori*, foreign private companies, on whose rights and obligations the Space Treaty is largely silent).

It should be recalled in this connection that the above activities also fall under the general heading of 'trade', which, if one approaches the matter from another angle, raises the question whether States have the right to discriminate

Affairs, U.N., New York (1998).

88. See Thaker 1997, *supra* note 85, at 551, 553. On Dec 13, 1996, the UNGA, by Resolution 51/122, unanimously adopted the *Declaration on international cooperation in the exploration and use of outer space for the benefit and in the interest of all States, taking into particular account the needs of developing countries*; for text, see *id*, App. 1, at 556-558.

89. See *e.g.* Bin Cheng, *The 1967 Outer Space Treaty: Thirtieth anniversary*: "In Article 1 of the Space Treaty on the subject of international cooperation, the space powers paid lip service to the developing countries. Some countries have ever since tried very hard to give Article 1 an excessively literal interpretation involving a legally binding obligation. Such efforts can hardly be said to have succeeded...", 23 (4/5) Air and Space L. 156-165 (1998), at 163.

in foreign trade between recipients of their goods and services and between the countries they wish to procure goods and services from. The answer to that question is yes, *unless* they have specifically agreed to impose limitations on that right. The prime example thereof is the 'package' of agreements concluded under the WTO umbrella. States *decide* whether and to what extent they give up the right to discriminate, between nationals and foreigners and amongst foreigners. And, though they increasingly liberalize world trade in goods and services, States do so after a weighing of the pro's and con's and starting from the legal principle that they don't *have* to give up their right to discriminate (*i.e.* the right to choose whom to trade with).
From that perspective, the above question may be phrased differently, *viz.* did the United States (or any other State for that matter) explicitly, that is, by becoming a party to the Space Treaty or to any other multilateral or bilateral agreement or arrangement, commit itself to trade with certain (or all) countries in specific (or all) sectors of the space industry.

As we saw above, the Space Treaty does not take away the right of member States to choose partners, to decide with whom to cooperate and share knowledge or whom to trade with. And the veritable plethora of bilateral agreements on space cooperation concluded since the advent of the space age has not changed the voluntary character of that cooperation.
The above brief GATS review has shown that the U.S., party to the GATS and the GPA, has refrained from making a commitment with respect to launch services and has excluded these services from the GPA. It had and continues to have the right to do so. An important reason for the U.S. approach is *national security,* a concept which *in internationalibus* is one of the most effectively used justifications for not trading (in certain goods/services) with certain countries.
In that connection, another arrangement should be recalled, that of the Missile Technology Control Regime of 1987/1993. The MTCR which aligns and coordinates national missile and launch technology export controls and in fact created a common - national/regional/global security motivated - 'we don't want to trade in these goods and technologies with you' front against all outsiders. Both this multilateral regime and the national export control regulations of the MTCR countries re-emphasize the right of countries to freely choose the parties they wish to do business with, *a fortiori* when it concerns goods, services and technology which, because of their high tech, dual-use character, possible or intended use and/or the identity of the end-user, bear a clear national security stamp.

In other words, it cannot be substantiated that there exists an obligation for space launch 'haves' to share launch technology, through sale or cooperation, with a space launch 'have-not', whether friend or foe.
Nor is there an obligation for satellite manufacturing countries to permit the sale and export of their satellites to a foreign customer or to license the export

of their satellite - whether government or privately owned - for the purpose of launching by a foreign entity.
Finally, nothing in present international/space law infringes upon the right of a State to decide whether and if so, under what conditions, a spaceport, which is domestically (government or privately) owned, operated and/or licensed, may be made available to foreign launch providers.

What remains to be discussed then is whether the above state of affairs is one that needs or deserves to be challenged or, alternatively, is acceptable as a *status quo*. This question will be dealt with in the last part of this study, the conclusions and recommendations (Chapter 5).

CHAPTER 5

# Conclusions and recommendations

There is little doubt that the U.S. export controls, discussed in the preceding Chapters, intend to serve a respectable purpose, *i.e.* that of national and global security.
This involves controls on the flow of goods and technologies that (may) serve as weapons and a careful monitoring of the in -and export and R & D behaviour of other countries, either because they are known or suspected to be - potential - producers and sellers of these goods and technologies, or because they *im*port these goods and technologies thereby creating a threat to U.S., regional or global security, peace and stability.
In this connection, terrorist (-supporting) countries are of particular concern and are therefore subject to special scrutiny.

To the extent that other countries, allies of the U.S., share the same goals and perceive the same threats to the attainment of those goals (*e.g.* proliferation of chemical weapons or the Iraqi invasion of Kuwait), they will follow or support the U.S. in taking such measures as export restrictions, sanctions or other common actions.

The U.S.' role as the sole super power and global security guard, taking and initiating the measures it deems fit, commands respect rather than universal love.

But that respect may find its limits in a number of situations: first, in cases where disagreement arises about the type or extent of the danger ( *e.g.* the sale of computers or encryption to Pakistan) or about the identity of, *c.q.* the threat posed by, the targeted 'villain' (*e.g.* Cuba) , or again about the severity of the measures proposed (*e.g.* restrictions on the export of satellites to China). The U.S. may also expect less respect and support for its actions or decisions when other than security considerations have influenced the choice of the measures concerned and/or the 'cure' has serious and unwelcome consequences or side-effects.

The first-mentioned situation, and the way it effects the U.S. export control measures and sanctions, has already been highlighted in this study.
We will focus here on the second situation mentioned above, before coming to a number of conclusions and recommendations.

The U.S. government's *missile control* policy aims at minimizing the risk of missile proliferation. That is a worthy goal. But the policy also denies countries, which seek to obtain a *civil* launch capability for peaceful purposes (the launch 'have-nots') the possibility to acquire the necessary launchers or launch technology, even when there is virtually no chance that this technology be used for military missile programs.
The U.S. government's justification for refusing to transfer launch technology to a country, when the latter has no missile program whatsoever which could benefit from the launch technology obtained, is that, because it is very difficult to turn a civil launch program into a commercially viable industry, there is a risk that either the technology will be turned to military uses in the receiving country after all or that it will be sold to third countries of the 'rogue' and 'missile-loving' type.
This reasoning has, of course, a touch of arrogance because it assumes (as almost inevitable) foreign governments' motivations and behaviour. It is also assumes that, basically, no country can be trusted with this technology. The inevitable result is a near total absence of cooperation in this field of civil space technology, a blocking of (foreign-based) innovation in the 'art' of launching, and a 'freeze' of the number and variety of launch providers world-wide.

Similarly, the U.S. government's controls of the *export of satellites*, including satellite components and technology, aim at keeping sophisticated means of telecommunications out of the hands of (the military establishment of) countries which are seen as a possible threat to regional/global peace, security and stability. That is, as such, a respectable goal.
But where these controls are used as a means to limit market entry and access and impose conditions in the form of capacity and price controls on foreign launch providers, another element is introduced, namely that of the unilateral regulation of international competition. Though these latter controls, in the form of bilateral launch trade agreements, have been gradually relaxed, and were in fact - slowly - on the way out, the recent 'China affair' again has shown that the mix of security and trade considerations, coupled with partisan politics and the always present threat of sanctions, has resulted in a trade-unfriendly environment, where unpredictability is the rule and both U.S. satellite manufacturers and operators and, in particular, foreign launch providers are the predictable victims.

The combined effect of the above phenomena is that under the 'security' umbrella, the U.S. government has adopted acts, formulated policies and taken enforcement actions, which have the, partly intended and partly unintended, effect of preventing or at least severely limiting international development, innovation, cooperation and competition in the field of launch technology and launch services.

It could be argued that this is not necessarily bad, for two reasons: first, because - roughly speaking - national/global security is more important than international technology and trade development, and second because there is a *cornucopia* of promising technological approaches and developments, particularly in the U.S., but also, albeit to a lesser extent, in Europe and Japan, which will take care of all present and future space transportation needs. Thus the restrictions imposed on other - prospective - launch providers are of only marginal importance to the development of the exploration and use of outer space.
The *first* argument presupposes that specific U.S. security purposes are indeed more important and are indeed being served. In other words a careful weighing of aims and means has taken place, and the end result is, on balance, a positive one. At best, this is unproven. And not only the U.S. 'security establishment' and the trade, industry, science and technology representatives, but also America's friends and allies may have sharply different views, as *inter alia* the China affair has shown. We will revert to this matter below.

The *second* argument is of crucial importance to the future of the space launch service industry and its customers. It presupposes that the development of launch activities is in good hands, namely those of the incumbents, and that the latter will be in a perfect position to adequately meet all present and future space transportation needs. In other words, (to add a dash of demagogy) the collective scientific and technological knowledge of the rest of the world is considered to be irrelevant for the development of innovative, higher quality, and lower cost launch services: briefly, there is no need for new players and more competition.

Once again, there is a certain arrogance in this latter argument, but it is the understandable arrogance of the (launch) 'haves'. An important reason, though, to challenge that position, is the fact that the launch industry is a *service* industry: apart from having to meet the demands of *governments* in such areas as military and civil communications, including global positioning/navigation services and meteorological/geological/environmental remote sensing, it serves the - fast deregulating - worldwide telecommunications industry, the 'global information super highway' *in statu nascendi* (already in 1997 valued at some USD 550 billion and forecasted to grow to USD 1 trillion in the year 2000), of which satellite communications form a core part.[1]
Additionally, the U.S. government's Global Positioning System will increasingly be used by the aviation, automobile, marine and (other) private

1. See *State of the Space Industry, 1997 Outlook, supra* Ch. 1, note 1, at 41, 42.

consumer sectors, and by the year 2000 the GPS industry's growth (since 1996) is anticipated to exceed 500 percent.
Also, satellite remote sensing produces increasingly sophisticated images which, computer-enhanced, provide crucial information for the oil and gas industry, forestry, agriculture, mining, mapping, water management etc.

The space infrastructure, *i.e.* satellites, including spaceports and ground control operations as well as the launch vehicles, are a crucial part of these new, dramatically developing, space hardware-dependent service industries, just as the launch part, which has been calculated as representing only about 10 to 15 percent of the total value of the space infrastructure through the years, is a crucial service within that space infrastructure.
Whether the respective launch companies perform according to expectations, now and in the future, is something their above - increasingly demanding - *clients* will determine.
In that connection it should be recalled that the presently available launch service providers offer a combined product which, notwithstanding important internal differences in performance, has been repeatedly depicted, by government and private customers alike, as unreliable, inflexible and much too expensive. This is still the situation today. In a relatively short period of 9 months ending early May 1999, the U.S. experienced six significant launch failures with combined satellite and launch vehicle losses totalling USD 3.5 billion. These failures affect both government and private customers' space programs.[2] As for the cost of launching, NASA's stated goal is to reduce the cost of putting payloads into low-earth orbit from USD 10,000 per pound in 1998 to USD 1,000 per pound by 2007 and USD 100 per pound in the year 2022;[3] an indication of how this agency thinks about the present cost of launching.

It must be clear that, notwithstanding abundant availability of U.S. launcher know-how and experience, additional efforts by non-U.S. launch industries, both existing and new, are neither superfluous nor a luxury.

**We come to the following conclusions and recommendations:**

The commercial/financial interests and the national and international economic importance of the earlier-mentioned U.S. and global 'clients' are so much bigger than those of the launch companies serving them, that the following suggestions appear justified:

2. NYT (May 12, 1999) at 1 ("Series of rocket failures unnerves U.S. space launching industry").
3. See NASA's aeronautics/space goals, AW/ST (Oct 19, 1998) at 40.

1. The development of the launch industry should not continue to be artificially restricted to, or oligopolized by, the launch companies of one country or of a very limited number of countries. Neither should it remain fundamentally dependent on and subjected to national security-inspired but in reality largely nationalistic laws, policies and practices which also address other, not security-related interests and concerns.

2. A) In the 'trade versus national security' battle that is inherent in the above suggestion, it is, in the absence of any noticeable pro-trade initiative on the part of the U.S. government so far, the responsibility of the *U.S. telecom industry* and the other U.S. clients of the launch industry - using data which document and substantiate their actual and forecasted importance for the U.S. economy - to pressure the U.S. government, *i.e.* both the Administration and Congress, to show the utmost restraint in using 'national security' as an argument for taking such measures as (i) forbidding U.S. launch companies to engage in *bona fide* civil launch cooperation - involving the exchange of launch know-how - with foreign companies, whether existing commercial launch companies or launch 'have-nots' with peaceful civil launch aspirations, (ii) forbidding or severely limiting U.S. satellite manufacturers to exchange such satellite-launch vehicle interface information with foreign launch companies as will permit the latter to improve their services to the benefit of their U.S. and foreign clients, and (iii) severely limiting and discouraging the use of foreign launch companies through the imposition of price and capacity restrictions on some of those foreign launch companies and through - the threat of - strict application of export controls or sanctions.

B) In view of the global character and scope of the satellite constellations and the *international telecom conglomerates* using these systems, it is evident that the latter should join the U.S. telecom industry and put similar and concurrent pressure on the U.S. government. In that connection reference could be made to the dramatically increasing importance of their industry for the global economy, brought about by the liberalization of global telecom, initiated, through WTO, by the same U.S. government.
At the same time the telecom parties concerned should formulate the launch (quantity, quality and price) requirements necessary to accommodate the expected growth of their industries and to meet the expectations of the consumers relying on their services.

3. The above would also imply that serious consideration should be given by these industries to promote, either through GATS (by way of a U.S. commitment with respect to launch services) or - initially - on a separate multilateral basis, the adoption of a 'national treatment' arrangement with respect to the use of (private) U.S. spaceports. This would enable foreign launching states and entities to perform launches from the safe and well-equipped U.S. facilities on the same conditions as the U.S. launch companies. Similar offers, outside GATS, on the part of Brazil and Australia, though the

spaceports or facilities concerned may not be fully comparable in sophistication and value-for-money, have set a precedent in this connection.
Another logical step to be promoted in the context of a wider availability of launch services for the public and private clients and the creation of more free competition between the international launch companies, would be the opening up of the U.S. government *civil*, *i.e.* non-military, non-'national security-sensitive' satellite launch market to foreign launch providers, to be accomplished either through a corresponding amendment of the U.S. launch services exclusion in the WTO Agreement on Government Procurement or - initially - on a separate multilateral basis.

We will refrain from using exhortative "the WTO should ..." language. In fact, we mention the use of the WTO arrangements as instruments of change with some hesitation, for the following reasons.
First, it has been noted that launch services have not - yet - been liberalized to the same extent as the industries they serve. In fact, there is today a notable absence of a pro-competitive international environment for launch services. This will prove to be a serious handicap for the WTO Basic Telecom Agreement realizing its full potential. That in itself, both for reasons of principle and for practical purposes, provides already ample justification for a serious effort on the part of the same countries concerned, to accomplish at least a start of liberalization of launch services during the new round of WTO-GATS discussions which start in November 1999. In particular the U.S. should feel that responsibility, having pushed so hard for the global adoption of its 'free competition and fair trade' principles to be applied to international (satellite) communications through the above agreement, and continuing to energetically spread that gospel.[4]
An additional reason for strongly favouring a WTO approach would be the legally binding effect of the resulting treaty arrangements and the predictability and stability this would bring for the U.S. and foreign industries concerned (as compared to the present situation in the U.S. in this field).

But, it is at this stage difficult to predict whether the U.S. government will, at that occasion, act in the interest of the international telecommunications

4. The Chairman of the FCC, in a March 1999 statement before a Congressional Committee outlining his agenda for the rest of 1999, submitted, *inter alia* the following points: "... promote competition in all sectors of the marketplace ... continue to deregulate ... ensure broad access to communications services and technologies ... foster innovation ... *we will advance these concepts worldwide, serving as an example and advocate of telecommunications worldwide ... and aggressively work on the worldwide adoption of the WTO Agreement for Basic Communications*" (emph. add.), see Statement of William Kennard, Chairman FCC before the Subcommittee on Commerce, Justice, State, and the Judiciary, Committee on Appropriations, US Senate, on the FCC's FY 2000 budget estimates (Mar 25, 1999) <http://www.fcc.gov/Speeches/Kennard/Statements/stwek917.html>.

industry and, perhaps, offer a commitment to provide foreign access to its commercial satellite launch market.
This difficulty to predict has two reasons: first, a detailed analysis of WTO rules and practices, including members' practices in the field of commitments, national security escape-clauses, exemptions and *quid-pro-quo* bargaining, would have to form the basis for a serious discussion of the various scenarios and possibilities with respect to government action in the WTO context in the field of the trade in launch services: this falls outside the scope of this study.
A second reason is the fact that any action or initiative on the part of the U.S. government during the next round of negotiations will necessarily be preceded by domestic (soul-searching and) decision-making on the advisability of changing the prevailing approach. In other words, the political will of each individual member state, and in this case in particular of the U.S., is decisive for the chances that change occurs, whether through WTO or through other means.
That brings us back to the domestic 'national security versus international trade' battle and to the ensuing views of the U.S. Administration and Congress on the advisability of changing *any* of the relevant laws, policies and practices.

4. The above state of affairs in the U.S. forces all parties interested in change to distinguish between measures based on *real, realistic and serious national security concerns* on the one hand and measures *not* belonging to that category on the other hand.

Clear examples of the *latter* are:
- the bilateral launch trade agreements with China, Russia and the Ukraine, in so far as they regulate market access, pricing and other aspects of market access and market behaviour;
- government policies which forbid or restrict the use, for commercial launches by foreign launch companies, of U.S. federal launch facilities or private spaceports;

Other examples belonging to the same category are:

- 'fly U.S.' laws and policies in so far as they apply to *civil* government satellites and forbid the launch companies of *e.g.* NATO members and major non-NATO allies access to that market;
- 'Strom Thurmond' treatment of all commercial communications satellites as arms or munitions for export licensing purposes, at least in so far as they include satellites with a relatively low level of sophistication, destined for 'friendly' nations or destinations;
- 'Strom Thurmond' based controls on the launch of U.S. commercial communications satellites by foreign launch providers in so far as the latter fall under the jurisdiction and control of NATO members or major non-NATO allies;

- 'Strom Thurmond' based controls on the launch of U.S. commercial communications satellites by China in so far as conditions are attached to export licenses which are of a strictly economic, trade or other 'non-national security'-related character;

Of a somewhat different nature, but nevertheless falling in this category because of the relatively low national security 'content' of the measures, are the following:
- measures which forbid, restrict or sanction a U.S. satellite manufacturer, which has received a permit for the Long March (or Proton) launch of his commercial communications satellite, to discuss such satellite-launcher interface aspects as will assist the Chinese (or Russian) launch provider in improving the chances for a successful launch of the U.S. satellite into the proper orbit;
- measures which forbid, restrict or sanction quality control discussions between a U.S. launch company and his Russian and or Ukrainian partners in joint ventures using Russian or Ukrainian launch vehicles.

Obviously, the transfer of missile technology or launch technology to terrorist countries or other countries posing a threat to national, regional or global security is, as such, a matter raising serious national security concerns. But on the scale of such national security/weapon proliferation concerns there is a vast difference between this case on the one hand and, for example, launch (technology) cooperation between a U.S. launch company and its non-military counterpart from *e.g.* a NATO country on the other hand.
Both MTCR and the respective U.S. Administration policy emphasize that *bona fide* peaceful national space programs or international cooperation in such programs should not be impeded by MTCR (-based) controls, as long as such cooperation could not be used for or contribute to delivery systems for weapons of mass destruction (WMD).
The U.S. however, as we have seen earlier, in 1996 added a national criterion which is not only patronizing but also of doubtful relevance for national security purposes:

"For MTCR countries we will not encourage new space launch vehicle programs which raise questions from a proliferation *and economic standpoint.*" (emph. add.)[4a]

In the light of a dearth of new, ambitious, and innovative launch companies outside the U.S., the emphasized clause seems inappropriate and, as one of the measures with a low national security content, fit for review.

4a. See Ch. 2 supra, (text to) note 352.

Of course, the above should not be interpreted as an attempt to disqualify serious U.S. national security concerns, but rather as an effort to separate the wheat from the chaff.
This serves two purposes:
first, to have the telecom industry and other users of launch services focus on those elements in the above government measures which should - and, from a national security point of view, *could* - be singled out for the purpose of liberalization;
second, to increase the likelihood that national measures which address real, realistic and serious national security concerns will be followed and supported by U.S. allies. For, as we have observed before, the more blunt, oversimplified or 'polluted' - by other than national security considerations, aspects or consequences - these national controls are,[5] the less international support for those measures can be expected.
And where, as we saw before, other members of the Wassenaar Arrangement, MTCR and NATO, but also non-members of these arrangements possess both satellite and missile/launch technology and may see important economic, scientific, technical or political benefits in cooperating with one another in these fields - without necessarily fully sharing the U.S. security concerns - there is ample reason for the U.S. authorities to make a major effort in selecting only those objects or targets for measures of control or sanctions which will command respect and support from their friends and allies.
The overall effect of the above (lobbying) efforts should be a change in U.S. policy from "do not transfer sensitive or dangerous high tech goods and technologies to any foreign countries, *unless* ..." to "promote space launch cooperation and competition, *unless* ..."[6]

5. In the words of a U.S. State Department official, "like applying a meat cleaver where laser surgery would be more appropriate", see Eizenstat 1997, *supra* Ch. 4, note 77.
6. One of the dilemmas the regulators will continue to grapple with is that of the identical/similar characteristics of launch vehicles and missiles. In the China affair, there was, and still is, no unanimous agreement among various U.S. experts about the military (missile) benefits for China of the transfer of U.S. satellite and - possibly - launch technology information. But if the question is phrased along the lines of the MTCR, *i.e.* *could* the technology be used for WMD delivery systems, it is difficult, given important similarities of the technologies concerned, to answer in the negative. But, in fact, that would apply to many technologies unrelated to launch vehicles. It therefore makes more sense to look at the potential user, the relationship between the parties concerned and the sophistication of the programs involved to estimate how big the chance is that launch technology cooperation will substantially benefit a missile program of concern. Is the missile program of a NATO partner of concern to the U.S.? If not, civil launch cooperation with that country should not pose a problem. An example comparable to Hughes' alleged transfer of technology to Long March is the situation which may result from the launch on the Indian PSLV of 3 foreign satellites, Korean (Kitsat-3), German (DLR-Tubsat) and Belgian (Proba), see Space News (Apr 5, 1999) at 16; the satellite-launcher interface information exchange may, if the Hughes analogy is used, result in a more reliable performance of the Indian launch vehicle and that knowledge could be transferred to India's missile program. Whether that indeed happens, and if so whether that is serious enough to discourage the three

More than anything else, that will set the stage for a responsible liberalization of the international trade in launch services.

5. As for the economic and trade aspects of the matter, a comparison with the ongoing liberalization of international *air transport,* and the U.S. role in that development, may be useful.
This transport activity is different from launching or space transport, in the sense that it is bilaterally regulated between states on the basis of the principle of a state's sovereignty over (the use of) its airspace, as compared to the launch activity's legal basis, the freedom - and free use - of outer space, a *res communis omnium* which is not subject to claims of sovereignty. On the other hand the international trade in launch services, seen from the U.S. perspective, shares with international air transport the characteristic that the U.S. government exercises sovereign control over foreign access to the U.S. market (of satellites to be launched and launchers to be sold, including the respective technologies and components). Thus, the U.S. government, in both cases has a considerable influence on the operational and/or commercial well-being of the foreign companies concerned.

Until some ten years ago, international market access was, with few exceptions, only obtainable for airlines through bilateral, inter-governmental negotiations characterized by protectionist concepts such as *quid-pro-quo*, 'equal exchange of economic benefits' and 'equal capacity', which would usually lead to a bilaterally exchanged access for the national airlines concerned to the other party's air transport market at a level determined by the weakest or least interested party. Where that latter party, in many cases, would be the least dynamic, least innovative, and, (also) in its own perception, least prepared for the effects of free market forces, the end-result was a system of restrictive bilateral treaties, stifling competition and short-changing the customer in quantity, quality and price of the transport products available to him.
The U.S. was the first country with a large aviation market to, initially only domestically, but later also internationally, 'deregulate' aviation, by removing protective domestic and international rules and regulations, in order to expose the industry to the harsher environment of free(r) competition and market forces.
This has fundamentally changed the (composition and behaviour of the) American and international airline industry.

Wassenaar Arrangement parties concerned to use the Indian launcher is debatable to say the least. A similar question can be asked concerning - the dangers of - the Arianespace-Antrix agreement of Oct 1998 on mutual sales of small payload capacity on India's PSLV and Europe's Ariane respectively. In the end, only technical developments resulting in civil launch technologies becoming *unfit* for missile applications would give the guarantees and certainties sought by the national security establishments; a concerted effort to that effect may therefore be worth considering.

The U.S.' reasons for changing its regulatory approach towards this service industry may contain lessons which could be used for the liberalization of the launch industry.

The underlying principle for 'deregulation' was the long-standing U.S. trade philosophy of free trade ('let the market, the customer decide'), which is seen as giving those companies the best chances for survival and prosperity which, in free competition with other companies and with minimal regulatory interference, consistently please the customer with the best quality at the lowest price.

The application of that principle *in internationalibus*, however, was (and is) not an automatic one, but depended in the case of aviation on such factors as (a) the perceived level of maturity and survivability of the U.S. airlines concerned, (b) the benefits deregulation or liberalization of market access would bring to these airlines (compared to what it would bring in competitive benefits to foreign airlines) and (c) the benefits for the (American) public and the national economy.
On the basis of the positive outcome of its appraisal, the U.S. government (not the U.S. airlines!) saw sufficient reason in the late seventies to actively promote aviation deregulation internationally, and has continued to do so ever since.

Applying the above U.S. approach to the space launch field, we have at an earlier stage, in Chapter 4, come to the conclusion that the U.S. launch companies are sufficiently mature and equipped to meet foreign competition. We also indicated above our belief (which is partly based on the same economic rationale that led to the adoption of WTO/GATT and GATS principles and is reinforced by the experience gained with international deregulation in the field of air transport), that free(r) competition in space transport will benefit important growth industries such as global telecommunications which depend on space hardware and space transport, and, as a result, will also benefit U.S. state, national and global economies.

The above aviation parallel (in addition to the U.S.' official pro-liberalization stand with respect to trade in another important category of services, namely that of telecommunications), would appear to support the conclusion that the U.S. government should take its first decisive steps towards liberalization of the launch industry.
There is one element however, that would also have to be addressed, as it may stand in the way of a soonest U.S. launch liberalization 'move', namely the absence of substantial foreign launch markets that would become available to the U.S. launch industry through market access liberalization, comparable to the U.S. private and, in particular, the government satellite launch market to which foreign launch providers would get access: as long as the latter market is far superior in size and value, one cannot expect the U.S. launch companies

to enthusiastically espouse the idea of a 'swap' of access to government markets (particularly if one also takes into account the fact that the European government markets are not as closed to U.S. launch companies as the other way around).

There are a number of arguments why that imbalance in new launch opportunities should not prevent the U.S. government from moving ahead:
*one*, if the U.S. government follows the aviation precedent, it will again place a higher value on the application of free market principles and the benefits these entail in the long term for the national economy, than on a short term - unattainable - *quid-pro-quo* for its launch industry;
*two*, also in international air transport the benefits of international deregulation at first mainly accrued to the foreign airlines which obtained access to the important and rich U.S. market, rather than to the U.S. carriers (hence the initial resistance of the latter against this form of international deregulation);
*three*, the relative importance, in size and value, of the U.S. government satellite launch market is slowly but definitely decreasing as compared to the private commercial satellite launch market; and it is in the latter market, and more in particular in the LEO satellite systems market that the U.S. launch providers are catching up with their main competitor, Arianespace;
*four*, the U.S. launch companies are part of and/or participate in aerospace and telecommunications conglomerates; the latter, as customers, (must) see the advantages of additional competition and innovation in the international launch market, brought about by wider access to all sectors of that market.[7]
In conclusion, we suggest that the time is ripe for the first solid steps on the part of the U.S. government towards a liberalization of the international trade in launch services along the lines as indicated above. Further, it is primarily up to the aforementioned 'space hardware' - dependent communications and other launch service user-industries - those which are most immediately affected by the consequences of the present U.S. laws, policies and practices

7. In the context of the aviation parallel, two additional developments in the U.S. are worth noting because of their possible application to the (de-)regulation of the launch business: 1. the adoption by the DOT of the so-called Undeserved Airports Policy of 1990: this policy allowed foreign airlines - under certain conditions, but outside the usual bilateral *quid-pro-quo* bargaining process - access to those secondary U.S. airports which had no (U.S. or other) direct airservices with the country of the foreign airline concerned. The adoption of the policy was the result of a concerted lobbying effort on the part of the respective airport and state authorities and was based on the argument that international airservices would stimulate the local and regional economy; though launch services are different in many aspects, the economic (jobs!) argument as such is a valid one, which should be explored by the U.S. spaceports looking for (foreign) clients; 2. with the advent of international airline alliances involving U.S. and foreign carriers, the American fly U.S. rules applicable to aviation have been interpreted so as to allow, under certain conditions, U.S. government traffic to be carried by the foreign alliance partner concerned; with the same *caveat* as above, this approach is worth exploring by both Boeing's Sea Launch and Lockheed Martin's ILS.

in this field - to take the necessary initiatives to convince both the Administration and particularly Congress that these steps are long overdue.

At the same time it is in the interest of the U.S. government, both in its quality of guardian of free trade principles and of customer of the launch industry, as well as in its role of 'global security guard' - in the field of export controls dependent on other countries to properly perform its job -, to make a strict and precise distinction between measures *exclusively* aimed at addressing 'with laser surgery' real, realistic and serious national/global security concerns on the one hand, and all other measures on the other hand. Only in that way, may the U.S. government hope, in its enlightened selfinterest, to be able to promote trade in launch services and at the same time meet essential security needs.

According to the author Naisbitt, telecommunications and information technology are two of the three "paradigm industries" which will drive the service-led economies of the 21st Century.[8]
Also from that point of view, it is justified to analyse as a matter of priority, in both national and international fora, the effects of the present regulatory regime, as described in this study, on the development of the launch industry and, consequently, on the development of these paradigm industries. Such an analysis should include forecasts as to the consequences for these industries of the various possible liberalization scenarios envisaged.

We briefly return to the need for increased international cooperation and competition between the U.S. and foreign launch companies, both incumbents and new, to make two final points:

1. The history of - the effects of - U.S. refusal or hesitation to transfer launch technology to foreign countries and/or its insistence on attaching strict conditions to the use thereof, has taught us that it is at best doubtful whether this has indeed effectively, and also in the long term, prevented the development of civil and/or military launch systems in the countries concerned. Europe, Japan, India and Brazil are, as we saw, examples of countries which, in stead of being discouraged by the U.S. attitude, rather felt confirmed in the view that they should 'go-it-alone', and, where necessary, look for other, less-

8. John Naisbitt is the author of Megatrends 2000 and Global Paradox. According to the author, the third 'paradigm industry' is *travel and tourism*, as approvingly noted (and quoted) by the World Travel and Tourism Council (WTTC) in its Millennium Vision. The WTTC, a global coalition of about 100 CEO's from all sectors of the travel and tourism industry, including transportation, has a solid reputation for promoting the liberalization of international aviation and telecommunications and, in that connection, the abolishment of trade barriers and protectionist policies, on the basis of - particularly - economic analyses, see <http://www.wttc.org> *passim*. The WTTC could be an interesting ally of the above space hardware dependent industries in underpinning and promoting the liberalization of the international satellite launch industry.

principled partners for assistance. Similar recent reactions, on the part of Europe, have been observed in the field of global navigation satellite systems and military observation (spy) satellites: also in these cases, an - apparent - overdose of foreign policy or national security-inspired cautiousness on the part of the U.S. only results in the countries concerned going their own way.
One may wonder whether - this - history has not taught us that a transfer of space (launch) hardware and/or technology, embedded in a peaceful space cooperation program, in the end would prove to be a more effective method to address missile proliferation worries and make the world a safer place to live.

2. To the extent that national security-based American policies maintain the gulf between U.S. space 'haves' and foreign 'have nots', and thus widen the technological and economic gap between the two groups, such policies have at the same time a peace, security and stability *threatening* effect. That affects not only the economic, political and security interests of the U.S. but also the corresponding interests of the world community at large.
For that reason in particular, the provisions of the Outer Space Treaty of 1967 and of the Outer Space Benefits Declaration of 1996, quoted in the previous Chapter, appeal to member states to engage to the maximum extent possible in international cooperation in the exploration and use of outer space. In fact, that is the central theme, the spirit of space law as a *lex specialis* of international law.

Laws, policies and practices, which virtually exclude cooperation in a sector of the above space activities, violate that spirit.

That should provide the framework for U.S. government efforts geared at the establishment of an international regime which does deserve the title "free and fair trade in launch services".

INDEX

## Samenvatting in het Nederlands - Summary in Dutch

### De internationale handel in lanceerdiensten

### De effecten van de Amerikaanse wetgeving, beleid en praktijk op haar ontwikkeling

**1.**

De indrukwekkende Saturnus V die Neil Armstrong en zijn collega's op de maan zette kan beschreven worden als een raket of als een vervoermiddel. Dat is geen kwestie van woordkeus maar van perceptie.

Een militair ziet de raket als een symbool van zaken als macht, agressie, zelfverdediging, overwinning, nederlaag. In de ogen van zijn burger-collega is het voornamelijk een middel om passagiers en vracht te vervoeren.

Beide hebben gelijk, zoals het gebruik van raketten in de praktijk aantoont. Afhankelijk van het soort gebruik noemen we de raket in het Engels een "missile" (als hij bestemd is voor het dragen van militaire explosieven, m.a.w. als wapen) of een "launch vehicle", een lanceervoertuig (als hij niet-militaire transport taken verricht); alle op dit moment in gebruik zijnde lanceervoertuigen, met uitzondering van de Space Shuttle, zijn "expendable", 'wegwerp'-voertuigen, d.w.z. slechts geschikt voor eenmalig gebruik. "Launching", lanceren, kan dus zowel een militaire als een civiele activiteit zijn. Het belangrijkste verschil in de praktijk is dat het civiele lanceren bedoeld is om voorwerpen, voornamelijk satellieten, in de ruimte te plaatsen, terwijl de missile een gronddoel heeft.

Het gemelde verschil in perceptie, gebaseerd op feitelijk of beoogd gebruik, ziet men ook bij andere types vervoermiddel, zoals vrachtauto's en vliegtuigen. Vrachtauto's kunnen manschappen vervoeren of militair materieel, en niet militaire versies worden gebruikt voor busdiensten of verhuizingen. Een B-52 vervoert bommen, terwijl de Boeing 747 passagiers en vracht vervoert.

**2.**

De oorsprong en achtergrond van het lanceren is duidelijk militair-strategisch van aard. Het begon allemaal met missiles en met ideeën over militair gebruik van de ruimte.

En, hoewel de gebroeders Wright geen militaire luchtvaartuigen ontwikkelden heeft de luchtvaart een soortgelijke achtergrond. Maar in de loop van zo'n driekwart eeuw heeft de luchtvaart zich grotendeels ontdaan van haar militaire 'erfenis', in die zin dat de gebruikers ieder hun eigen weg zijn gegaan. Zo is er aan de ene kant een militaire luchtvaartindustrie met wereldwijde luchtmachtgebruikers ontstaan, terwijl zich anderzijds een grootschalige wereldwijd opererende commerciële luchttransport industrie heeft ontwikkeld, waarin honderden luchtvaartmaatschappijen uit vrijwel alle soevereine staten actief zijn.

De internationale commerciële luchtvaart is een *service industry*. We gebruiken die term om aan te geven dat de luchtvaart zich met - internationale - dienstverlening bezighoudt. Dit impliceert dat luchtvaartmaatschappijen er niet aan ontkomen zoveel mogelijk de wensen van klanten te vervullen, enerzijds om te voorkomen dat ze overstappen naar de concurrent, anderzijds omdat de luchtvaart in zijn totaliteit de wereldeconomie dient.
De internationale burgerluchtvaart is een commerciële activiteit die van vitaal en onmisbaar belang is voor de wereldhandel en voor de wereldeconomie.
Daarmee is het militair-strategische aspect van deze activiteit zodanig verdwenen dat overheidsregelsring, gebaseerd of gericht op militair-strategische of (nationale) veiligheidsgronden, geen rol speelt in haar - verdere - ontwikkeling en ontplooiing.

Zoals we zullen zien in deze studie heeft de internationale commerciële lanceerindustrie dat stadium nog niet bereikt.

**3.**
De internationale commerciële lanceerindustrie staat op een kruispunt.
De handel in lanceerdiensten groeit met sprongen. De eisen van de privéondernemingen die van deze diensten gebruik maken, vooral grote telecommunicatiemaatschappijen en conglomeraten, vormen meer en meer de drijvende kracht achter de ontwikkeling van de lanceerbedrijven. En deze laatste willen graag aan die eisen voldoen, zoals het een 'normale' dienstverlener betaamt. Maar aan de andere kant wordt het reilen en zeilen van deze dienstverlener nog sterk bepaald en beïnvloed door de militair-strategische en "national security" aspecten van het lanceren en de houding die op grond daarvan tegenover deze industrie wordt ingenomen.
Ten behoeve van hun klanten willen de lanceerbedrijven zich als normale dienstverleners kunnen opstellen, maar in de praktijk laten een aantal belangrijke 'spelers' waarvan zij afhankelijk zijn dit nog niet toe.

Dit conflict tussen belangen van nationale (en wereld-) veiligheid enerzijds en internationale handel anderzijds, en de wijze waarop dit de ontwikkeling van de internationale handel in lanceerdiensten beïnvloedt, is het centrale thema van deze studie.

De *speler* die hierbij het meest centraal staat is de Verenigde Staten. Niet zozeer vanwege de indrukwekkende omvang en het belang van haar civiele en militaire ruimtevaart industrie, inclusief de lanceerbedrijven, maar vooral omdat - meer nog dan in de luchtvaart - de wetgeving, het beleid en de daden van de Amerikaanse overheid en haar interactie met de andere binnenlandse en buitenlandse spelers van grote invloed blijken te zijn op de ontwikkeling van de commerciële lanceeractiviteiten van andere landen.

Dit brengt ons bij het startpunt en de eigenlijke reden voor deze studie.

**4.**

Zoals hierboven aangegeven speelt de internationale telecommunicatie industrie een steeds belangrijker rol als aanjager van de ontwikkelingen bij de lanceerbedrijven. De omvang van de markt van te lanceren satellieten wordt vooral bepaald door groeiende telecombehoeften, op het gebied van o.a. data transmissie, mobile telefonie, fax en internet verkeer. Andere activiteitengebieden waarbij steeds meer gebruik wordt gemaakt van satellieten, zoals meteorologie, astronomie, geologie, landbouw en geografie, vergroten deze commerciële markt nog verder. (Daarnaast is er ook nog de omvangrijke markt van overheidssatellieten (militair en civiel), zij het dat het woord 'markt' hier in zoverre misleidend is dat de respectieve overheden de lancering van hun satellieten meestal reserveren voor de nationale lanceerbedrijven.)
Alles bij elkaar, zo is de verwachting, zullen er in de komende 10 jaar zo'n honderd commerciële satellieten per jaar gelanceerd moeten worden.
Men zou op grond daarvan verwachten dat een flink aantal concurrerende lanceerbedrijven staat te springen om lucratieve lanceercontracten te sluiten met de satellietfabrikanten - die vaak de satelliet plus lancering in één pakket aanbieden - of met de kopers van de satellieten.

In feite is er weliswaar een aantal landen met een eigen lanceerindustrie en een keuze aan lanceervoertuigen, maar bij nader onderzoek blijkt de daaruit resulterende concurrentie, en dus de keuze voor de klanten, gering, en wel in een aantal opzichten.
De huidige aanbieders zijn de V.S., Europa, Rusland, China, Ukraine, Japan, India, Israël en Brazilië. Daarvan hebben de V.S. en Rusland het meest gevarieerde aanbod aan lanceer-'families' en lanceerbases, waaruit de klanten, afhankelijk van het gewicht, de omvang, de gewenste locatie in de ruimte van de satelliet, en de kosten, de juiste combinatie kan kiezen.
En de geografische en socio-politieke variëteit en spreiding van bovenstaande lanceerlanden geeft de even gevarieerde klantenkring ook de nodige keuze.

Maar waarom bieden alleen deze staten lanceerdiensten aan? Waar zijn de concurrerende lanceerbedrijven van landen als Zuid Afrika, Argentinië, Taiwan, Zuid Korea, Iran, Saoedi Arabië, en Australië?
En waarom domineren de V.S., met de lanceerbedrijven van Lockheed Martin en Boeing, en Europa, met Arianespace, de internationale lanceermarkt, terwijl bijvoorbeeld Rusland en China, ondanks hun grote ervaring op lanceergebied, in commerciële zin ver achterblijven bij deze koplopers? Waarom is de Ukraine nog maar net in de markt begonnen en moet Japan, ondanks zijn technologische prestaties, in feite nog beginnen? En India, met zijn geavanceerde ruimtevaartindustrie en zijn eigen lanceerbedrijf, verricht wel lanceringen om in eigen behoeften te voorzien, maar is nog niet actief op de wereld markt, terwijl Israël in samenwerking met een Amerikaans bedrijf lanceercontracten sluit, maar nog weinig succesvolle lanceringen heeft weten te

verrichten. En waarom vliegt de Braziliaanse *Veiculo Lancador de Satellites* nog niet?
Kortom, waarom zijn er zo weinig volwaardige spelers in deze veelbelovende markt, waar zijn de nieuwkomers en is er sprake van enige innovatie buiten de V.S.? En, tenslotte, waar blijven de overnames en mergers, c.q. de allianties in deze sector van de handel in diensten?

Deze vragen zouden wellicht ongesteld zijn gebleven - en deze studie ongeschreven - als de luchtvaart niet als ijkpunt en vergelijkingsmateriaal voor de auteur beschikbaar was geweest.
Immers, in die sector is het gebruikelijk dat een soevereine staat zich incompleet voelt zonder een eigen nationale luchtvaartmaatschappij. Er zijn vele - meer of minder- rationele argumenten om de oprichting of instandhouding van een eigen maatschappij te bevorderen, variërend van economisch-commerciële (toerisme, nationale economie) of strategische (eigen verbindingen in geval van nood) redenen, tot overwegingen van nationaal prestige of regionale dominantie, en diverse mengvormen daarvan. Zelfs 'just fun' kan een reden zijn!
In al die gevallen, en onafhankelijk van de motivatie van de overheid of de privé entrepreneur in kwestie, zal de toekomstige luchtvaartondernemer vliegtuigen aanschaffen, bemanningen, technische en verkoopstaf rekruteren, een luchthaven van de nodige apparatuur voorzien *en toestemming vragen aan de luchtvaartautoriteiten van de beoogde buitenlandse bestemmingen om commerciële operaties op de desbetreffende landen te mogen uitvoeren.*

In de internationale luchtvaart zijn het vaak niet zozeer de technisch-operationele of zelfs financiële barrières die aan de start of het succes van een luchtvaartbedrijf in de weg staan, maar veeleer het hierboven gecursiveerde regulatoire aspect. Condities of beperkingen, opgelegd door buitenlandse overheden, kunnen zowel het betreden van de luchtvaartmarkt als het veroveren van een aandeel in die markt in de weg staan. En hoe vitaler het belang van een eigen luchtvaartmaatschappij in de ogen van een nationale overheid is, des te meer zal deze geneigd zijn door bescherming, in de vorm van het buitensluiten of beperken van buitenlandse concurrenten, het overleven van de eigen maatschappij te garanderen. (Waarbij overigens vaak voorbijgegaan wordt aan het feit dat bescherming en 'survival of the fittest' in de Darwinistische zin van het woord haaks op elkaar staan).

Met deze achtergrond, en met als gegeven dat de V.S. internationaal de meest invloedrijke speler op het gebied van satellietfabricage en -export en van lanceeractiviteiten is, ligt het voor de hand te onderzoeken of en, zo ja, in hoeverre Amerikaanse wetgeving, beleid en praktijk de ontwikkeling van de internationale handel in lanceerdiensten heeft beïnvloed *c.q.* nog steeds beïnvloedt, en dan vooral door het opwerpen van zodanige hindernissen voor buitenlandse lanceermaatschappijen dat deze niet of slecht in staat zijn de internationale commerciële lanceermarkt te 'betreden' of daarin marktaandeel te veroveren.

Daarnaast dient de vraag beantwoord te worden in hoeverre (de praktijk van) de resulterende regulatoire omgeving voor de betrokken partijen werkbaar en acceptabel is, gegeven de grote en diverse belangen die op het spel staan. Tenslotte dienen aanbevelingen geformuleerd te worden die een bijdrage kunnen leveren aan de oplossing van de gesignaleerde 'pijnpunten', d.w.z. die aspecten en consequenties van de Amerikaanse praktijk welke, met inachtneming van de andere belangen (zoals national security), niet werkbaar en acceptabel zijn voor de internationale lanceerindustrie en haar klanten.

5.
Gegeven het doel van de studie is het allereerst van belang de markt te identificeren waarin de lanceerbedrijven actief zijn, m.a.w. de bedrijven die satellieten fabriceren en de satellietkopers en -gebruikers; de laatste groep wordt in toenemende mate gedomineerd door internationale telecommunicatiesatellieten consortia met wereldwijde ambities en grootse projecten, zoals Iridium, Globalstar, Teledesic en anderen. Tegen de achtergrond van deze plannen en van de wijze waarop bedrijven als Hughes, Aerospatiale en andere satellietmakers op deze plannen inspelen, bekijken we de prestaties van de bestaande lanceerbedrijven in de V.S. en daarbuiten en de wijze waarop ze zich voorbereiden op de dienstverlening die in de toekomst van hen verwacht wordt. Interessant is in dit verband het gegeven dat de satellieten die voor de geostationaire baan, op ongeveer 36.000 km hoogte, bestemd zijn steeds groter en gecompliceerder lijken te worden, terwijl de lage aardbaan (Low Earth Orbit, LEO), waarvan de meeste bovengenoemde consortia gebruik maken, vraagt om lanceringen van aanmerkelijk kleinere satellieten, maar wel, in de aanvangsfase, met aantallen van 4 tot 12 tegelijk. De meer incidentele vervanging van LEO satellieten creëert daarnaast een markt voor kleinere lanceervoertuigen. Hoofdstuk 1, waarin deze zaken worden behandeld, besteed ook aandacht aan de lanceerbases die door de diverse lanceerbedrijven gebruikt worden, en signaleert de opkomst in de V.S. van nieuwe 'spelers', nl. de particuliere 'spaceports' naast de bestaande federale faciliteiten die sinds het begin van de ruimtevaart door NASA en het Ministerie van Defensie werden gebruikt. Een aantal interessante samenwerkingsprojecten, o.a. tussen Lockheed Martin en een tweetal Russische bedrijven en tussen Boeing en een Russisch, Ukraïens en Noors bedrijf, beide gebruik makend van niet-Amerikaanse lanceerexpertise, en daarnaast ook Europees-Russische en Europees-Indiase samenwerking van wat beperktere omvang worden hier geïntroduceerd. Ten slotte komen de mogelijke praktische barrières voor een lanceerbedrijf in oprichting (gebrek aan technologie, hoge kosten, beperkt inzicht in de markt, dominante positie van de marktleiders enz.) ter sprake en wordt gekeken naar de problemen die een bestaande lanceerindustrie kan hebben, zoals bijvoorbeeld onvoldoende marketing en verkoop ervaring.
Het zal niet verbazen dat reeds in dit stadium geconcludeerd kan worden dat er, afgezien van deze - mogelijke - barrières van praktische aard, ook belemmeringen en hindernissen in de sfeer van overheidsreguleringen zijn. Deze zgn.

*regulatory impediments* komen in de volgende hoofdstukken gedetailleerd aan bod. Daarbij staat vooral de Amerikaanse praktijk centraal.

**6.**
Om te begrijpen hoe de huidige regulatoire omgeving voor de internationale lanceerindustrie is ontstaan, is het nodig terug te gaan in de historie, en in chronologische volgorde de ontwikkeling van het Amerikaanse denken te volgen en analyseren over de inzet van ruimtevoertuigen voor militaire en civiele, en uiteindelijk ook commerciële, doeleinden.
Interessant is het in dat verband te zien hoe de praktijk van overheidslanceringen (door NASA en het ministerie van Defensie) met lanceervoertuigen gekocht bij de eigen fabrikanten, in de tachtiger jaren overgaat in het meer en meer afnemen van lanceer*diensten* van grotendeels dezelfde bedrijven. Dit was in de Amerikaanse marktfilosofie (de combinatie van private enterprise en concurrentie levert betere producten en diensten dan de overheid) uiteindelijk onvermijdelijk. Maar bovendien had de ramp met de Space Shuttle Challenger in 1986 duidelijk gemaakt dat *assured access to space*, een paradigma gebaseerd op nationale veiligheid en buitenlandse politiek, beter gediend werd door een variëteit aan efficiënte en goedkope lanceermiddelen naast de Shuttle.
En tenslotte was de Europese *Ariane*, een lanceervoertuig waarmee internationaal aan de weg getimmerd werd, een geduchte concurrent gebleken voor de Amerikaanse overheid op de internationale markt, en diende de Amerikaanse industrie gestimuleerd te worden om deze taak over te nemen. Het resultaat is een aantal wetten en beleidsmaatregelen, die enerzijds de Shuttle beperkten tot overheidslanceringen en anderzijds de Amerikaanse lanceerindustrie beter wapenden voor de internationale concurrentie.
Daartoe werd o.a. binnen het Department of Transportation een Office of Commercial Space Transportation opgericht, kreeg de industrie gesubsidieerde lanceerfaciliteiten en werd de aansprakelijkheid voor schade aan derden door de overheid beperkt.

**7.**
In een aantal Hearings van het Congres vonden - soms heftige - discussies plaats over de toekomst van de Amerikaanse lanceerindustrie. Uit deze discussies en uit de wetten en het beleid die daarvan het resultaat waren kan een aantal 'rode lijnen' gedestilleerd worden.
Ten eerste, de overheersende plaats die de begrippen 'nationale veiligheid en buitenlandse politiek' daarbij innamen en die vrijwel altijd reden waren om voor een sterke en veerkrachtige nationale lanceerindustrie te pleiten. Ten tweede, de gecompliceerde relatie tussen de Amerikaanse overheid, de Administratie, en het Congress, die vaak verschillende prioriteiten en 'agendas' blijken te hebben, met soms onvoorziene gevolgen voor de eigen lanceerindustrie en voor de relaties van de V.S. met het buitenland op dit gebied. Ten derde, de conflicterende belangen van de Amerikaanse lanceerindustrie enerzijds en de Amerikaanse satellietenindustrie anderzijds: de laatste streeft, ten behoeve van haar eigen klanten, naar een zo groot mogelijke variëteit aan

lanceerbedrijven en zal daarom het gebruik van buitenlandse bedrijven niet schuwen, sterker, ter bevordering van de kwaliteit en verlaging van de kosten, internationale concurrentie op dit gebied zo veel mogelijk stimuleren.

**8.**

Er is één type regels dat qua invloed op het wel en wee van de betrokken industrieën alle andere in de schaduw stelt, nl. die welke de export van wapens en strategisch-relevante goederen en technologieën aan controles onderwerpen. Zowel in de V.S. als in andere landen wordt daarbij een onderscheid gemaakt tussen enerzijds wapens en anderzijds 'high tech'-goederen en technologieën die zowel voor militair als civiel gebruik geschikt zijn. In de eerste categorie vallen militaire raketten, maar ook de ruimtevoertuigen waarmee satellieten worden gelanceerd. Tot de tweede, zgn. sensitive 'dual-use', groep behoren vele uiteenlopende zaken zoals nachtkijkers, computers, allerlei precisie-apparatuur, en ook *communicatiesatellieten.*

Het idee achter deze controles, ontstaan tijdens de koude oorlog, is dat het in het nationale veiligheidsbelang is om een technologische voorsprong op de vijand te houden en dus om te verhinderen dat bovenvermelde goederen en technologieën in zijn handen komen. In 1949 creëerde de Westerse wereld daartoe het CoCom regime, dat er op toezag dat Westers strategisch materiaal niet in Communistische handen viel. De betrokken lidstaten stemden hun nationale exportwetgevingen op elkaar af, hanteerden dezelfde lijst van gerestitueerde goederen en bezaten een vetorecht als een andere lidstaat (toch) een dergelijk goed naar een communistisch land wilde exporteren.
In 1987 kwam daar een ander regime bij, het zgn. *Missile Technology Control Regime* (MTCR), dat zich vooral richtte op het restricteren van de export van militaire raketten en andere middelen om massavernietigingswapens te transporteren. Ook dit is een van oorsprong Westers regime, bedoeld om het aantal landen dat over deze wapens beschikt zo klein mogelijk te houden. En ook hier betreft het een afspraak, geen verdrag, om de nationale wetgeving en de exportvergunningen praktijk zo veel mogelijk op één lijn te krijgen. Dit niet alleen om een gemeenschappelijk 'security' front tegenover de op bewapening beluste - potentieel vijandige - buitenwereld te handhaven, maar ook om concurrentievervalsing te voorkomen. Immers als het ene land een lucratieve export blokkeert en de industrie van een ander land neemt het contract over en levert de strategische goederen onbekommerd aan de afnemer, dan levert dit een ongerechtvaardigd handelsvoordeel op voor het exporterend land. In het Wassenaar Arrangement dat in 1996 het koude oorlogsinstrument CoCom verving, is van een vetorecht geen sprake, en wordt er uitgegaan van het verantwoordelijkheidsgevoel van de betrokken landen en onderlinge openhartigheid ten aanzien van het nationale exportgedrag.

**9.**

Hier wordt een belangrijk deel van de problematiek duidelijk, zowel nationaal als internationaal. Enerzijds is het in het belang van nationale economieën om zoveel mogelijk te exporteren, anderzijds is er een veiligheidsbelang dat een verbod op of beperking van export van specifieke goederen wenselijk maakt. De vraag is dan hoe de diverse landen met deze tegenstrijdige belangen omgaan. In de V.S., waar export controles al bestaan sinds de Burgeroorlog, woedt deze strijd in volle hevigheid tussen, ruwweg, de lucht- en ruimtevaart, computer- en elektronica-industrie en het 'nationale veiligheidsestablishment', met wisselende winnaars en verliezers. Het is in dit verband noodzakelijk te weten dat er twee nationale wetten zijn die dit gebied regelen, nl. de Arms Export Control Act, die het State Department autoriseert om vergunningen op het gebied van wapenexport te verlenen, en de Export Administration Act, die aan het Department of Commerce de verantwoordelijkheid heeft gegeven om de export van strategische 'dual-use' goederen te reguleren. Commerce heeft in zoverre een dubbele loyaliteit dat enerzijds het nationale veiligheidsbelang gediend moet worden, terwijl anderzijds de handelsbelangen van de V.S. gediend moeten worden. Commerce is daardoor in de praktijk een 'regulator' én een bondgenoot van de Amerikaanse exportbedrijven.

Dat missiles en lanceervoertuigen, als wapens ("munitions"), onder State Department controle vallen is tot nu toe geen punt van debat geweest. Wel heeft dit Department, na een intensieve lobbycampagne van de industrie onder leiding van Hughes, in 1996 de controle over commerciële communicatie-satellieten, tot dan toe beschouwd - voor exportvergunning-doeleinden - als wapens, moeten afstaan aan Commerce. Zoals we later zullen zien, leidde een spionnageschandaal waarin China was betrokken er al in 1998 toe dat deze beslissing van de President door het Congres ongedaan werd gemaakt.

Intussen heeft zo de toepassing van deze export controles een grote en, vooral door de verschillende opvattingen binnen het Congres en die tussen het Congres en de Administratie, wisselende en onvoorspelbare invloed op het wel en wee van de Amerikaanse satellietenbouwers, de Amerikaanse lanceerbedrijven, en hun buitenlandse collega's. En uiteraard op de klanten die satellieten willen kopen en een lanceerbedrijf zoeken dat bij *hun* behoeften past en niet primair bij de wensen van het Congres of de Administratie. Want een punt van belang is hier dat buitenlandse politiek, en de verschillende visies op wat acceptabele en wat onacceptabele handelspartners zijn, in deze problematiek een grote rol is gaan spelen.
Zo wordt de vraag of Amerikaanse communicatiesatellieten naar China of Rusland mogen worden geëxporteerd om vandaar gelanceerd te worden er niet alleen één van toepassing van de exportwetgeving, maar ook één die binnen- en buitenlandse handelspolitieke aspecten heeft en daarnaast mensenrechten, nonproliferatiegedrag en democratisch gehalte als additionele punten van afweging binnen het Congres en de Administratie (en tussen deze twee) meebrengt. Daarmee hebben ook partijpolitieke overwegingen hun entree in deze problematiek gemaakt.

**10.**

Met het juridisch-politieke kader aldus in kaart gebracht, kijken we naar de wijze waarop de V.S. in concreto met de vier belangrijkste concurrenten van haar lanceerindustrie is omgegaan, nl. (de lanceerbedrijven van) China, Rusland, Ukraine en Europa, waarbij China en Rusland vooral aandacht krijgen vanwege de politieke 'lading' die de relaties met de V.S. in het algemeen maar ook op dit specifieke gebied hebben. Beide landen zochten toegang tot de internationale commerciële lanceermarkt en beide vonden de Amerikaanse exportwetgeving m.b.t. satellieten op hun weg. De dominantie van de Amerikaanse satellietenmakers en van de fabrikanten van belangrijke satellietonderdelen was zodanig in 1988 dat China zich gedwongen voelde toegang tot de lanceermarkt te 'kopen' met het accepteren van een overeenkomst tussen de beide overheden waarin zowel de hoeveelheid lanceercontracten als de te hanteren lanceerprijzen voor China werden vastgelegd.
Dit was geen garantie voor China's markttoegang: de exportwetgeving bleef een 'case-by-case' beoordeling op normen van nationale veiligheid en buitenlandse politiek van elke te exporteren Amerikaanse satelliet voorschrijven. En *Tiananmen* betekende dan ook een onmiddellijke opschorting van de bestaande exportvergunningen en de lopende procedures.

Deze zaak toonde bovendien de macht en de - gedeeltelijk partijpolitiek gedreven - wens van het Congres om wetgeving aan te nemen gericht op China die verder ging dan de Administratie wenselijk achtte, een fenomeen dat tot op de dag van vandaag een complicatie vormt in de relaties V.S.- China, maar ook in die met Rusland op dit gebied, maar bovenal extra onzekerheid creëert voor alle betrokken spelers. Dit ontmoedigt kopers van Amerikaanse satellieten die een Chinese of Russische lancering prefereren.
Ook met Rusland en Ukraïne zijn bilaterale overeenkomsten gesloten die prijs en capaciteit voorschrijven. De reden ligt ook hier in een bescherming van de Amerikaanse lanceerindustrie tegen de marktpraktijken van bedrijven uit "non-market economies", maar, waar in het geval van China een politiek van "engagement" van de Administratie een belangrijke reden was om China's lanceermaatschappij - gecontroleerd - toe te laten, speelden in het geval van Rusland en Ukraine vooral non-proliferatie overwegingen een rol, nl. bezorgdheid over de mogelijkheid dat ongebruikt blijvende lanceertechnologie door de betrokken landen om financiële redenen aan terrorisme-ondersteunende landen zou worden verkocht.
Ook hier zien we derhalve een verweving van handelspolitieke en veiligheidsafwegingen.

De capaciteitslimieten in de bovenstaande bilaterale overeenkomsten zijn inmiddels onder druk van zowel de Amerikaanse satellietbouwers als van de Amerikaanse partners van de Russische en Ukraïnse lanceerbedrijven aanmerkelijk verruimd, maar of deze overeenkomsten, in overeenstemming met een beleidsvoornemen van President Clinton in 1996, inderdaad in 2000/2001 niet meer verlengd worden, mag in het licht van de inmiddels onder invloed van het Congres verscherpte aandacht voor de negatieve aspecten van buitenlandse lanceringen van Amerikaanse satellieten, betwijfeld worden. En overigens blijven ook dan de exportcontroles gewoon bestaan.

**11.**
De relaties met Europa zijn van een geheel andere orde. Hier gaat het vooral om een volwaardige 'market-economy'-concurrent, die bovendien in politiek en militair opzicht een bondgenoot van de V.S. is, en in principe dezelfde algemene veiligheidsdoelstellingen heeft.
De Europese landen zijn vrijwel alle lid van de NAVO, en aangesloten bij zowel MTCR als het Wassenaar Arrangement. Dit impliceert dat voornamelijk handelspolitieke overwegingen in de relatie tussen de beide partners op dit gebied een rol spelen.
De Europees-Amerikaanse discussies betroffen dan ook vooral kwesties als subsidiëring van de lanceerindustrie aan beide zijden, de wens aan Amerikaanse kant om deze en andere 'fair competition' verstorende gedragingen aan banden te leggen in overeen te komen gedragsregels ("rules of the road") en de klacht aan Europese zijde dat de Amerikaanse overheidssatellietenlanceermarkt (een woord waarmee in het Scrabble-spel een aanzienlijk aantal punten kan worden behaald) op grond van het "fly U.S." beleid geheel aan Amerikaanse lanceerbedrijven is voorbehouden.

Daar er ook aan Europese kant een soortgelijke policy bestaat ten behoeve van de Ariane, is het interessant te bezien in hoeverre de combinatie van deze twee regelingen, en/of één van beide afzonderlijk, een additionele *regulatory impediment* oplevert. De conclusie lijkt gerechtvaardigd dat beide deze kwalificatie verdienen, zij het dat zowel het (juridisch) dwingender karakter als de daarop gebaseerde praktijk van de Amerikaanse regeling, gevoegd aan de aanzienlijk grotere omvang van de desbetreffende markt inderdaad tot een *de facto* aanmerkelijk grotere belemmering van de vrije concurrentie in de totale lanceermarkt leidt dan haar Europese tegenhanger veroorzaakt. Dit laatste is zowel door de European Space Agency als door de Europese Commissie al enkele malen in hun respectieve contacten met de Amerikaanse overheid als een punt van zorg opgebracht. Wel dient hierbij vermeld te worden dat het militaire deel van deze overheidsmarkt (militaire communicatie-, navigatie- en verkenningssatellieten) een onweersproken national security karakter heeft, en zich dus begrijpelijkerwijs minder leent voor een behandeling gebaseerd op uitsluitend handelsoverwegingen.

**12.**
Het wordt in dit stadium van de discussie tijd nader aandacht te schenken aan het soort regime dat de betrokken partijen idealiter voor ogen staat. Daarbij nemen we als uitgangspunt de door Clinton in 1996 in het vooruitzicht gestelde "free and fair trade in international launch services". Het is duidelijk dat het huidige regime die kwalificatie, ook in Amerikaanse ogen, niet verdient. Maar welke ingrediënten zijn nodig om die beoogde situatie te bereiken. Het concept

als zodanig geeft geen duidelijkheid, maar als we de visies van de verschillende partijen in en buiten de V.S. de revue laten passeren, krijgen we een aantal verlanglijstjes die wel inzicht geven in de minimale voorwaarden waaraan voldaan moet worden om deze handel "free and fair" te maken.

Het zal niet verrassen dat de satellietfabrikanten in Amerika grote problemen hebben met de huidige situatie: buitenlandse lanceerbedrijven vormen een onzekere schakel in hun contractuele relaties met hun klanten, de kopers en gebruikers van satellieten. Dit dwingt eerstgenoemden om de Amerikaanse lanceerindustrie te gebruiken en aan te prijzen ook in die situaties waarin de buitenlandse klant duidelijk een andere voorkeur heeft. Dat leidt tot verlies van deze klanten aan de Europese satelliet industrie, die minder gehandicapt wordt in haar relaties met China en Rusland door van intensiteit en politieke prioriteit wisselende export controles. De oplossing voor de Amerikaanse industrie lijkt simpel, nl. een zo grote keuze aan concurrerende Amerikaanse lanceerbedrijven dat de buitenlandse lanceerindustrie niet meer nodig is. Dat is ook de duidelijke voorkeur van het Congres, maar betekent wel het verlies van die klanten die aan een niet-Amerikaans lanceerbedrijf om wat voor reden dan ook de voorkeur geven. En voorlopig is de Amerikaanse lanceerindustrie onvoldoende geëquipeerd om deze rol te spelen. De Amerikaanse satellietenindustrie zal dus - moeten - blijven pleiten voor een aanmerkelijk minder door nationale veiligheid en buitenlandse politiek gedomineerd exportbeleid m.b.t. commerciële communicatiesatellieten.

De lanceerbedrijven van de V.S. hebben een uitstekende uitgangspositie in de concurrentiestrijd met hun buitenlandse collega's. De overheid draagt door middel van militaire en civiele lanceer- en ontwikkelingscontracten voor miljarden dollars bij aan de kwalitatieve en kwantitatieve uitbouw van hun huidige en toekomstige 'families' van lanceervoertuigen. Daarnaast hebben zij allianties gesloten met Russische bedrijven waardoor hun totale aanbod van lanceerdiensten nog is toegenomen. De bovenvermelde ontwikkelingen spelen hen bovendien in de kaart. Deze lanceerbedrijven lijken gebaat bij de *status quo*.

Dat de Russische, Chinese en Ukraïnse lanceerbedrijven op dit moment niet volledig kunnen meespelen in de concurrentie, en daar ontevreden over zijn is al uitgebreid gereleveerd: de beperkende condities waaronder zij opereren verdwijnen maar gedeeltelijk als de met de V.S. gesloten overeenkomsten niet meer worden verlengd. In het politieke intra-Amerikaanse spel trekken zij voorlopig aan het kortste eind, hoezeer dat ook strijdig is met de belangen van de Amerikaanse satellietenmakers.

Arianespace is een commercieel zeer succesvol bedrijf dat echter in vergelijking met haar Amerikaanse collega's een belangrijke 'government market backbone' mist en "free en fair trade" pas aanwezig acht als zij in de Amerikaanse overheidsmarkt een graantje mag meepikken.

**13.**
Blijven over, afgezien van de Amerikaanse particuliere spaceports die voor hun commerciële succes zowel autochtone als buitenlandse lanceerbedrijven willen accommoderen, de Administratie en het Congres.
Wij beperken ons hier tot een specifiek nieuw aspect, nl. de houding van de Administratie tegenover de GATS, de General Agreement on Trade in Services. Lanceren is een vorm van dienstverlening, van handel in diensten, en valt als zodanig automatisch onder de algemene beginselen van de GATS. Daartoe hoort o.a. het *most-favoured-nation* (MFN) principe, dat een ongelijke behandeling van buitenlandse handelspartners verbiedt. Als een land een specifieke marktsector, zoals zijn lanceermarkt, expliciet openstelt voor buitenlandse bedrijven worden ook andere GATS regels van kracht, zoals het *national treatment* principe dat discriminatie tussen eigen en buitenlandse ondernemingen verbiedt.
Het zal, gegeven het bovenuiteengezette beleid van de Amerikaanse overheid, niet verbazen dat laatstgenoemde van de geboden gelegenheid gebruik heeft gemaakt om, onder verwijzing naar "kwantitatieve restricties en prijsdisciplines in bepaalde bilaterale overeenkomsten m.b.t. de handel in lanceerdiensten" de toepassing van MFN op "space transportation" uit te sluiten.
Ook een suggestie van Europese zijde, gedaan tijdens de Uruguay ronde, om d.m.v. desbetreffende "commitments" de lanceermarkten over en weer te openen, en daarmee alle GATS principes op de handel in lanceerdiensten van toepassing te maken, werd niet opgevolgd. Naast de GATS is nog een andere overeenkomst binnen WTO kader relevant, nl. de Agreement on Government Procurement (GPA), een zgn. Plurilateral Trade Agreement waar niet automatisch alle WTO leden partij bij zijn. Deze overeenkomst regelt de toegang tot overheidsmarkten (die altijd buiten GATT/GATS is gehouden). Ook hier heeft de Amerikaanse overheid, trouw aan haar 'fly U.S.' beleid, uitdrukkelijk lanceerdiensten van de werking van de overeenkomst uitgesloten.
Daarmee weerspiegelt de Amerikaanse positie in multilaterale handelsliberalisatiebesprekingen in WTO-verband haar nationale beleid. Dit geeft meteen een redelijke indicatie van de mate van bereidheid van de Amerikaanse overheid om de handel in lanceerdiensten in multilateraal verband te liberaliseren.
De Administratie lijkt voor afzienbare tijd tevreden te zijn met de regulatoire *status quo*. Het concept van "free and fair trade" mist daardoor *de facto* de marktgerichte dynamiek die het lijkt te beloven.

**14.**
De positie van het Congres is al eerder ter sprake gekomen. Hier is het vooral van belang een zekere tweeslachtigheid te constateren. Enerzijds heeft het Congres door de jaren heen de Amerikaanse 'aerospace industry' gesteund met wetgeving die hen de wapens gaf om internationaal te concurreren. Dit heeft zowel de satellietbouwers als de lanceerbedrijven geen windeieren gelegd. Anderzijds is het Congres - vooral de laatste 10 jaar - vlot geweest in het opleggen van sancties aan landen wier gedrag niet in overeenstemming was met de normen die dit orgaan wenselijk achtte. Dat deze sancties (vaak op het

gebied van de bilaterale handel) herhaaldelijk het buitenlands beleid van de President doorkruisten en bovendien, door een gebrek aan steun van buitenlandse bondgenoten, ineffectief en schadelijk voor de eigen industrie bleken, heeft het Congres tot op heden niet merkbaar tot een ander beleid gebracht. Daarbij spelen in de relatie tussen het huidige Congres en President Clinton ongetwijfeld elementen van partijpolitieke opportuniteit een extra verstorende en complicerende rol.

Dat tenslotte, in het Congres, China de rol van 'evil empire' van Rusland heeft overgenomen, blijkt uit de meest recente ontwikkelingen, inclusief nieuwe op China gerichte sanctiewetgeving. Hoewel de V.S.-China relaties uiteindelijk door een nucleaire spionage affaire onder druk zijn komen te staan, lag de oorsprong van het conflict op voor ons inmiddels vertrouwd terrein, nl. de - mislukte - Chinese lanceringen van Amerikaanse satellieten. Het vermoeden dat de Amerikaanse satellietbedrijven Loral en Hughes, die samen met de Chinezen naar de oorzaak van deze mislukkingen hadden gekeken, daarbij knowhow, bruikbaar voor de verbetering van de Chinese Long March raket - en dus ook van militaire raketten - , hadden overgedragen, leidde tot een diepgaand onderzoek door een Commissie van het Congres (de Cox Commissie) en, nog voor het onderzoek was afgerond, tot wetgeving die het lanceren van Amerikaanse satellieten door de Chinezen aan zeer stringente, voornamelijk handelspolitieke, condities onderwierp.
Deze *Strom Thurmond Act*, door Clinton met grote tegenzin ondertekend, droeg bovendien de autoriteit voor het verlenen van export vergunningen voor commerciële communicatiesatellieten weer over aan het State Department, en leidde tot nieuwe regelingen die het ook andere landen moeilijker maakt om op dit 'high tech' gebied zaken met de V.S. te doen. In feite betreft het hier bijna xenofobische en in ieder geval vrij protectionistische wetgeving die niet alleen in China, maar ook bij Amerika's trouwste handelspartners en NATO bondgenoten, tot verontrusting heeft geleid.
Daarmee heeft het Congres, met een beroep op nationale veiligheid, deze handel verder gerestricteerd en verpolitiekt, en daarmee het odium op zich geladen een tegenstander te zijn van liberalisatie van de internationale handel in lanceerdiensten. In feite was de boodschap van het Congres aan de Administratie drievoudig: 1. U heeft de belangen van de satellietfabrikanten zwaarder laten wegen dan belangen van nationale veiligheid toelieten; 2. U heeft de handelsbelangen met China zwaarder laten wegen dan uit het oogpunt van nationale veiligheid acceptabel was; en 3. U moet er voor zorgen dat Amerikaanse satellieten alleen door Amerikaanse bedrijven worden gelanceerd.

**15.**

We staan kort stil bij de mogelijkheid dat één van de betrokken partijen verhaal zou willen zoeken bij de Amerikaanse overheid vanwege schade veroorzaakt, of winst gederfd, door de bovenvermelde wetgeving, beleid of praktijken, bijvoorbeeld omdat een satelliet niet verkocht of niet geleverd kon worden, een buitenlandse lancering niet door ging of toegang tot de markt geweigerd werd. Een kort onderzoek toont aan dat de Amerikaanse bedrijven zich zeer bewust

zijn van het 'sensitive' karakter van de handel in satellieten en raketten, van het primaat van de President om, in het belang van 'national security and foreign policy', in contractsrelaties te interveniëren en van de exportwetten en voorschriften, die verwijzingen naar dat primaat bevatten. Contracten van deze bedrijven met buitenlandse afnemers zullen daarom altijd een zgn. 'excusable delays' clausule bevatten, die aansprakelijkheid voor schade uitsluit ingeval een contract niet of te laat wordt uitgevoerd en de oorzaak ligt in daden van "any governmental authority (in its sovereign or contractual capacities), including inability to obtain any necessary export licenses."
Een andere vraag is of het *ruimterecht* enige steun geeft aan de stelling dat de V.S. of enig ander ruimtevaartbedrijvend land verplicht is om toegang tot haar markt te geven of samenwerking op ruimtevaart-, en specifiek lanceer(technologie-), gebied met andere landen die dat wensen aan te gaan. Als basis voor die claim zou artikel 1 van het Ruimteverdrag van 1967 moeten dienen. Dit artikel stelt dat het onderzoek en gebruik van de ruimte moet worden verricht "for the benefit and in the interests of all countries.." Met name de ontwikkelingslanden hebben het standpunt uitgedragen dat dit artikel *verplicht* tot samenwerking en het delen/overdragen van knowhow. De doctrine verwerpt echter deze interpretatie als te excessief en te zeer ingrijpend in het soevereine recht van staten om zelf hun partners uit te zoeken, en wordt daarin gesterkt door een in 1996 door de Algemene Vergadering van de Verenigde Naties aanvaarde Verklaring, de Outer Space Benefits Declaration, waarin het recht van de lidstaten wordt bevestigd om op het gebied van ruimtevaartsamenwerking met andere staten zelf de inhoud en strekking en alle andere aspecten daarvan te bepalen.
Daarmee lijkt de conclusie gewettigd dat het huidige internationale regime een gegeven is, waar slechts in -nationale en internationale - politieke zin aan 'gesleuteld' kan worden.

**16.**
De vraag die wij ons ten slotte moeten stellen is of de huidige situatie, een gereguleerde, gerestricteerde en sterk door elementen van (vooral Amerikaanse) national security en foreign policy gedomineerde internationale markt van commerciële lanceerdiensten, alle betrokken belangen in aanmerking nemend, een acceptabele is.

We gaan daarvoor terug naar de rol van de V.S. als 'global security guard', en stellen vast dat de vrienden en bondgenoten van de V.S. deze rol in principe ondersteunen, voorzover bepaalde grenzen niet overschreden worden. Er zijn in ieder geval twee situaties denkbaar waarin controle- of sanctiemaatregelen van de V.S. in haar bovenvermelde rol niet zonder meer ondersteuning krijgen. Ten eerste, wanneer er geen overeenstemming bestaat over de soort of mate van gevaar (bijv. verkoop van computers aan Pakistan), de identiteit en de mate van 'schurkachtigheid' van het door maatregelen te treffen land (bijv. Cuba) of de zin en zwaarte van de maatregelen (bijv. beperkingen op de satellietenexport, t.b.v. lancering, naar China).

Een tweede situatie waarin een verminderd respect (en steun) voor V.S. maatregelen te verwachten valt is die waarin deze maatregelen gebaseerd zijn op andere dan 'security' achtergronden of doelen, en/of deze maatregelen ernstige en ongewenste consequenties of bijeffecten hebben. De laatste variant komt hier nogmaals aan bod.

De Amerikaanse overheid oefent strikte controles uit op (de handel in) militaire draagraketten (missiles) en rakettechnologie om te voorkomen dat steeds meer landen de capaciteit ontwikkelen om nucleaire en andere massavernietigingswapens te lanceren. Dat ('missile non-proliferation') is op zich een respectabel doel. Maar die strikte controles maken het tegelijkertijd ook onmogelijk voor landen, die lanceeractiviteiten willen ontplooien voor uitsluitend vreedzame doeleinden, om draagraketten/lanceervoertuigen en /of de betreffende technologie te verwerven.

De V.S. rechtvaardigt haar beleid om aan dergelijke landen, ook als ze geen militaire raketprogramma hebben, lanceertechnologie te ontzeggen met het argument dat het zó moeilijk is om van lanceren een commercieel succes te maken dat het risico groot is dat de betreffende knowhow alsnog door de ontvangers militair wordt aangewend of verkocht wordt aan derde landen met 'missile' aspiraties. En indien dergelijke landen wel een militaire raketindustrie hebben zullen ze, volgens de V.S., de verleiding niet kunnen weerstaan om civiele lanceertechnologie voor hun militaire programma's te gebruiken.

Deze redenering heeft iets arrogants: immers, hij suggereert dat, in principe, geen enkel land met lanceertechnologie te vertrouwen is.

En het resultaat is dat er op dit belangrijke deelgebied van de ruimtevaart praktisch geen internationale samenwerking bestaat, dat het aantal en de variëteit van lanceerbedrijven wereldwijd bevroren is, en dat van innovatie buiten de V.S. nauwelijks sprake is.

De Amerikaanse overheid oefent ook strikte controles uit op de export van communicatiesatellieten, inclusief belangrijke onderdelen en technologie, om te voorkomen dat dergelijke geavanceerde apparatuur en knowhow in handen komen van (het militaire establishment van) landen die daarmee een - extra - gevaar voor de regionale of wereldvrede, veiligheid en stabiliteit zouden kunnen vormen. Maar deze controles worden ook gebruikt om toegang tot de lanceermarkt te beperken en daaraan prijs- en capaciteitscondities te verbinden. Daarmee reguleert de V.S. unilateraal de internationale concurrentie op dit gebied.

Hoewel de desbetreffende bilaterale overeenkomsten in de loop der tijd liberaler zijn geworden laat de 'China affaire' zien dat de combinatie van de op zich al moeilijk verenigbare concepten van (nationale) veiligheid en (vrije) (internationale) handel in de V.S., onder invloed van partijpolitieke opportuniteit en de altijd aanwezige dreiging van sancties, een klimaat heeft gecreëerd dat weinig bevorderlijk is voor de ontwikkeling van de internationale handel in lanceerdiensten, een situatie waarvan niet alleen de Amerikaanse satellietenbouwers en exploitanten maar vooral ook de niet-Amerikaanse lanceerbedrijven het slachtoffer zijn.

Het gecombineerde effect van de bovenstaande fenomenen is dat de Amerikaanse overheid, met een beroep op nationale en internationale veiligheid wetten heeft aangenomen, beleid heeft gevoerd en acties heeft ondernomen die - gedeeltelijk bedoeld, gedeeltelijk onbedoeld - hebben geleid tot een belemmering van de internationale ontwikkeling, innovatie en concurrentie op het gebied van lanceertechnologie en het aanbieden van lanceerdiensten.

**17.**
Men zou kunnen stellen dat dit gesignaleerde negatieve effect niet gedramatiseerd moet worden, om twee redenen. Ten eerste, omdat het doel, nationale/-internationale veiligheid en stabiliteit nu eenmaal belangrijker is dan onbelemmerde technologische ontwikkeling en internationale handel en concurrentie. ten tweede omdat er, vooral in de V.S. maar ook in (concurrerend) Europa, een zodanig veelbelovende technologische ontwikkeling plaatsvindt dat aan alle huidige en toekomstige lanceerwensen zonder probleem voldaan kan worden, en de bovenvermelde belemmeringen daarom slechts een marginale invloed hebben op de ontwikkeling, innovatie en concurrentie op lanceergebied en dus op de ontwikkeling van het onderzoek en gebruik van de ruimte.

Het eerste argument veronderstelt dat nationale/internationale veiligheid altijd prioriteit heeft en inderdaad *de facto* gediend is door de wettelijke maatregelen, beleidsdaden en feitelijke acties van de Amerikaanse overheid, m.a.w. dat een zorgvuldige afweging van doel en middelen heeft plaatsgevonden en het resultaat daarvan een positief saldo oplevert. Dit is niet bewezen en ook moeilijk te bewijzen.

En niet alleen het Amerikaanse 'veiligheids-establishment' en representanten van V.S. handel, industrie en wetenschap, maar ook de vrienden en bondgenoten van de V.S. zullen daarover van mening verschillen.
Het tweede argument is van cruciaal belang voor de toekomst van de internationale lanceerindustrie en haar klanten. Het veronderstelt namelijk dat er, gezien de capaciteiten en prestaties van de bestaande lanceerbedrijven, geen behoefte is aan nieuwe 'spelers' en meer concurrentie; anders, wellicht demagogische, gezegd, dat de gezamenlijke wetenschappelijke/technologische kennis van de rest van de wereld beschouwd kan worden als onnodig voor de ontwikkeling van innovatieve, betrouwbaardere, en goedkopere lanceersystemen; kortom, een overbodige luxe. Die veronderstelling is niet van arrogantie ontbloot, maar het is de -ook vanuit commercieel-defensief oogpunt- begrijpelijke arrogantie van de lanceer'haves'.
Een belangrijke reden om die veronderstelling ter discussie te stellen ligt in het feit dat de lanceerindustrie*diensten* levert en dat het veeleer de klant is die bepaalt of de gewenste diensten naar tevredenheid geleverd worden en die al of niet het vertrouwen heeft dat de bestaande lanceerbedrijven ook aan hun toekomstige behoeftes zullen kunnen voldoen. En hoe (economisch) machtiger de klant is, des te relevanter is zijn mening en des te dwingender zijn eisenpakket.

**18.**
Zoals inmiddels bekend werken de bestaande lanceerbedrijven niet alleen voor nationale overheden (militaire en civiele telecommunicatie, navigatie en meteorologische satellieten), maar bedienen ze ook de (mede door internationale liberalisatie) dramatisch groeiende, wereldwijd opererende telecommunicatie-industrie, de 'global information super highway' *in statu nascendi* (die in 1997 al een waarde van USD 550 miljard vertegenwoordigde en in het jaar 2000 zo'n USD 1 biljoen ($1 trillion) waard zal zijn), waarvan *satellieten*communicatie een essentieel onderdeel uitmaakt.[1]
Daarnaast zal ook bijv. het Global Positioning System van het Amerikaanse ministerie van Defensie meer en meer gebruikt worden door de luchtvaart, auto, scheepvaart en andere sectoren van de particuliere (consumenten) industrie, leidend tot een verwachte groei van het gebruik met meer dan 500 procent (tussen 1996 en 2000). En de olie- , gas-, mijnbouw-, landbouw-, en kartering industrie maakt een toenemend gebruik van gespecialiseerde en verfijnde 'remote sensing' producten.
Deze economisch sterke en machtige dienstenindustrieën, zijn afhankelijk geworden van een goed functionerende 'space infrastructure', d.w.z. satellieten, inclusief grondstations, en ruimte transport, waaronder de draagraketten en de lanceerbases en faciliteiten (spaceports). Het lanceerdeel, dat ongeveer 10 à 15 procent van de waarde van de totale ruimteinfrastructuur vertegenwoordigt, is een cruciale schakel die echter qua omzet in het niet valt bij de 'space infrastructure'- afhankelijke industrieën die zij dient.

**19.**
Zowel de overheden als de particuliere klanten van de lanceerbedrijven hebben zich bij herhaling beklaagd over de beschikbare lanceerdiensten die zij, ondanks onderlinge verschillen in kwaliteit van de desbetreffende bedrijven, geregeld en tot op de dag van vandaag beschrijven als onbetrouwbaar, inflexibel en veel te duur.

Dat is ook nu nog het geval: zo kreeg de V.S. in een betrekkelijk korte periode van 9 maanden tot mei 1999 zes belangrijke lanceermislukkingen te verwerken, een schadepost van totaal 3.5 miljard dollar en een ernstige tegenslag voor de getroffen particuliere en overheidsprogramma's.[2]

En, voor wat betreft de lanceer*kosten*, is NASA het in ieder geval ook met de kwalificatie "te duur" eens, getuige haar nog niet zo lang geleden geformuleerde doelstelling om de kosten van het lanceren in een lage aardbaan (LEO)

1. Zie *State of the Space Industry - 1997 Outlook*, uitgegeven door Space Vest, KPMG Peat Marwick, Space Publications en het Centre for Wireless Communications, pp 41, 42
2. New York Times (12 mei 1999), p.1 ("Series of rocket failures unnerves U.S. space launching industry").

terug te brengen van de huidige USD 10,000 per pond (lb), tot USD 1,000 per pond in 2007, en tot USD 100 per pond in het jaar 2022.[3]

Het zal duidelijk zijn dat, ondanks de ruime aanwezigheid van Amerikaanse knowhow en expertise, aanvullende inspanningen van niet-Amerikaanse lanceerindustrieen, zowel bestaande als nieuwe, allesbehalve een overbodige luxe kunnen worden genoemd.

**20.**
Het bovenstaande brengt ons tot de volgende conclusies en aanbevelingen:

De commercieel/financiële belangen en het nationaal en internationaal economisch belang van bovengenoemde Amerikaanse en internationale 'klanten' zijn zoveel groter dan die van de hen (be-)dienende lanceerbedrijven dat de volgende suggesties gerechtvaardigd zijn.

(i) De ontwikkeling van de internationale lanceerindustrie dient niet langer kunstmatig te worden beperkt tot of geoligopoliseerd door de lanceerbedrijven van het kleine aantal bestaande lanceer-'landen' of afhankelijk blijven van op nationale veiligheid geïnspireerde maar in de praktijk vooral nationalistische wetgeving, beleid of praktijken die ook andere dan veiligheidsbelangen en zorgen adresseren.

(ii) In het 'handel versus nationale veiligheid'conflict dat met deze suggestie onopgelost blijft is het, zolang de Amerikaanse overheid geen aanstalten maakt duidelijke 'pro-handel' initiatieven te nemen, de verantwoordelijkheid van de Amerikaanse telecomindustrie om de overheid (Administratie en Congres) ervan te overtuigen uiterste terughoudendheid te betrachten bij het gebruik van het argument van 'nationale' (of internationale) veiligheid om (a) bona fide buitenlandse lanceer- 'have-nots' hulp in het verwerven van lanceerknowhow of in het opbouwen van een lanceerbedrijf te onthouden, (b) Amerikaanse satellietbouwers te verbieden bij te dragen aan de veiligheid van buitenlandse lanceerbedrijven mede t.b.v. de Amerikaanse en buitenlandse (telecom-) klanten van die lanceerbedrijven en/of © het gebruik van bestaande buitenlandse lanceerbedrijven te ontmoedigen door prijs en capaciteitsbeperkingen en/of de dreiging van strenge toepassing van export controles of sancties.

(iii) Gezien het internationale en wereldomspannende karakter van de satellietconstellaties en de daarmee opererende internationale communicatieconglomeraten, ligt het voor de hand dat deze laatste, samen met hun Amerikaanse collega's in internationaal verband soortgelijke druk uitoefenen op de Amerikaanse overheid.

3. Zie *NASA's aeronautics/space goals*, Aviation Week & Space Technology (19 okt 1998), p.40

Daarbij kan niet onvermeld blijven het sterk groeiend belang van hun gezamenlijke industrie voor de wereldeconomie, o.a. gestimuleerd door de liberalisatie van wereldtelecommunicatiediensten, in gang gezet middels WTO afspraken die door de V.S. zijn geïnitieerd.

(iv) In dat verband zouden zij, als een eerste stap, moeten bevorderen dat de Amerikaanse overheid buitenlandse lanceerbedrijven in staat stelt gebruik te maken van de veilige en goed-geëquipeerde (particuliere) Amerikaanse lanceerbases en faciliteiten onder gelijke voorwaarden als de Amerikaanse lanceerbedrijven. (Soortgelijke aanbiedingen van de kant van o.a. Brazilië en Australië, hoewel niet geheel vergelijkbaar, hebben op dat punt al een precedent geschapen). Een dergelijke 'national treatment' regeling zou gerealiseerd kunnen worden door middel van een Amerikaans 'commitment' om lanceerdiensten onder de werking van de GATS te brengen of, in eerste instantie, door middel van een andersoortig multilateraal werkend instrument;
Een volgende, door genoemde industrieën te bepleiten, stap zou kunnen zijn het openen van de Amerikaanse lanceermarkt voor *civiele*, dus niet veiligheidsgevoelige, overheidssatellieten voor buitenlandse lanceerbedrijven, middels een daartoe strekkende aanpassing van de "launch services"- uitsluiting van de GPA overeenkomst of, in eerste instantie, door middel van een andersoortig multilateraal werkend instrument van beperktere strekking (m.a.w. een begin van versoepeling van de 'fly America' regels).

(v) De uitdrukking "de WTO zou moeten..." wordt hier niet gebruikt, en met reden. Enerzijds kunnen een aantal goede redenen voor een bemoeienis van de WTO niet ontkend worden. Zo zijn de lanceerdiensten niet in dezelfde mate geliberaliseerd als de industrieën die zij dienen. Dat kan een ernstige belemmering gaan opleveren voor de middels de WTO Basic Telecom Agreement in gang gezette liberalisatie van internationale telecommunicatiediensten. Op zich is dat al een goede, principiële en praktische, reden om bij de nieuwe WTO GATS ronde die in november 1999 van start gaat een serieuze poging te doen tot enige liberalisatie van lanceerdiensten. Vooral de V.S. zou deze verantwoordelijkheid moeten voelen nu zij zich met zoveel succes ingespannen heeft om haar 'free competition and fair trade' beginselen in middels bovenvermelde multilaterale overeenkomst internationaal geaccepteerd te krijgen, en zij deze 'gospel' nog steeds zo energiek verspreidt.[4]

4. De voorzitter van de Amerikaanse FCC bracht in een statement voor een commissie van het Congres over zijn agenda voor 1999 o.a. de volgende agendapunten op: "..promote competition in all sectors of the marketplace..continue to deregulate...ensure broad access to communications services and technologies..foster innovation..*we will advance these concepts worldwide, serving as an example and advocate of telecommunications worldwide...and agressively work on the worldwide adoption of the WTO Agreement for Basic Communications."* (cursiv. toegevoegd), zie statement William Kennard voor de Subcommittee on Commerce, Justice, State, and the Judiciary, Senate Committee on Appropriations (15 maart 1999) <http://www.fcc.gov/Speeches/Kennard/Statements/stwek917.html>.

Een additionele en belangrijke reden om een sterke voorkeur voor een WTO benadering te kiezen ligt in het juridisch bindende karakter van het resulterende verdrag, dat de betrokken Amerikaanse en buitenlandse spelers die voorspelbaarheid en stabiliteit zou brengen die zij nu zo node missen.
Aan de andere kant is het belangrijk te constateren dat het hier niet gaat om wat de WTO zou moeten of kunnen, maar wat de lidstaten bereid zijn via de WTO te doen. M.a.w. de politieke wil van de individuele lidstaten, en vooral van de V.S., bepaalt de kans op verandering, en de WTO *kan* daarbij het geprefereerde middel zijn.
Dit brengt ons weer terug bij de 'nationale veiligheid versus internationale handel' problematiek en bij de bereidheid van de V.S. Administratie en het Congres om de handel meer ruimte te geven door het wijzigen van de huidige wetten, beleid en praktijk.

(vi) Zowel de nationale veiligheid als de internationale handel zijn gebaat bij een strikt onderscheid tussen maatregelen die realistische en serieuze nationale veiligheidsbelangen betreffen en maatregelen die niet tot die categorie behoren. Duidelijke voorbeelden van laatstgenoemde categorie zijn:
- de bilaterale overeenkomsten met China, Rusland en Ukraïne voorzover deze markttoegang, prijzen en andere aspecten van marktgedrag regelen;
- overheidsbeleid dat het gebruik van federale of particuliere lanceerbases of faciliteiten door buitenlandse lanceerbedrijven (voor commerciële lanceringen) verbieden of beperken.

Tot dezelfde categorie behoren:
- 'fly U.S.' wetten en voorschriften voorzover deze van toepassing zijn op civiele overheidssatellieten en bijv. NATO-leden en belangrijke niet-NATO partners de toegang tot deze markt verbieden;
- de behandeling van commerciële communicatiesatellieten als wapens (conform de Strom Thurmond wet van 1998), wanneer het gaat om export van deze satellieten naar bevriende landen;
- (Strom Thurmond) controles op de lancering van Amerikaanse commerciële communicatiesatellieten door buitenlandse lanceerbedrijven wanneer deze laatste onder verantwoordelijkheid en jurisdictie van NATO-leden of belangrijke niet-NATO partners vallen;
- (Strom Thurmond) controles op de lancering van commerciële communicatiesatellieten door China, voorzover aan de exportvergunningen condities worden gehecht die een commercieel, economisch, handels-, of ander niet-veiligheidskarakter hebben.

Van een enigszins ander karakter, maar niettemin nog in dezelfde categorie vallend vanwege het betrekkelijk geringe nationale veiligheidsgehalte van de betreffende maatregelen, zijn nog de volgende:
- maatregelen die het een Amerikaanse satellietenbouwer, voorzien van een vergunning om deze satelliet door een buitenlandse maatschappij te laten lanceren, verbieden of moeilijk maken om zodanige gegevens uit te wisselen

met het lanceerbedrijf dat de kansen op een succesvolle lancering van de Amerikaanse satelliet vergroot worden;
- maatregelen die het Amerikaanse lanceerbedrijven verbieden of moeilijk maken kwaliteitscontrole en verbeteringsgesprekken te voeren met hun buitenlandse partners in joint ventures die gebruik maken van buitenlandse lanceervoertuigen en -technologie.

Vanzelfsprekend is de overdracht van raket- en lanceertechnologie aan terroristische landen of landen die anderszins een bedreiging voor de wereldvrede en veiligheid vormen, als zodanig een reden tot ernstige bezorgdheid vanuit het oogpunt van die vrede en veiligheid. Maar op de schaal van non-proliferatiebezorgdheid is er een groot verschil tussen dit geval en, bijv. samenwerking op het gebied van lanceertechnologie tussen een Amerikaans lanceerbedrijf en zijn collega uit een ander NATO-land.
Zowel de MTCR als het desbetreffende Amerikaanse beleid benadrukken dat bona fide vreedzame nationale ruimtevaartprogramma's of internationale samenwerking m.b.t. zulke programma's niet belemmerd moeten worden door MTCR-gerelateerde controles, zolang deze samenwerking niet kan worden gebruikt voor - of kan bijdragen tot systemen waarmee massavernietigingswapens worden overgebracht.
De V.S. heeft echter in 1996 een nationaal criterium toegevoegd dat niet alleen paternalistisch aandoet, maar bovendien in dit kader een wat twijfelachtige relevantie heeft:

"For MTCR countries we will not encourage new space launch vehicle programs which raise questions from a proliferation *and economic standpoint.*" (cursiv. toegevoegd)[5]

In het licht van het eerder gesignaleerde gebrek aan nieuwe, ambitieuze en innovatieve lanceerbedrijven buiten de V.S. lijkt de gecursiveerde toevoeging misplaatst en, als voorbeeld van een maatregel met een beperkt 'national security' gehalte, rijp voor heroverweging.

(vii) Het bovenstaande dient niet geïnterpreteerd te worden als een poging om ernstige zorgen van de Amerikaanse overheid op dit gebied te bagatelliseren of the diskwalificeren, maar veel meer als een poging (en aansporing) om het kaf van het koren te scheiden.
Dit dient twee doelen.
Ten eerste, om de telecomindustrie en de andere gebruikers van lanceerdiensten een aanknopingspunt te geven voor het ter discussie stellen van die overheidsmaatregelen die voor liberalisatie in aanmerking komen, en vanuit het oogpunt van nationale veiligheid ook zonder bezwaar daarvoor in aanmerking *kunnen* komen.

5. Clinton's National Space Policy (19 sep 1996) ("Non-proliferation, export controls, and technology transfer") <http://www.pub.whitehouse.gov..etc>.

Ten tweede, om de kans dat nationale maatregelen die zich specifiek en alleen richten op echte en serieuze nationale veiligheidszorgen, verdiende ondersteuning krijgen van Amerika's bondgenoten. Want, hoe botter, grover of 'vervuilder' (door andere dan veiligheidsoverwegingen, aspecten of consequenties) deze nationale controles zijn, des te minder internationale steun voor de handhaving daarvan verwacht mag worden.

En, waar andere leden van het Wassenaar Arrangement, MTCR en NATO, maar ook niet-leden van deze arrangementen zowel satellieten als lanceertechnologie bezitten en belangrijke economische, wetenschappelijke, technische of politieke voordelen zien in het samenwerken met andere landen op deze gebieden, zonder noodzakelijkerwijs de 'security' zorgen van de V.S. te delen, is er alle reden voor de Amerikaanse autoriteiten om met grote toewijding en precisie alleen die landen, doelen en projecten voor controle of sanctiemaatregelen te selecteren die waardering en steun van Amerika's vrienden en bondgenoten rechtvaardigen.

Deze - lobby- inspanningen zouden er toe moeten leiden dat het V.S. - beleid van "draag geen strategische high tech goederen en knowhow over aan enig ander land, tenzij.." gewijzigd wordt in "bevorder internationale lanceersamenwerking en concurrentie, tenzij.."
Uiteindelijk zal dat het juiste kader scheppen voor een verantwoorde liberalisering van de internationale handel in lanceerdiensten.

(viii) Een vergelijking met het beleid van de U.S. ten aanzien van (liberalisering van) de internationale *luchtvaart* is in dit stadium wellicht zinvol. Weliswaar is de betreffende transportactiviteit, anders dan de het vrij gebruik van de ruimte, bilateraal gereguleerd op basis van het principe van staatssoevereiniteit over het nationale luchtruim, maar de handel in lanceerdiensten heeft in ieder geval vanuit Amerikaans perspectief met luchtvaart o.a. gemeen dat de U.S. overheid soevereine controle uitoefent over buitenlandse toegang tot de Amerikaanse markt (van -te lanceren- satellieten en -te verkopen- draagraketten en de daarbij horende technologie), en op basis daarvan invloed heeft op het operationele en commerciële wel en wee van buitenlandse lanceerbedrijven.
Tot enige jaren geleden was internationale markttoegang voor luchtvaartmaatschappijen alleen bereikbaar middels bilaterale, intergouvernementele onderhandelingen die vrijwel zonder uitzondering gebaseerd waren op protectionistische principes zoals *quid pro quo* of uitwisseling van 'equal economic benefits' (equal capacity), hetgeen in de praktijk meestal leidde tot een over en weer gunnen van toegang tot elkaars luchttransport markt op een niveau of in een mate die bepaald werd door de zwakste of minst geïnteresseerde partij. Waar laatstgenoemde partij in de praktijk vaak het minst dynamisch, minst innovatief en (ook) in eigen ogen het minst op de krachten van de vrije markt voorbereid was, resulteerde dit regime in een systeem van restrictieve bilaterale luchtvaartverdragen die de concurrentie sterk beperkten en de klant op het gebied van

kwantiteit, kwaliteit en prijs van het beschikbare luchttransportproduct te kort deden.
De V.S. was het eerste land met een aanzienlijke luchtvaartmarkt die, eerst intern maar later ook internationaal, de luchtvaart 'dereguleerde' door protectionistische en dirigistische regels en voorschriften in de nationale wetgeving en de internationale bilaterale verdragen zoveel mogelijk te vervangen door een regime waarin de industrie werd blootgesteld aan het -hardvochtiger- klimaat van vrije(re) concurrentie en de krachten van de markt. Dit heeft een fundamentele verandering gebracht in zowel de samenstelling als het gedrag van de Amerikaanse en internationale luchtvaartindustrie.

(ix) De overwegingen die aan Amerikaanse zijde ten grondslag lagen aan de nieuwe benadering van deze 'service industry' bevatten wellicht lessen voor (de liberalisering van) de lanceerindustrie.
Het basisprincipe was van economische aard, namelijk de Amerikaanse vrijehandel-/vrijemarktfilosofie ("let the market, the customer decide") die geacht wordt die bedrijven de beste overlevingskansen te bieden die in vrije concurrentie (met minimale overheidsbemoeienis) met andere bedrijven de klant consequent het beste product tegen de laagste prijs bieden.
*Internationaal* paste de Amerikaanse overheid dit principe niet toe op de luchtvaart dan nadat
ze zich ervan vergewist had dat (a) de Amerikaanse luchtvaartmaatschappijen volwassen en sterk genoeg waren om vrije concurrentie te overleven, (b) deze bedrijven, in vergelijking met de betreffende buitenlandse luchtvaartmaatschappijen, ook aanmerkelijke voordelen zouden halen uit het openen van de toegang tot elkaars luchtvervoersmarkten, en (c)de nationale economie er wel bij zou varen. Op basis van de positieve uitkomst van deze evaluatie concludeerde de Amerikaanse overheid dat er geen reden (meer) was om de Amerikaanse (en internationale) luchtvaartindustrie een substantieel andere behandeling te geven dan de levensmiddelenindustrie, computer- of reisindustrie of banken, en besloot zij, tegen de zin van de Amerikaanse luchtvaartmaatschappijen, de deregulering/liberalisering van de luchtvaart internationaal te bevorderen.

Wanneer men de bovenstaande overwegingen en afwegingen toepast op de handel in lanceerdiensten, kan worden gesteld, dat de Amerikaanse lanceerbedrijven voldoende 'fit, willing and able' zijn om in vrije concurrentie met buitenlandse lanceerbedrijven te overleven. Voorts hebben wij al eerder gesteld dat - op basis van dezelfde economische rationale die heeft geleid tot aanvaarding van de GATT en GATS principes en van bijvoorbeeld de creatie van de Europese interne markt en van de NAFTA, en versterkt door de positieve ervaringen opgedaan met de deregulering en liberalisering van de luchtvaart - vrij(re) concurrentie in de internationale lanceerindustrie een positieve impuls zal geven aan de belangrijke groeiindustrieën die van space hardware (en dus van het lanceren daarvan) afhankelijk zijn, en zo de groei van de betrokken regionale en nationale economieën, en (dus ook) de wereldeconomie, zal bevorderen.

(x) Op grond van de bovenstaande parallellen met de luchtvaart zou men al kunnen concluderen dat de Amerikaanse overheid een begin met deze liberalisering zou moeten maken, zij het dat een derde punt van (mogelijke) intern-Amerikaanse afweging daartoe geen steun lijkt te bieden: het feit dat de bij liberalisering voor Amerikaanse lanceerbedrijven beschikbaar komende buitenlandse markten qua omvang verre achterblijven bij wat hun buitenlandse concurrenten aan commerciële mogelijkheden verwerven als de Amerikaanse markt geheel of gedeeltelijk wordt opengesteld; maakt het te begrijpen dat een 'ruil' van qua omvang en waarde zo dramatisch verschillende overheidslanceermarkten (want daar gaat het voornamelijk om) voor de Amerikaanse *lanceer*bedrijven geen reden tot het enthousiast omarmen van dereguleringsplannen van hun overheid zal zijn.
Daar passen echter een aantal kanttekeningen bij:
- als de Amerikaanse overheid het luchtvaartprecedent volgt, hecht zij meer waarde aan de toepassing van vrije markt principes en de voordelen die dit op de langere termijn biedt voor de nationale economie dan aan een korte termijn *quid-pro-quo* voor haar lanceerindustrie;
- ook in de luchtvaart kwamen de voordelen van de internationalisering van de Amerikaanse deregulering in eerste instantie meer ten goede aan buitenlandse luchtvaartmaatschappijen die toegang kregen tot de (omvang-)rijke Amerikaanse luchtvervoersmarkt dan aan Amerikaanse maatschappijen die toegang kregen tot de buitenlandse markten (vandaar ook het aanvankelijk verzet van die laatste maatschappijen tegen 'American style' deregulering);
- het relatieve belang, in omvang en waarde, van de Amerikaanse overheidslanceermarkt is langzaam maar zeker aan het teruglopen in vergelijking met de particuliere lanceermarkt (waar de Amerikaanse lanceerbedrijven inlopen op -vooral- Arianespace);
- de Amerikaanse lanceerbedrijven zijn onderdeel van en hebben aandelen in lucht- en ruimtevaart ('aerospace') en telecommunicatie conglomeraten, die zelf, als klanten, de voordelen (moeten) zien van additionele concurrentie en innovatie in de internationale lanceermarkt.

(xi) Met volledige erkenning van de Amerikaanse rol als 'global security guard' en haar verantwoordelijkheid voor- en bezorgdheid over 'national security', concluderen wij dat de tijd rijp is voor het zetten van de eerste Amerikaanse stappen op het pad van de liberalisatie van de internationale handel in lanceerdiensten langs de bovenuiteengezette lijnen. Het zullen, zoals gezegd, met name de bovenvermelde 'space hardware'- afhankelijke communicatie - en andere industrieën zijn die, als meest onmiddellijk door de huidige regelgeving, beleid en praktijken van de Amerikaanse overheid geaffecteerde spelers, het voortouw moeten nemen om de Amerikaanse overheid, en vooral het Congres, te overtuigen van het nut en de noodzaak van deze liberalisatie.

Telecommunicatie en informatie technologie zijn, volgens de auteur Naisbitt, twee van de drie "paradigm industries" die de stuwende kracht zullen vormen

achter de door (handel in) diensten gedomineerde economieën van de 21e eeuw.[6]
Er is, ook uit dien hoofde, alle reden om met prioriteit, in zowel nationale als internationale fora, een analyse te maken van de effecten van de huidige nationale en internationale regelgeving en praktijk zoals in deze studie beschreven op de ontwikkeling van de lanceerindustrie en *daardoor* op de ontwikkeling van deze 'paradigm industries', een en ander gekoppeld aan een inschatting/raming van de gevolgen voor de ontwikkeling van deze industrieën wanneer een liberalisatie van deze regelgeving inderdaad plaats vindt.

(xii) Hoewel bovenstaande argumenten, van voornamelijk economische en handelspolitieke aard, op zich een voldoende rechtvaardiging zouden kunnen leveren voor de V.S. om, o.a. uit verlicht eigenbelang, de liberalisering van de internationale lanceerindustrie in gang te zetten, zijn er nog twee additionele argumenten die tot een heroverweging van de huidige restrictieve beleidspraktijken zouden kunnen leiden:

a. in de openingsparagrafen van dit hoofdstuk werd al gesteld dat, naarmate andere landen niet alleen begrip tonen voor het doel van V.S. maatregelen ter bevordering van 'global security', maar het ook eens zijn met de (mate en soort van) bedreiging daarvan en de identiteit van de 'bedreigers', deze landen de V.S. zullen volgen of steunen in de te treffen maatregelen, zoals gemeenschappelijke export controles en/of sancties. Een andere kant van die stelling is dat een verminderd respect (en steun) voor dergelijke V.S. maatregelen te verwachten valt wanneer deze gebaseerd zijn op andere dan 'security' overwegingen of gericht zijn op niet-'security' doelen en/of deze maatregelen ernstige/ongewenste consequenties of bijeffecten hebben.
Voor een grotere effectiviteit van dergelijke maatregelen door multilateralisatie is dus zowel een strenge selectie van 'security' doelen en middelen als een zoveel mogelijk los koppelen van 'security' van andere overwegingen en doelen geboden.
Dat zou meer ruimte bieden voor liberalisatie van de internationale lanceerindustrie door middel van samenwerking met, zowel bestaande als nieuwe, buitenlandse lanceerbedrijven;

6. John Naisbitt is auteur van *Megatrends 2000* en *Global Paradox*. De derde 'paradigm industry' is volgens dezelfde auteur de reis- en tourisme industry, zoals de World Travel and Tourism Council (WTTC) met tevredenheid aanhaalt in zijn publicatie *Millennium Vision*. De WTTC is een wereldomspannende coalitie van ongeveer 100 CEO's uit alle sectoren van de reis en tourisme industry, incl. alle vormen van transport. De organisatie heeft een solide reputatie opgebouwd op het gebied van de bevordering van liberalisatie van de internationale luchtvaart en van telecommunicatie door middel van, vooral op economische analyses gefundeerde, pleidooien en acties gericht op het slechten van handelsbarrieres en het afschaffen van protectionistische regels en praktijken, zie <http://www.wttc.org> *passim*. De WTTC zou een interessante bondgenoot kunnen zijn van de eerdergenoemde telecommunicatie- en andere 'space hardware-afhankelijke' industrieën bij het bevorderen en bepleiten van liberalisatie van de internationale satellieten lanceerindustrie.

b. Laatstgenoemde samenwerking heeft nog twee andere aspecten:
Ten eerste: de geschiedenis van (de effecten van) de V.S. weerstand tegen de overdracht van lanceertechnologie aan het buitenland heeft getoond dat het op z'n minst twijfelachtig is of hierdoor de ontwikkeling van civiele en/of militaire lanceersystemen in de desbetreffende landen effectief en ook op de langere termijn wordt voorkomen. Europa, Japan, India en Brazilië zijn, zoals we gezien hebben, voorbeelden van landen die door de Amerikaanse houding veeleer gesterkt werden in hun overtuiging 'to go it alone', eventueel met de assistentie van minder beginselvaste (of bezorgde) landen. Men kan zich afvragen of deze historie niet geleerd heeft dat een, in een civiel ruimtevaart-samenwerkingsprogramma ingebedde, gecontroleerde overdracht van lanceer-technologie en/of hardware, een uiteindelijk effectievere methode is om 'missile'-proliferatie- zorgen te adresseren en de wereld veiliger te maken;

Ten tweede: waar het restrictieve Amerikaanse beleid de tegenstelling tussen ruimte (lanceer) 'haves' en 'have-nots' handhaaft en daarmee de technologische en economische 'gap' tussen deze groepen verdiept, kan men aan dat beleid ook een vrede-, veiligheid- en stabiliteitsbedreigende werking toeschrijven. Dat raakt niet alleen het Amerikaanse economische, politieke en veiligheidsbelang, maar de belangen van de hele internationale gemeenschap.
De in het vorige hoofdstuk geciteerde bepalingen van het Ruimteverdrag van 1967 en de daarop gebaseerde Space Benefits Declaration van 1996 roepen om die reden met klem op tot internationale samenwerking op het gebied van het onderzoek en gebruik van de ruimte. In feite is dat het centrale thema, de geest van het ruimterecht als *lex specialis* van het internationale recht, en is een beleid dat samenwerking op een deelgebied van de ruimtevaart vrijwel geheel uitsluit in strijd met die geest.

Daarmee lijkt het kader aanwezig voor een door de U.S. - op basis van aangepaste wetgeving, beleid en praktijken- gecreëerd internationaal regime dat de titel 'free and fair trade in launch services' verdient zonder toevoeging van het *epitheton ornans* 'à l'Americaine'.

## ABBREVIATIONS AND ACRONYMS

| | | |
|---|---|---|
| *a fortiori* | = | with greater reason |
| *à l'Américaine* | = | American-style |
| a.o. | = | among other (things) |
| AADC | = | Alaska Aerospace Development Corporation |
| ABM (Treaty) | = | Anti-Ballistic Missile (Treaty) |
| ACDA | = | Arms Control and Disarmament Agency |
| *ad hoc* | = | concerned with a particular end/purpose or formed/ used for a specific or immediate problem/need |
| AECA | = | Arms Export Control Act |
| AFB | = | Air Force Base |
| AIA(A) | = | Aerospace Industries Association (of America) |
| ANPRM | = | Advance Notice of Proposed Rulemaking |
| APMT | = | Asia-Pacific Mobile Telecommunications |
| art. | = | article |
| artt. | = | articles |
| AST | = | Associate Administrator of Commercial Space Transportation |
| AW/ST | = | Aviation Week & Space Technology |
| *bona fide* | = | in good faith |
| BXA | = | Bureau of Export Administration |
| *c.q.* | = | *casu quo,* alternatively |
| *caveat* | = | reservation, qualification |
| CBO | = | Congressional Budget Office |
| CBW | = | Chemical and Biological Weapons |
| CCA(F)S | = | Cape Canaveral Air (Force) Station |
| CCF | = | Cooperation Forum on Export Controls |
| CCL | = | Commerce/ Commodities Control List |
| CDIA | = | Canadian Defence Industries Association |
| CEO | = | Chief Executive Officer |
| CFR | = | Code of Federal Regulations |
| CGWIC | = | China Great Wall Industry Corporation |
| Ch. | = | Chapter |
| CIA | = | Central Intelligence Agency |
| CIS | = | Commonwealth of Independent States |
| Cl.Ct. | = | Claims Court |
| CMLR | = | Common Market Law Reports |
| CNES | = | Centre National d'Etudes Spatiales |
| COCOM | = | Coordinating Committee for Multilateral Export Controls |
| COLLOQ | = | Colloquium |
| COMSAT | = | Communications Satellite Corporation |
| COMSTAC | = | Commercial Space Transportation Advisory Committee |

| | | |
|---|---|---|
| Cong. | = | Congress |
| COO | = | Chief Operating Officer |
| COPUOS | = | Committee on the Peaceful Uses of Outer Space |
| CPC | = | Central Product Classification |
| CRC | = | Coleman Research Corporation |
| CRS | = | Congressional Research Service |
| CSLA | = | Commercial Space Launch Act |
| *cum* | = | (combined) with, including |
| CYSA | = | Cape York Space Agency |
| | | |
| D | = | Democrat |
| DASA | = | DaimlerChrysler Aerospace |
| *de facto* | = | in fact |
| *de iure* | = | in law |
| Dept of State Bull | = | Department of State Bulletin |
| DFH | = | Dong Fang Hong (the East is red) |
| DOC | = | Department of Commerce |
| DOD | = | Department of Defense |
| DOS | = | Department of State |
| DOT | = | Department of Transportation |
| DTC | = | Defense Trade Controls |
| DTSA | = | Defense Technology Security Administration |
| | | |
| E.C. | = | European Commision |
| *e.g.* | = | *exempli gratia*, for example |
| e.i.f. | = | entry into force |
| E.O. | = | Executive Order |
| EAA | = | Export Administration Act |
| EAR | = | Export Administration Regulations |
| ECJ | = | European Court of Justice |
| ECSL | = | European Centre for Space Law |
| EELV | = | Evolved Expendable Launch Vehicle |
| ELDO | = | European Launcher Development Organisation |
| ELV | = | Expendable Launch Vehicle |
| emph. add. | = | emphasis added |
| EPCI | = | Enhanced Proliferation Control Initiative |
| ESA | = | European Space Agency |
| ESC | = | European Space Conference |
| ESRO | = | European Space Research Organisation |
| *et seq.* | = | and following (provisions) |
| EU | = | European Union |
| | | |
| F(ed). R(eg). | = | Federal Regulations |
| FAA 1958 | = | Federal Aviation Act of 1958 |
| FAA | = | Federal Aviation Administration |
| FAR's | = | Federal Aviation Regulations |

| | | |
|---|---|---|
| FCC | = | Federal Communications Commission |
| FEER | = | Far Eastern Economic Review |
| FY | = | Fiscal Year |
| | | |
| G-7 | = | Group of 7 (most) industrialized countries |
| GAO | = | General Accounting Office |
| GATS | = | General Agreement on Trade in Services |
| GATT | = | General Agreement on Tariffs and Trade |
| GD | = | General Dynamics |
| GEO | = | Geostationary Earth Orbit |
| GPA | = | (WTO) Agreement on Government Procurement |
| GPO | = | Government Printing Office |
| GPS | = | Global Positioning System |
| GSLV | = | Geosynchronous Satellite Launch Vehicle |
| GTO | = | Geostationary Transfer Orbit |
| GWIC | = | Great Wall Industry Corporation |
| | | |
| H.R. | = | House of Representatives |
| HEOS | = | Highly Eccentric Orbit Satellite |
| HSR | = | History Study Report |
| | | |
| (I)IL | = | (International) Industrial List |
| *i.a., inter alia* | = | among other things |
| *i.e.* | = | *id est*, that is (to say) |
| I.L.M. | = | International Legal Materials |
| *ibid.* | = | *ibidem*, in/on the same place |
| ICBM | = | Intercontinental Ballistic Missile |
| ICSU | = | International Council of Scientific Unions |
| *id.* | = | *idem*, the same (source) |
| IGY | = | International Geophysical Year |
| IHT | = | International Herald Tribune |
| IISL | = | International Iustitute of Space Law |
| ILS | = | International Launch Services |
| *in internationalibus* | = | in international affairs |
| *in statu nascendi* | = | in state of being born, in state of development |
| INF | = | Intermediate-Range Nuclear Forces (Treaty) |
| *infra* | = | below |
| INMARSAT | = | International Maritime Satellite Organisation |
| INR | = | Intelligence and Research Bureau |
| INTELSAT | = | International Telecommunications Satellite Organisation |
| IR(B)M | = | Intermediate-Range (Ballistic) Missile |
| IRS | = | Indian Remote-sensing Satellite |
| ISRO | = | Indian Space Research Organisation |
| ISS | = | International Space Station |
| ITAR | = | International Traffic in Arms Regulations |

| | | |
|---|---|---|
| J. Air L. & Com | = | Journal of Air Law and Commerce |
| J. Space L. | = | Journal of Space Law |
| JEA | = | Joint Endeavor Agreement |
| *jo.* | = | *juncto*, (taken, read) together with, in combination with |
| KSC | = | Kennedy Space center |
| L. | = | Law |
| LEO | = | Low Earth Orbit |
| *lex specialis* | = | special law |
| LKEI | = | Lockheed Khrunichev Energia International |
| LM | = | Lockheed Martin |
| LM | = | Long March |
| M(c)DD | = | Mc Donnell Douglas |
| M.o.A. | = | Memorandum of Agreement |
| M.o.C. | = | Memorandum of Consultations |
| M.o.U. | = | Memorandum of Understanding |
| MDE | = | Major Defense Equipment |
| MEO | = | Medium Earth Orbit |
| MFN | = | Most Favoured Nation |
| MLA | = | Manufacturing License Agreement |
| MM(C) | = | Martin Marietta (Corporation) |
| MTCA | = | Missile Technology Control Act |
| MTCR | = | Missile Technology Control Regime |
| Mtops | = | Million theoretical operations per second |
| NACA | = | National Advisory Comittee for Aeronautics |
| NAIC | = | National Air Intelligence Center |
| NASA | = | National Aeronautics and Space Administration |
| NASDA | = | National Space Development Agency |
| NATO | = | North Atlantic Treaty Organization |
| NL | = | Netherlands |
| NOAA | = | National Oceanic and Atmospheric Administration |
| *nolens volens* | = | willy-nilly |
| NORAD | = | North American Air Defense |
| NPT | = | Non-Proliferation Treaty |
| NSA | = | National Security Agency |
| NSAM | = | National Security Action Memorandum |
| NSC | = | National Security Council |
| NSDD | = | National Security Decision Directive |
| NSG | = | Nuclear Suppliers Group |
| NSPD | = | National Space Policy Directive |
| NSTS | = | National Space Transportation System |
| NYT | = | New York Times |

| | | |
|---|---|---|
| OCST | = | Office of Commercial Space Transportation |
| ODTC | = | Office of Defense Trade Controls |
| OMB | = | Office of Management and Budget |
| OSC | = | Orbital Sciences Corporation |
| OSP | = | Orbital-Suborbital Program |
| OST | = | Outer Space Treaty (of 1967) |
| OSTP | = | Office of Science and Technology Policy |
| OTA | = | Office of Technology Assessment |
| | | |
| P(ub). L. | = | Public Law |
| para. | = | paragraph |
| *passim* | = | in various places, here and there |
| PKM | = | Perigee Kick Motor |
| PLA | = | People's Liberation Army |
| PM | = | Bureau of Political-Military Affairs |
| PRC | = | People's Republic of China |
| Proceed. | = | Proceedings |
| PSLV | = | Polar Satellite Launch Vehicle |
| publ | = | publication, published |
| | | |
| Q. | = | Quarter |
| *quid-pro-quo* | = | something for something |
| | | |
| RLV | = | Reusable Launch Vehicle |
| RPV | = | Remotely Piloted Vehicle |
| R&D | = | Research and Development |
| RSC | = | Rocket System Corporation |
| *res communis omnium* | = | a good belonging to all/everybody |
| RKA | = | Russian Space Agency |
| R | = | Republican |
| | | |
| Sec. | = | Section |
| SEI | = | Space Exploration Initiative |
| SELVS | = | Small Expendable Launch Vehicle Services |
| SES | = | Société Européenne des Satellites |
| Sess. | = | Session |
| SIA | = | Satellite Industry Association |
| SIG (Space) | = | Senior Inter-Agency Group on Space |
| SLBM | = | Submarine-launched Ballistic Missile |
| SME | = | Significant Military Equipment |
| SRM | = | Short(er)-Range Missile |
| SSI | = | Space Services Inc. |
| SSTO | = | Single-Stage-To-Orbit |
| START | = | Strategic Arms Reduction Treaty |
| Stat. | = | Statutes |
| *status quo* | = | the existing state |

| | | |
|---|---|---|
| STS | = | Space Transportation System |
| SU | = | Soviet Union |
| *supra* | = | above |
| | | |
| TAA | = | Technical Assistance Agreement |
| TAA | = | Trade Agreement Act |
| TCI | = | Trans-Space Carriers Inc. |
| TIAS | = | Treaties and other International Acts Series |
| TPCC | = | Trade Promotion Coordinating Committee |
| TPSC | = | Trade Policy Staff Committee |
| Trb | = | Tractatenblad |
| TTCP | = | Technology Transfer Control Plan |
| | | |
| U.S. | = | United States |
| UAV | = | Unmanned Air Vehicle |
| ULV | = | Unmanned Launch Vehicle |
| UNCOPUOS | = | United Nations Committee on the Peaceful Uses of Outer Space |
| UNGA | = | United Nations General Assembly |
| unpub. | = | unpublished |
| USA | = | United Space Alliance |
| USAF | = | United States Air Force |
| USBI | = | U.S. Space Boosters, Inc. |
| USC | = | United States Code |
| USG | = | United States Government |
| USML | = | United States Munitions List |
| UST | = | United States Treaty Series |
| USTR | = | United States Trade Representatives |
| | | |
| VAFB | = | Vandenberg Air Force Base |
| VCSFA | = | Virginia Commercial Space Flight Authority |
| viz. | = | *videlicet,* namely |
| VLS | = | Veiculo Lancador de Satellites |
| | | |
| WA | = | Wassenaar Arrangement |
| Weekly Comp. Pres. Docs. | = | Weekly Compilation of Presidential Documents |
| WEU | = | Western European Union |
| WMD | = | Weapons of Mass Destruction |
| WSJ | = | Wall Street Journal |
| WTO | = | World Trade Organisation |
| WTTC | = | World Travel and Tourism Council |
| | | |
| ZLW | = | Zeitschrift für Luft- und Weltraumrecht |

# BIBLIOGRAPHY

## Books and Articles (incl. speeches)


| | | |
|---|---|---|
| 1981 | Anderson, Frank W. | *Orders of magnitude - A history of NACA and NASA, 1915-1980*, USA (1981) |
| 1990 | Ashford, David & Collins, Patrick | *Your spaceflight manual: how you could be a tourist in space within twenty years*, U.K. (1990) |
| 1996 | Becker, F. & Worms, J.C. | *Defining a European space research policy - the role of the European Science Committee*, 12 (4) Space Policy 277-286 (1996) |
| 1995 | Beider, Perry C. | *Pricing competitively - a response to Jay Lightfoot*, 11 (1) Space Policy 67-69 (1995) |
| 1976 | Bourély, Michel G. | *l'Agence spatiale Européenne*, 1 Annals Air & Space L. 183-196 (1976) |
| 1981 | Bourély, Michel G. | *Institutional arrangements for space cooperation in Europe*, Proceed. 24th Colloq. L. Outer Space 159-167 (1981) |
| 1981 | Bourély, Michel G. | *La production du lanceur Ariane*, 6 Annals Air & Space L. ... (1981) |
| 1987 | Bourély, Michel G. | *National space legislation in Europe*, Proceed. 30th Colloq. L. Outer Space 197-202 (1987) |
| 1991 | Brooks, Timothy A. | *Regulating international trade in launch services*, 6 High Technology L.J. 59-107 (1991) |
| 1990 | Burnett, Dennis J. & Fuchs, Marco | *Amendment of COCOM rules and the commercialization of space*, Proceed. 33rd Colloq. L. Outer Space 11-17 (1990) |
| 1994 | Burnett, Dennis J. & Schroeder, Francesca O. | *Development in US bilateral launch service agreements*, 19 (6) Air & Space L. 326-331 (1994) |
| 1996 | Burnett, Dennis J. & Lihani, David | *US national space policy and bilateral launch service agreement*, Proceed. 39th Coll. L. Outer Space 263-270 (1996) |
| 1996 | Burnett, Dennis J. & Lihani, David | *Developments in U.S. bilateral launch service agreements - an update*, 21 (3) Air & Space L. 100-104 (1996) |
| 1997 | Bzhilianskaya, Liudmila | *Russian launch vehicles on the world market: a case study of international* |

| | | |
|---|---|---|
| | | *joint ventures*, 13 (4) Space Policy 332-338 (1997) |
| 1991 | Cassidy, Daniel E. | *Insuring space launch and related risks,* Proceed. 34th Colloq. L. Outer Space 389-392 (1991) |
| 1991 | Cassidy, Daniel E. | *Current status and prospects for space insurance,* 19 (2) J. Space L. 166-171 (1991) |
| 1997 | Cassidy, Daniel E. | *Current space insurance market conditions*, 25 (2) J. Space L. 155-159 (1997) |
| 1995 | Castillo Ceballos, Décio | *The Brazilian space program: a selective strategy for space development and business*, 11 (3) Space Policy 202-204 (1995) |
| 1990 | Chandrashekar, S. | *Missile technology control and the third world - are there alternatives?*, 6 (4) Space Policy 278-284 (1990) |
| 1993 | Chen, Yanping | *China's space commercialization effort - organization, policy and strategies,* 9 (1) Space Policy 45-53 (1993) |
| 1998 | Cheng, Bin | *The 1967 Outer Space Treaty: Thirtieth Anniversary*, 23 (4/5) Air and Space L. 156-165 (1998) |
| 1990 | Chenard, Stéphane | *The long march to launch regulation,* 4 Space Markets 193-201 (1990) |
| 1989 | Collins, Patrick Q. | *Legal considerations for traffic systems in near-earth space,* Proceed. 32nd Colloq. L. Outer Space 296-343 (1989) |
| 1992 | Collins, Patrick Q. | *Implications of reduced launch costs for commercial space law* in: *Legal aspects of space commercialization* (K. Tatsusawa, Ed.) 139-149 (1992) |
| 1990 | Coulter, William K. | *Regulatory developments in litigation* (second annual symposium on the law and outer space), 5 (1) J. L. Tech. 39-43 (1990) |
| 1989 | Dembling, Paul G. | *Contract issues - introduction* (Annual symposium on the law and outer space), 4 (1) J. L. & Tech. 29-30 (1989) |
| 1987 | Doyle, Stephen E. | *Legal aspects of international competition in provision of launch services,* Proceed. 30th Colloq. L. Outer Space 203-227 (1987) |

| | | |
|---|---|---|
| 1986 | Dula, Arthur M. | *Export controls affecting space operations,* 51 J. Air L. & Com. 927-950 (1986) |
| 1991 | Dunk, Frans G. von der | *Liability versus responsibility in space law: misconception or misconstruction?,* Proceed. 34th Colloq. L. Outer Space 363-371 (1991) |
| 1988 | Dupas, Alain | *Asia in space - the awakening of China and Japan,* 4 (1) Space Policy 31-40 (1988) |
| 1989 | Eigenbrodt, S. | *Out to launch: private remedies for outer space claims,* 55 J. Air L. & Com. 185-221 (1989) |
| 1973 | Fenema, H. Peter van | *The 1972 Convention on international liability for damage caused by space objects,* LL.M. thesis (unpubl.), McGill University Montreal (1973) |
| 1985 | Finch, Edward F. & Moore, Amanda L. | *Astrobusiness - a guide to the commerce and law of outer space,* USA (1985) |
| 1989 | Fought, Bonnie | *Legal aspects of the commercialization of space transportation systems,* 3 High Tech. L. J. 99-147 (1989) |
| 1987 | Frankle, Edward A. | *Commercial ELV services and the National Aeronautics and Space Administration: Concord or discord?,* Proceed. 30th Colloq. L. Outer Space 216-223 (1987) |
| 1991 | Frankle, Edward A. | *New NASA cross waiver regulations,* 6 (...) J. L. & Tech. (1991) |
| 1996 | Fuhrman, Robert A. & Wild, Jürgen H. | *International cooperation - how to proceed,* 12 (2) Space Policy 142-146 (1996) |
| 1996 | Gair, Christina | *The global launch industry - new players enter the scene,* Via Satellite, 44-55 (1996) |
| 1978 | Galloway, Eilene | *The United States Congress and space law,* 3 Annals Air & Space L. 395-407 (1978) |
| 1979 | Galloway, Eilene | *Recent developments in United States space policy,* 4 Annals Air & Space L. 483-504 (1979) |
| 1994 | Galloway, Eilene | *NASA: policy and early implementation,* bookreview of *The Birth of NASA: the diary of T. Keith Glennan* (Ed. J.D. Hunley) in: 10 (3) Space Policy 240-241 (1994) |

1997 Gillis, Anne — *China's space policy: review and prospects*, 13 (3) Space Policy 215-227 (1997)

1991 Ginger, S.R. — *The trial of the Palapa B-2 case; a look at the liability issue in commercial space launches,* 30 Fed. Bar News & J. 132 (1991)

1985 Goldman, Nathan C. — *Space commerce - free enterprise on the high frontier,* USA (1985)

1988 Goldman, Nathan C. — *American space law - international and domestic,* USA (1988)

1988 Gorove, K. — *The Commercial Space Launch Act Amendments of 1988: a brief overview*, 16 (2) J. Space L. 184-185 (1988)

1989 Gorove, S. — *United States Space Law, national & international regulation*, USA (1989)

1990 Gorove, S. — *U.S. space laws in perspective- focus on recent domestic highlights,* Proceed. 33rd Colloq. L. Outer Space 206-209 (1990)

1993 Greenberg, Joel S. — *Competitiveness of commercial space transportation services,* 9 (3) Space Policy 220-232 (1993)

1996 Hansson, Anders — *The future of the European space industry* (conference report), 12 (4) Space Policy 293-294 (1996)

1996 Hansson, Anders — *Evaluating the benefits from space technology - thoughts on a Swedish study*, 12 (3) Space Policy 203-206 (1996)

1996 Hashimoto, Yasuaki — *Japanse space policy - where is she going?*, Proceed. 39th Coll. L. Outer Space 229-234 (1996)

1996 Heydon, Douglas — *US government policy - the major factor shaping the international commercial space launch market place*, 12 (4) Space Policy 237-244 (1996)

1990 Iserland, Klaus — *Ten years of Arianespace,* 6 (4) Space Policy 341-343 (1990)

1996 Jenkins, Dennis R. — *Space Shuttle - The history of developing the national space transportation system*, USA (1996)

1988 Jiefang, Huang — *Toward a regulatory regime for competition in space transport* in: *Space law: views of the future,* (Tanja L.

| | | |
|---|---|---|
| 1997 | Gillis, Anne | *China's space policy: review and prospects*, 13 (3) Space Policy 215-227 (1997) |
| 1991 | Ginger, S.R. | *The trial of the Palapa B-2 case; a look at the liability issue in commercial space launches,* 30 Fed. Bar News & J. 132 (1991) |
| 1985 | Goldman, Nathan C. | *Space commerce - free enterprise on the high frontier,* USA (1985) |
| 1988 | Goldman, Nathan C. | *American space law - international and domestic,* USA (1988) |
| 1988 | Gorove, K. | *The Commercial Space Launch Act Amendments of 1988: a brief overview,* 16 (2) J. Space L. 184-185 (1988) |
| 1989 | Gorove, S. | *United States Space Law, national & international regulation*, USA (1989) |
| 1990 | Gorove, S. | *U.S. space laws in perspective- focus on recent domestic highlights,* Proceed. 33rd Colloq. L. Outer Space 206-209 (1990) |
| 1993 | Greenberg, Joel S. | *Competitiveness of commercial space transportation services,* 9 (3) Space Policy 220-232 (1993) |
| 1996 | Hansson, Anders | *The future of the European space industry* (conference report), 12 (4) Space Policy 293-294 (1996) |
| 1996 | Hansson, Anders | *Evaluating the benefits from space technology - thoughts on a Swedish study*, 12 (3) Space Policy 203-206 (1996) |
| 1996 | Hashimoto, Yasuaki | *Japanse space policy - where is she going?*, Proceed. 39th Coll. L. Outer Space 229-234 (1996) |
| 1996 | Heydon, Douglas | *US government policy - the major factor shaping the international commercial space launch market place*, 12 (4) Space Policy 237-244 (1996) |
| 1990 | Iserland, Klaus | *Ten years of Arianespace,* 6 (4) Space Policy 341-343 (1990) |
| 1996 | Jenkins, Dennis R. | *Space Shuttle - The history of developing the national space transportation system,* USA (1996) |
| 1988 | Jiefang, Huang | *Toward a regulatory regime for competition in space transport* in: *Space law: views of the future,* (Tanja L. |

| | | |
|---|---|---|
| | | Zwaan, Ed.-in-chief) 57-65, Netherlands (1988) |
| 1988 | Johnson-Freese, Joan | *Changing patterns of international cooperation in space - the Soviet factor,* 4 (1) Space Policy 61-73 (1988) |
| 1995 | Jourdain, Laurence | *Space in Europe: new stakes, new structures?,* 11 (2) Space Policy 87-88 (1995) |
| 1991 | Kayser, Valérie | *An achievement of domestic space law: US regulation of private commercial launch services,* 16 Annals Air & Space L. 341-379 (1991) |
| 1991 | Kayser, Valérie | *Legal aspects of private launch services in the United States,* LL.M. thesis (unpubl.) I.A.S.L., McGill University (1991) |
| 1997 | Kerrest, Armel | *The launch of spacecraft from the sea,* in: *Outlook on space law over the next 30 years* (Gabriel Lafferanderie & Daphné Crowther, Eds.), 217-... (1997) |
| 1997 | Kerrest, Armel | *Launching spacecraft from the sea and the outer space treaty: the Sea Launch project,* IISL (1997) |
| 1996 | Khozin, Grigori S. | *Russian space commercialization - getting the banks involved,* 12 (3) Space Policy 157-159 (1996) |
| 1989 | Kissick, Ralph L. | *Commercial space launch contracts: disputes and remedies,* 4 (1) J. L. & Tech. 31-42 (1989) |
| 1995 | Krawec, Roman | *Ukrainian space policy - contributing to national economic development,* 11 (2) Space Policy 105-114 (1995) |
| 1994 | Krige, J. & Russo, A. | *Europe in space, 1960-1973,* ESA SP-1172, Netherlands (1994) |
| 1991 | Kuckelman, D.J. | *Regulation of exports for commercial space launches outside the United States,* 38 Fed. Bar News & J. 135-... (1991) |
| 1993 | Kuskuvelis, Ilias I. | *The space risk and commercial space insurance* 9 (2) Space Policy 109-120 (1993) |
| 1992 | Kuskuwelis, Ilias I. | *Space insurance* in: *Legal aspects of space commercialization,* (K. Tatsusawa, Ed.) 60-67 (1992) |
| 1990 | Lacoste, Beatrice | *Europe: stepping stones to space,* U.K. (1990) |

| | | |
|---|---|---|
| 1988 | Lafferanderie, Gabriel | *The European Space Agency (ESA) 1987,* 13 Annals Air & Space L. 331-337 (1988) |
| 1989 | Lafferanderie, Gabriel | *European Space Agency in 1988,* 14 Annals Air & Space L. 491-499 (1989) |
| 1993 | Lai, Bill C. | *National subsidies in the international commercial launch market,* 9 (1) Space Policy 17-34 (1993) |
| 1994 | Launius, Roger D. | *NASA: A history of the U.S. civil space program*, USA (1994) |
| 1989 | Lee-Miller, Stephanie | *Licensing and regulating U.S. commercial space launches,* 4 (1) J. L. & Tech. 45-47 (1989) |
| 1982 | Leister, Valnora | *Space technology: from national development to international cooperation*, D.C.L. thesis (unpubl.), I.A.S.L., McGill University (1982) |
| 1990 | Lessard & Nordlund | *Les bases de lancement: evolution et aspects juridiques,* 15 Annals Air & Space L. 359-400 (1990) |
| 1994 | Lightfoot, Jay M. | *Competitive pricing for multiple payload launch services: the road to commercial space*, 10 (2) Space Policy 121-133 (1994) |
| 1995 | Lightfoot, Jay M. | *Competitive pricing for multi-payload launches revisited,* 11 (1) Space Policy 75-76 (1995) |
| 1986 | Logsdon, John M. | *The decision to develop the space shuttle*, (2) Space Policy 103-119 (1986) |
| 1991 | Madders, Kevin J. | *Space insurance: European perspectives,* 19 (2) J. Space L. 171-172 (1991) |
| 1991 | Madders, Kevin J. | *Space Insurance - a European perspective,* Proceed. 34th Colloq. L. Outer Space 393-398 (1991) |
| 1992 | Madders, Kevin J. & Thiebaut, W.M. | *Two Europes in one space: the evolution of relations between the European Space Agency and the European Community in space affairs,* 20 (2) J. Space L. 117-132 (1992) |
| 1997 | Madders, Kevin J. | *A new force at a new frontier: Europe's development in the space field in the light of its main actors, policies, law and activities from its beginnings up to the present*, U.K. (1997) |
| 1988 | Mark, Hans | *A forward looking space policy for the USA,* 4 (1) Space Policy 19-23 (1988) |

| | | |
|---|---|---|
| 1995 | Marshall, Alan | *Development and imperialism in space,* 11 (1) Space Policy 41-52 (1995) |
| 1991 | Martin, P.M. | *Legal consequences of the lack of French space legislation,* Proceed. 34th Colloq. L. Outer Space 250-256 (1991) |
| 1992 | Martinez, Larry F. | *The legal implications of high technology export controls for commercial activities in outer space,* Proceed. 35th Colloq. L. Outer Space 229-238 (1992) |
| 1992 | Martinez, Larry F. | *The future dimension of East-West space markets* in: *Legal aspects of space commercialization,* (K. Tatsusawa, Ed.) 2-9 (1992) |
| 1969 | Matte, Nicolas M. | *Aerospace Law*, Canada (1969) |
| 1992 | McCall Jr., Jack H. | *The missile technology control regime and space launch vehicles: an update,* 20 (2) J. Space L. 61-65 (1992) |
| 1989 | Meredith, Pamela L. | *A comparative analysis of United States domestic licensing regimes for private commercial space activities,* Proceed. 32nd Colloq. L. Outer Space 373-381 (1989) |
| 1992 | Meredith, Pamela L. & Robinson, George S. | *Space Law: a case study for the practitioner,* Netherlands (1992) |
| 1984 | Meyers, James R. | *Federal Government regulation of commercial operations using expendable launch vehicles,* 12 (1) J. Space L. 40-51 (1984) |
| 1994 | Middleton, B.S. | *The US commercial space launch industry: policies for survival*, 20th natioal space symposium, Washington (Apr 1994) |
| 1989 | Middleton, B.S. & Cory, E.F. | *Australian space policy,* 5 (1) Space Policy 41-46 (1989) |
| 1992 | Monk, David G. | *The lessons of airline regulation and deregulation: will we make the same mistakes in space?*, 57 J. Air L. & Com. 715-753 (1992) |
| 1994 | Monserrat Filho, José | *The place of the Missile Technology Control Regime (MTCR) in international space law*, 10 (3) Space Policy 223-228 (1994) |
| 1995 | Monserrat Filho, José | *The new Brazilian Space Agency: a political and legal analysis*, 11 (2) Space Policy 121-130 (1995) |

| | | |
|---|---|---|
| 1996 | Monserrat Filho, José | *Brazilian-Chinese space cooperation: an analysis of its legal performance*, Proceed. 39th Coll. L. Outer Space 164-175 (1996) |
| 1987 | Musarra, G. | *Commercial space transportation: regulatory activities of the United States Department of Transportation,* Proceed. 30th Colloq. L. Outer Space 224-227 (1987) |
| 1989 | Narjes, Karl-Heinz | *Space and the European Community,* 5 (1) Space Policy 59-64 (1989) |
| 1989 | Nesgos, Peter D. | *The challenges facing the private practitioner: liability and insurance issues in commercial space transportation,* 4 (1) J. L. & Tech. 21-27 (1989) |
| 1991 | Nesgos, Peter D. | *Commercial space transportation: a new industry emerges*, 16 Annals Air & Space L. 393-422 (1991) |
| 1995 | Nomura, Tamiya | *Japan's new long-term vision - creating a space age in the new century*, 11 (2) Space Policy 9-17 (1995) |
| 1989 | O'Brien, John E. | *Liability and insurance - introduction,* (Annual symposium on the law and outer space), 4(1) J.L. & Tech. 19-20 (1989) |
| 1992 | Oosterlinck, René | *Private law concepts in space law,* in: *Legal aspects of space commercialization,* (K. Tatsusawa, Ed.) 42-59 (1992) |
| 1988 | Pace, Scott | *US space transportation policy - history and issues for a new administration,* 4 (4) Space Policy 307-318 (1988) |
| 1988 | Paolini, Jérôme | *French military space policy and European cooperation,* 4 (3) Space Policy 201-210 (1988) |
| 1996 | Perkins, John S. | *Launch vehicles: keeping the U.S. satellite industry competitive*, (Oct 8, 1996) <http://www.hughes.com/speeches> |
| 1997 | Perkins, John S. | *Achieving the promise of space by increasing the world's supply of commercial launch vehicles*, (Apr 2, 1997) <http://www.hughes.com/speeches> |

| | | |
|---|---|---|
| 1991 | Pike, Gordon | *Chinese launch services, a user's guide,* 7 (2) Space Policy 103-115 (1991) |
| 1990 | Potter, M.A. | *Swords into plowshares: legal & policy implications of a commercial launch vehicle based on the SS-20 missile,* Proceed. 33rd Colloq. L. Outer Space 48-57 (1990) |
| 1991 | Potter, M.A. | *Swords into ploughshares, missiles as commercial launchers,* 7 (2) Space Policy 146-150 (1991) |
| 1991 | Qizhi, He | *Legal issues of China's entry into international space market,* 40 (3) Zeitschrift für Luft- und Weltraumrecht 278-281 (1991) |
| 1986 | Raclin, Grier C. | *Going to work in space: a survey of presently available launch systems* in: *American enterprise, the law and the commercial use of space 30-72,* USA (1986) |
| 1992 | Reibel, David Enrico | *Procurement of launch vehicles and services*, Proceed. 35th Colloq. L. Outer Space 248-256 (1992) |
| 1987 | Reynolds, Glenn & Merges, Robert P. | *Outer space: problems of law and policy,* (2nd. ed.) USA (1987) |
| 1988 | Reynolds, Glenn & Merges, Robert. P. | *Toward an industrial policy for outer space: problems and prospects of the commercial launch industry*, 29 Jurimetrics J. 7-42 (1988) |
| 1997 | Reynolds, Glenn & Merges, Robert P. | *Outer space - problems of law and policy*, (2nd ed.) USA (1997) |
| 1986 | Robinson, George S. & Meredith, Pamela L. | *Domestic commercialization of space: the current political atmosphere* in: *American enterprise, the law and the commercial use of space,* 1-29 USA (1986) |
| 1996 | Sadeh, Eligar & Lester, James P. & Sadeh, Willy Z. | *Modelling international cooperation for space exploration,* 12 (3) Space Policy 207-223 (1996) |
| 1998 | Sato, Masahiko | *The Japanese legal framework: third party liability resulting from NASDA launch activities*, IISL-98-IISL.2.05, 49th International Astronautical Congress, Melbourne (Sep 28-Oct 2, 1998) |
| 1991 | Scarborough, J. | *The privatization of expendable launch vehicles: reconciliation of conflicting* |

*policy objectives*, 10 (213) Policy Studies Review 12-30 (1991)

1992 Scarborough, J. — *Free trade and the commercial launch industry,* 8 (2) Space Policy 109-110 (1992)

1991 Schwetje, F. Kenneth — *U.S. legislation to implement the missile technology control regime,* Proceed. 34th Colloq. L. Outer Space 321-325 (1991)

1979 Sloup, G.P. — *The space transportation system and the U.S. President's launch policy of 1972: beginning a new type of "shuttle diplomacy",* Proceed. 22nd Colloq. L. Outer Space 77-81 (1979)

1994 Smith, Bruce G. — *Civil and military space in Europe - an industrial perspective*, 10 (2) Space Policy 91-94 (1994)

1992 Smith, Marcia S. — *Buying Russian technology - pros and cons for the US programme*, 8 (4) Space Policy 362-365 (1992)

1998 Smith, Michael T. — *Deregulation: the key to realizing the promise in satellite communications*, luncheon address (Oct 28, 1998), <http://www.hughes.com/speeches>

1984 Steptoe, E. Jason — *United States Government licensing of commercial space activities by private enterprise,* Proceed. 27th Colloq. L. Outer Space 191-196 (1984)

1985 Steptoe, E. Jason — *Regulation of private commercial space transportation by the United States Department of Transportation,* Proceed. 28th Colloq. L. Outer Space 240-246 (1985)

1986 Sterns, Patricia M. & Tennen, Leslie I. — *Doing business in space: operating strategies for a changing market,* Proceed. 29th Colloq. L. Outer Space 183-192 (1986)

1987 Straubel, M. — *The Commercial Space Launch Act: the regulation of private space transportation,* 52 J. Air L. & Com. 941-969 (1987)

1991 Supancana, Ida Bagus Rahmadi — *Commercial utilization of outer space and its legal formulation - developing countries' perspectives,* Proceed. 34th Colloq. L. Outer Space 348-356 (1991)

| | | |
|---|---|---|
| 1994 | Tarasenko, Maxim V. | *Russia's place in space: a home view*, 10 (2) Space Policy 115-120 (1994) |
| 1996 | Tarasenko, Maxim V. | *Current status of the Russian space programme*, 12 (1) Space Policy 19-28 (1996) |
| 1992 | Tatsusawa, K. (Ed.) | *Legal aspects of space commercialization* Japan (1992) |
| 1997 | Thaker, Jitendra S. | *The development of the outer space benefits declaration*, XXII-I Annals of Air and Space L. 537-558 (1997) |
| 1996 | Traa-Engelman, Hanneke L. van | *Commercialization of space activities - legal requirements constituting a basic incentive for private enterprise involvement*, 12 (2) Space Policy 119-128 (1996) |
| 1990 | Trinder, Rachel B. | *Recent developments in litigation* (second annual symposium on the law and outer space), 5 (1) J. L. & Tech. 45-61 (1990) |
| 1989 | Trippet, Lillian M. | *Legislative initiatives to encourage private activity,* 4 (1) J. L. & Tech. 49-57 (1989) |
| 1996 | Vedda, James A. | *Evolution of executive branch space policy making*, 12 (3) Space Policy 177-192 (1996) |
| 1996 | Villain, Jacques | *A brief history of Baikonur*, 12 (2) Space Policy 129-134 (1996) |
| 1988 | Wallace, Helen | *Building a European space policy,* 4 (2) Space Policy 115-120 (1988) |
| 1984 | Webber, A.D. | *Launching the rocket industry in the United States: domestic regulation of private expendable launch vehicles* 49 J. Air L. & Com. 1-67 (1984) |
| 1990 | Wirin, William B. | *U.S. restrictions on space commerce,* Proceed. 33rd Colloq. L. Outer Space 120-132 (1990) |
| 1992 | Wirin, William B. | *Quo vadis? - Space law in the 21st century,* Proceed. 35th Collog. L. Outer Space 194-204 (1992) |
| 1994 | Wirin, William B. | *Policy considerations of launching U.S.-origin satellites in the People's Republic of China,* Proceed. 37th Colloq. L. Outer Space 172-182 (1994) |
| 1989 | Yelton, Kim G. | *Evolution, organization and implementation of the Commercial Space* |

| | | |
|---|---|---|
| | | *Launch Act and Amendments of 1988,* 4 (1) J. L. & Tech. 117-137 (1989) |
| 1996 | Yiliu, Zhu | *Fast-track development of space technology in China* (report), 12 (2) Space Policy 139-142 (1996) |
| 1989 | Yong, Jiao | *Chinese policy and legal guarantees in the provision of launch services for foreign countries,* Proceed. 32nd Colloq. L. Outer Space 440-444 (1989) |


## Reports and documents

| | | |
|---|---|---|
| | Boutros-Ghali | *International cooperation in space activities for enhancing security in the post-cold ware era*, Report of the Secretary-General, U.N., Dept of Political Affairs, A/48/221 |
| 1982 | Dattner, A. | *Reflections on Europe in space - the first two decades and beyond*, ESA publ. BR-10 (Mar 1982) |
| 1983 | | *Space Commercialization*, Hearings before the Subcommittee on Space Science and Applications, House Committee on Science and Technology, 98th Cong., 1st Sess. (1983) |
| 1983 | | *Policy and legal issues involved in the commercialization of space*, Staff of Senate Committee on Commerce Science and Transportation, 98th Cong., 1st Sess., Committee print (1983) |
| 1983 | | *The Expendable Launch Vehicle Commercialization Act*, Hearings before the Subcommittee on Space Science and Applications, House Committee on Science and Technology, 98th Cong., 1st & 2nd Sess. (1983-84) |
| 1984 | | *Commercial Space Launch Act*, H.R. Report 98-816 (to accompany H.R. 3942), House Committee on Science and Technology, 98th Cong., 2nd Sess. (May 31, 1984) |
| 1984 | | *Twenty years of cooperation in space '64-'84*, ESA Report, Netherlands (1984) |

| | | |
|---|---|---|
| 1984 | | *To facilitate certain space launches, and for other purposes*, Hearings on S2931 before the Subcommittee on Science Technology and Space, Senate Committee on Commerce Science and Transportation, 98th Cong., 1st Sess (1984) |
| 1984 | | *Commercialization of expendable launch vehicles and services*, Senate Report No. 656, 98th Cong., 2nd Sess. (1984) |
| 1986 | | *Setting space transportation policy for the 1990s*, Congressional Budget Office (1986) |
| 1987 | | *European space - on course for the 21st century*, ESA publ. BR-39, France (1987) |
| 1987 | | *State of the commercial space launch industry*, Hearings before the Subcommittee on Space Science and Applications, House Committee on Science, Space and Technology, 100th Cong., 1st Sess. (1987) |
| 1987 | | *Missile Technology Control Regime*, Dept of State press briefing, Apr 16, 1987, Doc 31, American Foreign Policy 74-80 (1987) |
| 1988 | Smith, Marcia S. | *Space commercialization in China and Japan*, CRS Report for Congress (Jul 28, 1988) |
| 1988 | | *Insurance and the U.S. commercial space launch industry*, S. Report 100-112, Senate Committee on Commerce, Science, and Transportation, 100th Cong., 2nd Sess. (July 1988) |
| 1988 | | *Reaching for the skies: The Ariane family story and beyond*, ESA BR-42 Netherlands (1998) |
| 1988 | | *The Administration's decision to license the Chinese Long March Vehicle*, Hearings before the House Committee on Science, Space, and Technology, 100th Cong., 2nd Sess. (Sep 23 and 27, 1988) |
| 1988 | | *U.S. commercial space transportation risk allocation and insurance - an AIAA* |

*position paper,* January 1988, 16 (1) J. Space L. 110-115 (1988)

1988 *Proposed sale and launch of United States satellites on Chinese missiles*, Hearing before the Subcommittee on Arms Control, International Security and Science, on Asian and Pacific Affairs, and on International Economic Policy and Trade of the Committee on Foreign Affairs of the House Committee on Foreign Affairs, 100th Cong., 2nd Sess. (Sep 28, 1988)

1988 *The Community and Space: a coherent approach*, COM (88) 417 final (Jul 26, 1988)

1988 *Commercial Space Launch Act Amendments of 1998*, H.R. Report 100-639 (to accompany H.R. 4399), H.R. Committee on Science, Space, and Technology, 100th Cong., 2nd Sess. (May 1988)

1988 *Commercial Space Launch Act Amendments of 1988*, S. Report 100-593, Senate Committee on Commerce, Science, and Transportation on H.R. 4399, 100th Cong., 2nd Sess. (Oct 1988)

1988 *Commercial Space Launch Act Amendments*, Hearings before the Subcommittee on Space Science and Applications, House Committee on Science, Space and Technology, 100th Cong., 2nd Sess. (1988)

1988 *Commercial Space Launch Act Amendments of 1988*, S. Report 100-593, Senate Committee on Commerce Science and Transportation on H.R. 4399 [CSLA Amendments], 100th Cong., 2nd Sess. (Oct 1988)

1990 Smith, Marcia S. *Space commercialization activities in the Soviet Union*, CRS Report for Congress, 90-372 SPR (Aug 3, 1990)

1990 *Space law and related documents: International space law documents, U.S. space law documents*, S. Print 101-98, Senate Committee on Commerce,

| | | |
|---|---|---|
| | | Science, and Transportation, 101st Cong., 2nd Sess. (June 1990) |
| 1991 | Davis, Zachary S. | *Non-proliferation regimes: A comparative analysis of policies to control the spread of nuclear, chemical and biological weapons and missiles*, CRS Report for Congress (Apr 1, 1991) |
| 1991 | Gibson, Roy | *The European Community, crossroads in space*, Report of the Advisory Panel on the European Community in Space, EUR 14010 (Sep 1991) |
| 1991 | | *Commercial space launch services: the U.S. competitive position*, CRS report to the House Committee on Science, Space, and Technology, 102nd Cong., 1st Sess. (Nov 1991) |
| 1992 | | *Resolution on European space policy on launch services*, ESA/C/CIII/Res2 (Oct 23, 1992 (Final)) |
| 1992 | | *Resolution on the implementation of the European long-term space plan and programmes (Chapter V "European Launcher Policy")*, ESA Council meeting at Ministerial level, Granada (Nov 10, 1992) |
| 1992 | | *The European Community and space, Challenges and opportunities*, COM (92) 360 final (Sep 23, 1992) |
| 1992 | | *Bilateral space cooperation with the former Soviet Union*, Hearing before Subcommittee on Space, House Committee on Science, Space, and Technology, 102nd Cong., 2nd Sess. (Mar 25, 1992) |
| 1993 | Chen, Yanping | *U.S. space policy assessed*, report US Vice President's Space Policy Advisory Board, Washington DC, USA, summary in 9 (3) Space Policy 246-248 (1993) |
| 1993 | Chow, Brian G. | *Emerging national space programs - economics and safeguards*, National Defense Research Institute, RAND, USA (1993) |
| 1993 | | *International competition in launch services*, Hearing before Subcommittee on Space, House Committee on Science, |

| | | |
|---|---|---|
| | | Space, and Technology, 103rd Cong., 1st Sess. (May 19, 1993) |
| 1993 | | *Commission proposal for a Council Decision concerning the conclusion of an Agreement between the [EEC] and the Russian Federation on Space Launch services*, COM (93) 355 final (Jul 22, 1993) |
| 1993 | | *Export Control Reform in High Technology*, Hearing before the House Committee on Science, Space, and Technology, 103rd Cong., 1st Sess. (Aug 13, 1993) |
| 1994 | Burnett, Dennis J. | *Global trade in satellite and launch services*, Report (Oct 13, 1994) |
| 1994 | Sebesta, Lorenzo | *US-European cooperation in space during the sixties*, ESA HSR-14, Netherlands (1994) |
| 1994 | Smith, Marcia S. | *Space activities of the United States, CIS and other launching countries/organizations: 1957-1993*, CRS Report for Congress, 94-347 SPR (Mar 29, 1994) |
| 1994 | | *Small missions: exploiting the opportunities*, (edited) report, Eurospace, in: 10 (4) Space Policy 339-340 (1994) |
| 1994 | | *Space Australia - the story of Australia's involvement in space*, Australia (1993), bookreview in: 10 (4) Space Policy 322-326 (1994) |
| 1994 | | *Global trade in satellite and launch services*, Hearing, House Committee on Science, Space and Technology, Subcommittee on Space (Sep 29, 1994) |
| 1995 | | *US-Russian cooperation in space*, Report, OTA, Washington DC (1995) Summary, Making the most of cooperation with Russia, 11 (3) Space Policy 209-211 (1995) |
| 1995 | | *Recommendations of the Franco-German discussion group on European space policy*, 11 (3) Space Policy 212-213 (1995) |
| 1995 | | *The national space transportation policy: issues for congress*, Report, |

| | | |
|---|---|---|
| | | OTA, Washington DC (1995), summary in: 11 (4) Space Policy 283-287 (1995) |
| 1995 | | *OCST sees growing market for low earth orbit satellites*, DOT News release (May 18, 1995) |
| 1995 | | *The national space transportation policy: issues for Congress*, Office of Technology Assessment, US Congress, OTA-ISS-620 (May 1995) |
| 1995 | | Commercial space launch agreement with Ukraine, Fact Sheet, Press release 95-91, Office of the USTR (Dec 14, 1995) |
| 1996 | | *The European Union and space: fostering applications, markets and industrial competitiveness*, Communication from the Commission to the Council and the European Parliament, COM (96) 617 final (1996) |
| 1996 | LD Consultants | *Prospect for Euro-Indian space cooperation (Report)*, 12 (1) Space Policy 71-74 (1996) |
| 1996 | Sebesta, Lorenzo | *The aviability of American launchers and Europe's decision 'to go it alone'*, ESA HSR-18, Netherlands (1996) |
| 1996 | | *Arms Control and Disarmament Agency (ACDA)*, Annual Report 1995 |
| 1997 | | *world space systems briefing*, Teal Group Corporation (1997) |
| 1997 | | *State of the space industry - 1997 outlook*, SpaceVest, KPMG Peat Marwick, Space Publications and Centre for Wireless Communications (1997) |
| 1997 | | *Access to space: issues associated with DOD's evolved expendable launch vehicle program*, Letter report GAO/NSIAD-97-13 (Jun 24, 1997) |
| 1997 | | *The worldwide growth of launch vehicle technology and services*, special report, 2nd Q 1997 Report, DOT-FAA-AST (1997) |
| 1997 | | *Commission liberalizes foreign participation in the U.S. telecommunications market*, FCC (IB Docket Nos. 97-142 and 95-22), Report |

No. IN 97-36 (Nov 25, 1997, e.i.f. Feb 1998)

1997 *Commission adopts procompetitive market opening policies for foreign satellites*, FCC (IB Docket 97-142, CC Docket 93-23), Report No. IN 97-37 (Nov 25, 1997, e.i.f. Feb 1998)

1997 *China and non-proliferation*, Fact Sheet, Dept of State (Jun 3, 1997)

1997 *The European Aerospace Industry - Meeting the global challenge*, COM (97) 466.fin., European Commission, Brussels (Sep 24, 1997)

1998 Kan, Shirley A. *China: Possible missile technology transfers from U.S. satellite export policy - Background and chronology*, CRS Report for Congress, 98-485 F (Aug 13, 1998)

1998 *Commercial Space Transportation: 1997 Year in review*, Department of Transportation (DOT), Federal Aviation Administration (FAA), Associate Administrator for Commercial Space Transportation (AST) (Jan 1998)

1998 *An overview of the U.S. commercial space launch infrastructure*, Special report, Commercial Space Transportation, 3rd Quarter 1998, DOT, FAA-Associate Administrator for Commercial Space Transportation (AST) (Jul 31, 1998)

1998 *Report of the Scientific and Technical Subcommittee on the work of its thirty-fifth session*, UNCOPUOS, United Nations General Assembly Doc. A/AC.105/697 (Feb 25, 1998)

1998 *International Bureau reports on developments in international telecommunications markets*, FCC News, Report No. 98-58 (Nov 19, 1998)

1998 *Commercial Space Act of 1997*, Senate Report 105-198, 105th Cong., 2nd Sess. (Jun 2, 1998)

1998 *Schedules of Commitments and Lists of art. II exemptions to be annexed to the*

*Fourth Protocol of the General Agreements on Trade in Services*, WTO (Jan 29, 1998)

1998 *Presidential satellite waives and other related launch information*, AIA (Jun 8, 1998) <http://aia-aerospace.org/homepage/china_table1.html>

1998 *Commercial satellite exports to China*, AIA (Jun 4, 1998) <http://aia-aerospace.org/homepage/china_exports.html>

1998 *Satellite launch fact sheet*, AIA (Jun 3, 1998) <http://aia-aerospace.org/homepage/china_facts.html>

1998 *Highlights in space - Progress in space science, technology and applications, international cooperation and space law 1997*, A/AC-105/691, U.N. Office for Outer Space Affairs, U.N., New York (1998)

1999 *1999 Commercial Space transportation forecasts*, FAA-Associate Administrator for Commercial Space Transportation (AST) and the Commercial Space Transportation Advisory Committee (COMSTAC) (May 1999)

1999 *U.S. national security and military/commercial concerns with the People's Republic of China*, Report of the House Select Committee (Cox Report) (unclassified, redacted version of the full report of Jan 1999) (May 1999) <http://www.house.gov/coxreport/>

1999 *An assessment of the proposed changes to the International Traffic in Arms Regulations (ITAR)*, Canadian Defence Industries Association (CDIA) (Feb 26, 1999) <http://www.cdia.can/assessment.htm>

1999 *Commercial Space Transportation: 1998 Year in review*, FAA-Associate Administrator for Commercial Space Transportation (AST) (Jan 1999)

1999 *Report on foreign policy export controls*, U.S. Dept of Commerce, Bureau of Export Administration <http://www.bxa.doc.gov/press199/Repts/foreignPolicyTOC.html>

## Treaties, bilateral and multilateral agreements

1964 *Memorandum of Understanding between the European Space Research Organization and the United States National Aeronautics and Space Administration*, Jul 8, 1964, NASA news release no. 67-110 (May 10, 1967)

1966 *Memorandum of Understanding between the European Space Research Organization and the National Aeronautics and Space Administration concerning the furnishing of satellite launching and associated services*, Dec 30, 1966, Yearbook of Air and Space Law 1967 (Ed. René Manciewicz), McGill Institute of Air and Space Law, Canada 1970

1967 *Treaty on principles governing the activities of states in the exploration and use of outer space, including the moon and other celestial bodies*, Jan 27, 1967, e.i.f. Oct 10, 1967, 18 U.S.T. 2410, T.I.A.S. 6347

1972 *Convention on international liability for damage caused by space objects*, Mar 29, 1972, e.i.f. Sep 1, 1972, 24 U.S.T. 2389, T.I.A.S. 7762

1973 *Arrangement between certain European Governments and the European Space Research Organisation concerning the execution of the Ariane Launcher Programme*, Sep 21, 1993, e.i.f. Dec 28, 1973, NL Trb (1974) Nr. 192

1976 *Convention on registration of objects launched into outer space*, Jan 14, 1975, e.i.f. Sep 15, 1976, 28 U.S.T. 695, T.I.A.S. 8480

1980 *Convention for the establishment of a European Space Agency*, May 30, 1975, e.i.f. Oct 30, 1980, UKTS, No 30 (1981) Cmnd. 8200, Vol. 1 Basic Texts of the European Space Agency, Convention and Rules (1980)

1980 *Declaration by certain European governments relating to the Ariane launcher production phase*, ESA Council doc. ESA/C (80) 8, Jan 14, 1980, e.i.f. Oct 30, 1980, NL Trb (1982) Nr 1, 6 Annals Air & Space L. 723-737 (1981)

1985 *Convention establishing the European Telecommunications Satellite Organization "Eutelsat"*, Jul 15, 1982, e.i.f. Jul 3, 1985, 11 Annals of Air and Space Law 541 (1986)

1987 *Agreement on guidelines for the transfer of equipment and technology related to missiles (MTCR)*, Arp 16, 1987, I.L.M. 599 (1987)

1989 *Memorandum of Agreement between the Government of the United States of America and the Government of the People's Republic of China regarding international trade in commercial launch services*, Jan 26, 1989, e.i.f. Mar 16, 1989, 28 I.L.M. 596 (1989)

1989 *Memorandum of Agreement on satellite technology safeguards between the Governments of the United States of America and the People's Republic of China*, Dec 17, 1988, e.i.f. March 16, 1989, 28 I.L.M. 596 (1989)

1989 *Memorandum of Agreement on liability for satellite launches between the Governments of the United States of America and the People's Republic of China*, Dec 17, 1988, e.i.f. March 16, 1989, 28 I.L.M. 596 (1989)

1990 *Exchange of Notes between the Government of the United Kingdom and the Government of the People's Republic of China concerning liability for damage arising during the launch phase of the*

| | |
|---|---|
| | *Asiasat satellite*, Peking, Mar 26, 1990 and Apr 2, 1990, e.i.f. Apr 2, 1990 |
| 1993 | *Agreement between the Government of the United States of America and the Government of the Russian Federation regarding international trade in commercial launch services*, Sep 2, 1993, e.i.f. Sep 2, 1993 |
| 1994 | *U.S. MFN exemption for "Transport services; Space transportation"*, Final List of Article II (MFN) Exemptions (U.S.) (Apr 15, 1994) |
| 1995 | *Agreement establishing the World Trade Organization* (WTO Agreement), Apr 15, 1994, e.i.f. Jan 1, 1995, 33 ILM 1144 (1994) |
| 1995 | *Memorandum of Agreement between the Government of the United States of America and the People's Republic of China regarding international trade in commercial launch services*, Jan 27, 1995, e.i.f. Jan 1, 1995 |
| 1996 | *Agreement between the Government of the United States of America and the Government of the Russian Federation to amend the "Agreement between the Government of the United States of America and the Government of the Russian Federation regarding international trade in commercial space launch services"*, Jan 30, 1996, e.i.f. Jan 30, 1996, 24 J. Space L. 183 (1996) |
| 1996 | *Agreement between the Government of the United States of America and the Government of Ukraine regarding international trade in commercial launch services*, Feb 21, 1996, e.i.f. Feb 21, 1996, 24 J. Space L. 187 (1996) |
| 1996 | *WTO Agreement on Government Procurement (GPA) of 1994*, e.i.f. Jan 1, 1996 <http://www.wto.org/wto/govt/agreement.htm> |
| 1996 | Global Mobile Personal Communications by Satellite (GMPCS) Memorandum of Understanding, Oct 23, 1996 |

<http://dettifoss.fcc.gov:8080/beta/doc-search/opasrchV2.cgi>

1996 *Declaration on international cooperation in the exploration and use of outer space for the benefit and in the interest of all states, taking into particular account the needs of developing countries*, U.N. General Assembly Resolution 51/122 (Dec 13, 1996), reproduced in Thaker, Jitendra S., The development of the outer space benefits declaration, XXII-I Annals of Air and Space L. 537-558 (1997) at 556-558 (App. 1)

1997 *WTO Agreement on Basic Telecommunications Services*, Feb 15, 1997, e.i.f. Feb 5, 1998 <http://www.wto.org/wto/services/tel.2.htm>

1997 *Loose-leaf system for the appendices to the Agreement [on Government Procurement]*, WTO doc GPA/W/35 (Feb 5, 1997)

1998 *Schedules of commitments and lists of article II exemptions to be annexed to the Fourth Protocol of the General Agreement on Trade in Services*, WTO (Jan 29, 1998) <http://www.wto.org/new/gbtoff.htm>

1999 *Satellite Technology Safeguards Agreement: Kazakhstan-Russia-United States*, U.S. State Dept Fact Sheet, Office of the Spokesman, Moscow, Jan 25, 1999, e.i.f. Jan 25, 1999

**U.S. legislation/regulations**

1976 *Arms Export Control Act of 1976*, Pub. L. 94-329, 90 Stat. 729 (Jun 30, 1976), 22 U.S.C. 2778

1979 *Export Administration Act of 1979*, (EAA) (lapsed on Aug 20, 1994) 50 U.S.C., app. 2401 *et seq.*

1979 *Export Administration Regulations (EAR or Commerce Regulations)*, 15 C.F.R. subchapter C

| | |
|---|---|
| 1984 | *Commercial Space Launch Act (H.R. 3942)*, Pub. L. 98-575, 49 U.S.C. 2601-2623 (Oct 30, 1984), subseq. codified as 49 U.S.C., Subtitle IX, Chapter 701 "Commercial Space Launch Activities" |
| 1985 | *Commercial space transportation; licensing process for commercial space launch activities, notice of policy and request for comments*, DOT, Office of the Secretary, 50 Fed. Reg. 7714 (Feb 25, 1985) |
| 1985 | *Commercial space transportation; third party liability insurance for commercial space launch activities* (requests for public comments), 50 Fed. Reg. 19280 (May 7, 1985) |
| 1985 | *Shuttle pricing policy for commercial and foreign users*, NASA authorization Act, FY 1986, Pub. L. 99-170, Dec 5, 1985, 99 Stat. 1012, Sec. 201-205 |
| 1986 | *Commercial space transportation; licensing regulations* (interim), 14 CFR Ch. III, 51 Fed. Reg. 6870 (Feb 26, 1986) |
| 1987 | *To facilitate commercial access to space, and for other purposes*, H.R. 3765, 100th Cong., 1st Sess., Dec 15, 1987 |
| 1988 | *Commercial space transportation; licensing regulations*, 14 CFR Ch. III, OCST, DOT (Docket No. 43810), Final rule (Apr 4, 1988) |
| 1988 | *Commercial Space Launch Act, Amendments* (H.R. 4399), Pub. L. 100-657 (Nov 15, 1988), 102 Stat. 3900 |
| 1989 | *International trade in commercial launch services; Guidelines for implementation of the Memorandum of Agreement with the People's Republic of China*, e.i.f. Mar 16, 1989, Fed. Reg. Vol. 54, No. 19, 4931-4933 (Jan 31, 1989) |
| 1989 | *Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act, FY 1990*, Pub. L. No. 101-162, 103 Stat. 988, |

1038, Sec. 610 (Nov 21, 1989) (restriction on the approval of export licenses for US-built satellites to the PRC for launch on Chinese-built launch vehicles)

1989 *International Traffic in Arms Regulation (ITAR)*, State Dept Reg. 108.840, 49 FR 47684 (Dec 6, 1984), Dept of State Publication 9793, Bureau of Political-Military Affairs, 22 CFR 120-130

1990 *U.S. Launch Strategy*, NSDD 254, Dec 27, 1986, NASA Authorization Act, FY 1991, Pub. L. 101-611, Nov 16,1990, 104 Stat. 3190, Sec. 112

1990 *Missile Technology Control Act*, National Defense Authorization Act, FY 1991, Pub. L. 101-510 (Nov 5, 1990), Title XVII (Sec. 1701-1704) "Missile Technology Controls", 104 Stat. 1738-1750

1990 *Foreign Relations Authorization Act, FY 1990 and 1991*, Pub. L. No. 101-246, 104 Stat. 15, Sec. 902 (Feb 16, 1990) (continued suspension of exports of US-built satellites to the PRC for launch on Chinese-built launch vehicles, subject to Presidential waiver)

1990 *Launch Services Purchase Act of 1990*, Pub. L. 101-611, NASA Authorization Act 1991 (Nov 16 1990)

1991 *Imposition and expansion of foreign policy controls, interim rule with request for public comments*, 15 CFR Parts 771, 773, 776, 779 and 799, Dept of Commerce, BXA, Docket 56 FR 40494 (Aug 15, 1991)

1991 *Prohibition on assistance to countries involved in transferor use of nuclear explosive devices (Glenn Amendment to the AECA)*, U.S.C. Title 22, Sec. 2799aa-1(b)

1991 *Department of Commerce, Justice, and Sate, the Judiciary, and Related Agencies Appropriations Act, FY 1992*, Pub. L. 102-140, 105 Stat. 824, Sec. 608 (Oct 28, 1991) (restriction on the approval of export licenses for US-built satellites to the PRC for launch on Chinese-built launch vehicles, subject to Presidential waiver)

1992 *State Dept, Final Rule Amending Sec. 38, Arms Export Control Act (transfer of certain commercial satellites to commerce export licensing control)*, (Oct 23, 1992)

1993 *Commercial communications satellites, Revisions to the Commercial Control List*, 15 CFR Part 799, DOC, Bureau of Export Administration, 58 FR 47322 (Sep 8, 1993)

1993 *Imposition of missile proliferation sanctions against entities in China and Pakistan*, Dept of State, Bureau of Political-Military Affairs, Public Notice 1857, Fed. Reg. Vol. 58, No. 165 (Aug 27, 1993)

1993 *ITAR* (Amendment 1993), Part II, 58 (No. 139), FR 39279-39326 (Jul 22, 1993), and 47636 (Sep 10, 1993)

1993 *Missile Technology Control Regime Guidelines Revised*, text of revisions, US Dept of State Dispatch 41-42 (1993)

1994 *Guidelines for U.S. implementation of the Agreement between the US and Russian Federation government regarding international trade in commercial space launch services*, USTR, Fed. Reg. Vol. 59, No. 47 (Mar 10, 1994)

1996 *ITAR* (Amendment 1996), 61 FR 48830 (Sep 17, 1996)

1998 *Notification of national implementing legislation*, Communication from the US, WTO, Committee on government procurement, GPA/23 (Jul 15, 1998)

1998 *Commercial Space Act of 1998*, (H.R. 1702, 105th Cong., 2nd Sess.) Pub. L. 105-303 (Oct 28, 1998)

1998 *Strom Thurmond National Defense Authorization Act for Fiscal Year 1999* (H.R. 3616), Pub. L. 105-261 (Oct 17, 1998)

1998 *Revocation of munitions exports licenses and other approvals for India*, State Dept, Bureau of Political-Military Affairs, Public notice 2825, Fed. Reg. Vol. 63, No. 97 (May 20, 1998)

1998 *Revocation of munitions exports licenses and other approvals for Pakistan*, State Dept, Bureau of Political-Military Affairs, Public notice 2835, Fed. Reg. Vol. 63, No. 116 (June 17, 1998)

1998 *Implementation of the Wassenaar Arrangement List of Dual-Use Items; Revisions to the Commerce Control List and Reporting under the Wassenaar Arrangement*, 63 FR 2452 (Jan 15, 1998) (to be codified at 15 CFR pts 732, 740, 742, 743, 744, 746, 762 and 774

1999 *Amendment to International Traffic in Arms Regulations (ITAR): Control of commercial communications satellites on the United States Munitions List*, eff. Mar 15, 1991 Fed. Reg. Vol. 64, No. 54 (Mar 22, 1999) at 13679-13681

## (Vice-)Presidential policies, directives, orders and statements

1983 *Commercialization of expendable launch vehicles*, NSDD 94 (May 16, 1983), Weekly Comp. Pres. Doc 712-714

1985 *Determination under Section 301 of the Trade Act of 1974*, The President, Memorandum for the United States Trade Representative of Jul 17, 1985, 50 Fed. Reg. 29631 (Jul 22, 1985)

1985 *Shuttle pricing for foreign and commercial users*, The White House, NSDD 181 of Jul 30, 1985, Fact Sheet (Aug 1, 1985)

1986 *Fourth Orbiter and the space program*, statement by the President, Aug 15, 1986, 22 Weekly Comp. Pres. Docs 1103-1104 (1986), formalized in U.S. Launch Strategy, NSDD 254 (Dec 27, 1986)

| | |
|---|---|
| 1988 | *The President's space policy and commercial space initiative to begin the next century*, Fact sheet, The White House, Office of the Press Secretary, Feb 11, 1988 (announcing and explaining the NSDD signed by the President on Jan 5, 1988) |
| 1989 | *National Space Policy*, Fact Sheet, The White House, Office of the Press Secretary (Nov 16, 1989) |
| 1990 | *Executive Order 12735 on chemical and biological weapons proliferation*, (Nov 16, 1990) |
| 1990 | *Commercial Space Launch Policy*, NSPD-2 (Sep 5, 1990) |
| 1991 | *U.S. Commercial Space Policy Guidelines*, The White House, Office of the Press Secretary (Feb 12, 1991) in Gorove, United States space law, national & international regulation, USA (1989) |
| 1991 | *President's report on MFN status for China*, White House, May 29, 1991, US Dept of State Dispatch 430-432 (Jun 17, 1991) |
| 1991 | *US trade with China*, White House, Fact Sheet, Office of the White House Press Secretary, Jun 16, 1991, U.S. Dept of State Dispatch 456 (Jun 24, 1991) |
| 1993 | *Joint statements on space cooperation, aeronautics, and earth observation*, Fact sheets, Office of the Vice President (Sep 2, 1993), in S. Gorove, United States Space Law, national & international regulation, USA (1989) |
| 1993 | *Non-proliferation and export control policy*, Fact sheet, White House, Office of the Press Secretary, Sep 27, 1993, US Dept of State Dispatch 676-677 (Oct 4, 1993) |
| 1993 | *Statement by the President on Most Favoured Nation for China*, White House Press Release (May 28, 1993) |
| 1994 | *National Space Transportation Policy*, NSTC-4, The White House, Office of |

| | | |
|---|---|---|
| | | Science and Technology Policy (Aug 5, 1994) |
| 1995 | | *Policy on the use of foreign excess ballistic missiles for space launch*, Fact sheet, White House, Office of Science and Technology Policy (Sep 29, 1995) |
| 1995 | | *Executive Order 12981*, (Dec 1995) (strengthening the role of various agencies in the review of dual-use export licenses) |
| 1996 | | *National Space Policy*, Fact sheet, The White House, National Science and Technology Council (Sep 19, 1996) |


**Testimonies, statements and speeches U.S. officials**


| | | |
|---|---|---|
| 1994 | Allgeier, Peter (USTR) | Statement, *Global trade in satellite and launch services*, Hearing, House Committee on Science, Space and Technology, Subcommittee on Space (Sep 29, 1994) |
| 1998 | Bacula, Gary R. (Commerce) | Remarks on commercial space transportation, Science, Technology and Space Subcommittee, Senate Commerce, Science, and Transportation Committee (Sep 23, 1998) |
| 1989 | Bartholomew (State) | *The Bush Administration's Nonproliferation Policy*, Statement, Mar 18, 1989, Doc. 21, American Foreign Policy 65-68 (1989) |
| 1994 | Davis, Lynn E. (State) | *Export controls and non-proliferation regimes in the post-cold war world*, statement, House, Feb 24, 1994, US Dept of State Dispatch 149-152 (Mar 14 1994) |
| 1994 | Davis, Lynn E. (State) | *Reforming export controls*, opening statement, State Dept press briefing, Apr 7, 1994, US Dept of State Dispatch 204 (Apr 11, 1994) |
| 1992 | Duelfer, Charles A. (State) | Statement, *Bilateral space cooperation with the former Soviet Union*, Hearing before the Subcommittee on Space, Housee Committee on Science, Space, and Technology (Mar 25, 1992) |
| 1997 | Eizenstat, Stuart | Remarks before the House Ways and |

| | | |
|---|---|---|
| | (State) | Means Trade Subcommittee, (Oct 23, 1997) |
| 1998 | Frankle, Edward A. (NASA) | Statement before the Subcommittee on Science, Technology and Space, Senate Committee on Commerce, Science and Transportation (Mar 5, 1998) |
| 1993 | Gibbons, John H. (OSTP) | Testimony before House Subcommittee on Space Science and Applications, (Oct 6, 1993) |
| 1994 | Gibbons, John H. (OSTP) | Statement before Subcommittee on Space, House Committee on Science, Space and Technology (Sep 20, 1994) |
| 1998 | Graham, Bob (Senate) | *Commercial Space Act of 1997*, Statement, Subcommittee on Science, Technology and Space, Senate Committee on Commerce, Science and Transportation (Mar 5, 1998) |
| 1991 | Hankin, Christopher G. (State) | *U.S. export control policy adapts to a changing world*, statement, Sep 24, 1991, US Dept of State Dispatch 752-754 (Oct 7, 1991) |
| 1998 | Holum, John D. (State) | *Special briefing on trip to China*, (Apr 9, 1998) |
| 1998 | Holum, John D. (State) | Testimony before the House International Relations Committee and National Security Committee, (Jun 18, 1998) |
| 1997 | Hunt, Reed (FCC) | Statement concerning WTO agreement on telecom services, (Feb 15, 1997) <http://www.fcc.gov/speeches> |
| 1999 | Kennard, William (FCC) | Statement before the Subcommittee on Commerce, Justice, State, and the Judiciary, Senate Committee on Appropriations (Mar 25, 1999) |
| 1998 | Majak, Roger (Commerce) | *Update 98 remarks*, (Jul 7, 1998) <http://www.bxa.doc.gov/press> |
| 1985 | Marshall, Harry R. (State) | *U.S. space programs: cooperation and competition from Europe*, address Apr 17, 1985, Dept of State Bull. 83-87 (Sep 1985) |
| 1998 | Oakley, Phyllis E. (State) | *Assessing current and projected threats to U.S. national security*, testimony before the Senate Select Committee on Intelligence (Jan 28, 1998) |

| | | |
|---|---|---|
| 1997 | Reinsch, William A. (Commerce) | Speech, Update West 1997 |
| 1997 | Reinsch, William A. (Commerce) | Testimony before Senate Committee on Governmental Affairs, Subcommittee on international Security, Proliferation, and Federal Services (Jun 11, 1997) |
| 1998 | Reinsch, William A. (Commerce) | *US/China technology transfer*, testimony before Joint Economic Committee (Apr 28, 1998) |
| 1998 | Reinsch, William A. (Commerce) | *The adequacy of Commerce Department satellite export controls*, testimony before the Subcommittee on international security, proliferation and federal services (Jun 18, 1998) |
| 1999 | Reinsch, William A. (Commerce) | *On reauthorization of the Export Administration Act*, testimony before the House International Relations Committee Subcommittee on International Economic Policy and Trade (Mar 3, 1999) |
| 1983 | Schneider, W. (State) | *Export control of high technology*, Dept of State Bull. 71-74 (Jun 1983) |
| 1988 | Wendt, Allan (State) | *U.S. export control policy*, address before the Atlantic Council of the United States, Jun 14, 1988, American Foreign Policy, Doc. 47, 126-129 (Jun 1988) |
| 1991 | Wendt, Allan (State) | *U.S. export controls in a changing global environment*, address before National Academy of Sciences symposium, Jun 11, 1991, US Dept of State Dispatch 480-482 (Jul 1, 1991) |

MEMBERSHIP INTERNATIONAL ORGANIZATIONS AND MULTILATERAL REGIMES

| | NATO | "Major non-NATO ally"* | MTCR | Wassenaar | EU | ESA |
|---|---|---|---|---|---|---|
| Belgium | × | | × | × | × | × |
| Canada | × | | × | × | | |
| Denmark | × | | × | × | × | × |
| France | × | | × | × | × | × |
| Germany | × | | × | × | × | × |
| Greece | × | | × | × | × | |
| Iceland | × | | × | | | |
| Italy | × | | × | × | × | × |
| Luxembourg | × | | × | × | × | |
| Netherlands | × | | × | × | × | × |
| Norway | × | | × | × | | × |
| Portugal | × | | × | × | × | |
| Spain | × | | × | × | × | × |
| Turkey | × | | × | × | | |
| U.K. | × | | × | × | × | × |
| U.S. | × | | × | × | | |
| Hungary | × | | × | × | | |
| Poland | × | | × | × | | |
| Tsjechia | × | | × | × | | |
| Australia | | × | × | × | | |
| Egypt | | × | | | | |
| Israel | | × | | | | |
| Japan | | × | × | × | | |
| Rep. of Korea | | × | | × | | |
| New Zealand | | × | × | × | | |
| Jordan | | × | | | | |
| Argentina | | × | × | × | | |
| Austria | | | × | × | × | × |
| Brazil | | | × | | | |
| Finland | | | × | × | × | × |
| Ireland | | | × | × | × | × |
| Russia | | | × | × | | |
| South Africa | | | × | | | |
| Sweden | | | × | × | × | × |
| Switzerland | | | × | × | | × |
| Romania | | | | × | | |
| Bulgaria | | | | × | | |
| Slovak Rep. | | | | × | | |
| Ukraine | | | × | × | | |

* See ITAR, Amendment of March 15, 1999, Ch. 4, (text to) notes 46 and 47.

# 1998 Worldwide Orbital Launch Events

| Date | Vehicle | Site | Payload | Operator | Manufacturer | Use | Coml Price | L | M |
|---|---|---|---|---|---|---|---|---|---|
| 1/6/98 | † Athena 2 | Spaceport Florida | Lunar Prospector | NASA | Lockheed Martin | Scientific | $21-28 M | S | S |
| 1/9/98 | v † Delta 2 7925 | CCAS | Skynet 4D | British Defense Ministry | Matra Marconi | Communications | $45-55 M | S | S |
| 1/22/98 | Shuttle Endeavour | KSC | STS 89 | NASA | Rockwell International | Crewed | | S | S |
| 1/22/98 | Shavit 1 | Palmachim | Offeq 4 | Israel Space Agency | Israel Aircraft Ind. (IAI) | Remote Sensing | | F | F |
| 1/29/98 | Soyuz | Baikonur | Soyuz TM-27 | RKK Energia | RKK Energia | Crewed | | S | S |
| 1/29/98 | Atlas 2A | CCAS | SM II 98-01 | DoD | Unknown | Intelligence | | S | S |
| 2/4/98 | v Ariane 44LP | Kourou | * Brazilsat B3 | Embratel | Hughes | Communications | $80-95 M | S | S |
| | | | * Inmarsat 3 F5 | Inmarsat | Lockheed Martin | Communications | | | |
| 2/10/98 | † Taurus 1 | VAFB | Geosat Follow-On | DoD | Ball Aerospace | Remote Sensing | $18-20 M | S | S |
| | | | * Celestis 2 | Celestis | Celestis | Other | | | |
| | | | * Orbcomms 03-04 | Orbcomm | Orbital (OSC) | Communications | | | |
| 2/14/98 | v † Delta 2 7420 | CCAS | * Globalstars 1-4 | Globalstar, Inc. | Space Systems/Loral | Communications | $45-55 M | S | S |
| 2/17/98 | Soyuz | Baikonur | * Spin 2 | Sovinformsputnik | Central Specialized Design Bureau (TsSKB) | Remote Sensing | | S | S |
| 2/18/98 | v † Delta 2 7920 | VAFB | * Iridiums 50,52-56 | Iridium, Inc. | Lockheed Martin | Communications | $45-55 M | S | S |
| 2/21/98 | H 2 | Tanegashima | COMETS 1 | NASDA | Toshiba | Communications | | F | F |
| 2/25/98 | † Pegasus XL | VAFB | SNOE | Univ. of Colorado/NASA | University of Colorado | Scientific | $12-15 M | S | S |
| | | | * Teledesic T1 | Teledesic | Orbital (OSC) | Communications | | | |
| 2/27/98 | v † Atlas 2AS | CCAS | * Intelsat 8A F6 | New Skies Satellites | Lockheed Martin | Communications | $90-105 M | S | S |
| 2/27/98 | v Ariane 42P | Kourou | * Hot Bird 4 | Eutelsat | Matra Marconi | Communications | $60-75 M | S | S |
| 3/15/98 | Soyuz | Baikonur | Progress M-38 | RKK Energia | RKK Energia | Mir Re-supply | | S | S |
| 3/16/98 | † Atlas 2 | CCAS | GBS 8 | DoD | Hughes | Communications | $62-85 M | S | S |
| 3/23/98 | Ariane 40 | Kourou | SPOT 4 | CNES | Matra Marconi | Remote Sensing | | S | S |
| 3/25/98 | v Long March 2C | Taiyuan | * Iridiums 51, 61 | Iridium, Inc. | Lockheed Martin | Communications | $20-25 M | S | S |
| 3/29/98 | v † Delta 2 7920 | VAFB | * Iridiums 55, 57-60 | Iridium, Inc. | Lockheed Martin | Communications | $45-55 M | S | S |
| 4/1/98 | Pegasus XL | VAFB | TRACE | NASA | NASA | Scientific | | S | S |
| 4/7/98 | v Proton | Baikonur | * Iridiums 62-68 | Iridium, Inc. | Lockheed Martin | Communications | $75-95 M | S | S |
| 4/17/98 | Shuttle Columbia | KSC | STS 90 | NASA | Rockwell International | Crewed | | S | S |
| 4/24/98 | v † Delta 2 7420 | CCAS | * Globalstars 6,8,14,15 | Globalstar, Inc. | Space Systems/Loral | Communications | $45-55 M | S | S |
| 4/28/98 | v Ariane 44P | Kourou | * BSAT 1 B | Broadcast Satellite Sys. | Hughes | Communications | $70-85 M | S | S |
| | | | * Nilesat 101 | Egypt Radio/TV Union | Matra Marconi | Communications | | | |
| 4/29/98 | Proton | Baikonur | Kosmos 2350 | Russian MoD | Unknown | Military | | S | S |
| 5/2/98 | v Long March 2C | Taiyuan | * Iridiums 69, 71 | Iridium, Inc. | Lockheed Martin | Communications | $20-25 M | S | S |
| 5/7/98 | Molniya | Plesetsk | Kosmos 2351 | Russia | NPO Lavochkin | Classified | | S | S |
| 5/8/98 | v Proton | Baikonur | * EchoStar 4 | EchoStar Satellite Corp. | Lockheed Martin | Communications | $75-95 M | S | S |
| 5/8/98 | Titan 4B/Centaur | CCAS | USA 139 | DoD | Unknown | Classified | | S | S |
| 5/13/98 | Titan 2 | VAFB | NOAA 15 | NOAA | Lockheed Martin | Meteorological | | S | S |
| 5/15/98 | Soyuz | Baikonur | Progress M-39 | RKK Energia | RKK Energia | Mir Re-supply | | S | S |
| 5/17/98 | v † Delta 2 7920 | VAFB | * Iridiums 70, 72-75 | Iridium, Inc. | Lockheed Martin | Communications | $45-55 M | S | S |
| 5/30/98 | Long March 3B | Xichang | ChinaStar 1A | Chinese Comm Ministry | Lockheed Martin | Communications | | S | S |
| 6/2/98 | Shuttle Discovery | KSC | STS 91 | NASA | Rockwell International | Crewed | | S | S |
| 6/9/98 | v † Delta 2 7925 | CCAS | * Thor 3 | Telenor A.S. | Hughes | Communications | $45-55 M | S | S |
| 6/16/98 | Cyclone 3 | Plesetsk | Kosmos 2352-57 | Russian MoD | NPO PM | Communications | | P | S |
| 6/18/98 | v † Atlas 2AS | CCAS | * Intelsat 8A F5 | Intelsat | Lockheed Martin | Communications | $90-105 M | S | S |
| 6/24/98 | Soyuz | Plesetsk | Kosmos 2358 | Russian MoD | Unknown | Military | | S | S |
| 6/25/98 | Soyuz | Baikonur | Kosmos 2359 | Russia MoD | Unknown | Military | | S | S |
| 7/1/98 | Molniya | Plesetsk | Molniya 3 | Russia PTT | NPO PM | Communications | | S | S |
| 7/4/98 | M 5 | Kagoshima | Nozomi | ISAS | NEC | Scientific | | S | S |
| 7/7/98 | v Shtil | Submarine | Tubsat-N & N1 | Berlin Technical Univ. | Berlin Technical Univ. | Communications | $0.1-0.2 M | S | S |
| 7/10/98 | Zenit 2 | Baikonur | Resurs-O1 N4 | Russia | VNII Elektromekhaniki | Remote Sensing | | S | S |
| | | | FASat-Bravo | Chilean Air Force | Surrey Sat. Tech. Ltd. | Remote Sensing | | | |
| | | | SAFIR 2 | OHB System | OHB System | Communications | | | |
| | | | * TMSAT 1 | Thai MicroSatellite Co. | Surrey Sat. Tech. Ltd. | Remote Sensing | | | |
| | | | WestPac | ElectroOptics Sys./RKA | Unknown | Remote Sensing | | | |
| | | | Tech Sat 2 | Asher Space Res. Inst. | Technion Tech. Institute | Development | | | |

v Denotes commercial launch, defined as a launch that is internationally competed or whose primary payload is commercial in nature.
† Denotes FAA-licensed launch.
* Denotes a commercial payload, defined as a spacecraft which serves a commercial function or is operated by a commercial entity.
L/M refers to the outcome of the launch and mission: S = success, P = partial success, F = failure.

| Date | Vehicle | Site | Payload | Operator | Manufacturer | Use | Coml Price | L | M |
|---|---|---|---|---|---|---|---|---|---|
| 7/18/98 | Long March 3B | Xichang | Sinosat 1 | EuraSpace/Sinosatcom | Aerospatiale | Communications | | S | S |
| 7/28/98 | Zenit 2 | Baikonur | Kosmos 2360 | Russian MoD | NPO Yuzhnoye | Intelligence | | S | S |
| 8/2/98 | v † Pegasus XL/HAPS | Wallops | * Orbcomms 13-20 | Orbcomm | Orbital (OSC) | Communications | $12-15 M | S | S |
| 8/12/98 | Titan 4/Centaur | CCAS | USA 1998-08 | DoD | Unknown | Classified | | F | F |
| 8/13/98 | Soyuz | Baikonur | Soyuz TM-28 | RKK Energia | RKK Energia | Crewed | | S | S |
| 8/20/98 | v Long March 2C | Taiyuan | * Iridiums 76, 78 | Iridium, Inc. | Lockheed Martin | Communications | $20-25 M | S | S |
| 8/25/98 | v Ariane 44P | Kourou | * ST 1 | Singapore Telecom | Matra Marconi | Communications | $70-85 M | S | S |
| 8/26/98 | v † Delta 3 | CCAS | * Galaxy 10 | PanAmSat | Hughes | Communications | $75-90 M | F | F |
| 8/30/98 | v Proton | Baikonur | * Astra 2A | SES | Hughes | Communications | $75-95 M | S | S |
| 8/31/98 | Taepo Dong 1 | Musudan-ri | Kwangmyongsong | North Korea | Unknown | Unknown | | F | F |
| 9/8/98 | v † Delta 2 7920 | VAFB | * Iridiums 77, 79-82 | Iridium, Inc. | Lockheed Martin | Communications | $45-55 M | S | S |
| 9/10/98 | v Zenit 2 | Baikonur | * Globalstars 5, 7, 9-13, 16-20 | Globalstar, Inc. | Space Systems/Loral | Communications | $30-40 M | F | F |
| 9/16/98 | v Ariane 44LP | Kourou | * PAS 7 | PanAmSat | Space Systems/Loral | Communications | $80-95 M | S | S |
| 9/23/98 | v † Pegasus XL/HAPS | Wallops | * Orbcomms 21-28 | Orbcomm | Orbital (OSC) | Communications | $12-15 M | S | S |
| 9/29/98 | Molniya | Plesetsk | Molniya 1T-1998 | Russia PTT | NPO PM | Communications | | S | S |
| 10/3/98 | Taurus 1 | VAFB | STEX | NRO | Lockheed Martin | Development | | S | S |
| 10/5/98 | v Ariane 44L | Kourou | * Eutelsat W2 | Eutelsat | Aerospatiale | Communications | $90-110 M | S | S |
| | | | * Sirius 3 | Nordiska Sat. (NSAB) | Hughes | Communications | | | |
| 10/9/98 | v † Atlas 2AS | CCAS | * Hot Bird 5 | Eutelsat | Matra Marconi | Communications | $90-105 M | S | S |
| 10/20/98 | † Atlas 2A | CCAS | GBS 9 | DoD | Hughes | Communications | $62-85 M | S | S |
| 10/21/98 | Ariane 5 | Kourou | ARD | ESA | Aerospatiale | Development | | S | S |
| | | | Maqsat 3 | Kayser-Threde | Kayser-Threde | Test | | | |
| 10/22/98 | v † Pegasus 1 | CCAS | SCD 2 | INPE | INPE | Communications | $10-14 M | S | S |
| 10/24/98 | Delta 2 7326 | CCAS | Deep Space 1 | NASA | Spectrum Astro, Inc. | Development | | S | S |
| | | | Sedsat-1 | NASA | Univ Alabama Huntsville | Communications | | | |
| 10/25/98 | Soyuz | Baikonur | Progress M-40 | RKK Energia | RKK Energia | Mir Re-supply | | S | S |
| | | | Sputnik 41 | AMSAT France | AMSAT France | Communications | | | |
| 10/28/98 | v Ariane 44L | Kourou | * AfriStar 1 | WorldSpace, Inc. | Alcatel Espace | Communications | $90-110 M | S | S |
| | | | * GE 5 | GE Americom | Aerospatiale | Communications | | | |
| 10/29/98 | Shuttle Discovery | KSC | STS 95 | NASA | Rockwell International | Crewed | | S | S |
| | | | Spartan 201-04R | NASA | NASA | Scientific | | | |
| | | | PANSAT 1 | Naval Postgrad. School | Naval Postgrad. School | Communications | | | |
| 11/4/98 | v Proton | Baikonur | * PAS 8 | PanAmSat | Space Systems/Loral | Communications | $75-95 M | S | S |
| 11/6/98 | v † Delta 2 7920 | VAFB | * Iridiums 83-87 | Iridium, Inc. | Lockheed Martin | Communications | $45-55 M | S | S |
| 11/20/98 | Proton | Baikonur | Zarya | International | Khrunichev | Space Station | | S | S |
| 11/22/98 | v † Delta 2 7925 | CCAS | * Bonum 1 | Media Most | Hughes | Communications | $45-55 M | S | S |
| 12/4/98 | Shuttle Endeavour | KSC | STS 88 | NASA | Rockwell International | Crewed | | S | S |
| | | | MightySat 1 | DoD | Orbital (OSC) | Development | | | |
| | | | SAC A | NASA | Bariloche | Development | | | |
| | | | Unity | NASA | NASA | Space Station | | | |
| 12/4/98 | v Ariane 42L | Kourou | * SatMex 5 | Telecomm Mexico | Hughes | Communications | $75-90 M | S | S |
| 12/5/98 | Pegasus XL | VAFB | SWAS | Smithsonian Astro. Obs. | NASA | Scientific | | S | S |
| 12/10/98 | Cosmos | Plesetsk | Nadezhda 5 | Russia | NPO PM | Navigation | | S | S |
| | | | Astrid 2 | Swedish Natl Space Brd | Swedish Space Corp. | Scientific | | | |
| 12/11/98 | Delta 2 7425 | CCAS | Mars Climate Orbiter | NASA | Lockheed Martin | Scientific | | S | S |
| 12/19/98 | v Long March 2C | Taiyuan | * Iridiums 92, 93 | Iridium, Inc. | Lockheed Martin | Communications | $20-25 M | S | S |
| 12/21/98 | v Ariane 42L | Kourou | * PAS 6B | PanAmSat | Hughes | Communications | $75-90 M | S | S |
| 12/24/98 | Cosmos | Plesetsk | Kosmos 2361 | Russia | NPO Lavochkin | Navigation | | S | S |
| 12/30/98 | Proton | Baikonur | Kosmos 2362-64 | Russian MoD | NPO PM | Navigation | | S | S |

v Denotes commercial launch, defined as a launch that is internationally competed or whose primary payload is commercial in nature.
† Denotes FAA-licensed launch.
* Denotes a commercial payload, defined as a spacecraft which serves a commercial function or is operated by a commercial entity.
L/M refers to the outcome of the launch and mission: S = success, P = partial success, F = failure.

Commercial space transportation: 1998 Year in review, FAA Associate Administrator for Commercial Space Transportation (AST) (Jan 1999).

## SPACE CHRONOLOGY

| | | | |
|---|---|---|---|
| 1957 | Oct | 4 | Sputnik 1 launched from Baikonur cosmodrome, Kazakhstan |
| 1958 | Oct | 1 | Birth of NASA |
| 1961 | Apr | 12 | Yuri Gagarin launched from Baikonur |
| | May | 21 | President Kennedy announces the Apollo program |
| 1967 | Oct | 4 | Sputnik's 10 year anniversary |
| | | | Attendance space law lectures Leiden University (Goedhuis) |
| 1969 | Jul | 20 | Lunar landing Apollo 11 |
| 1972 | Jan | | President Nixon's decision to develop U.S. space transportation system (STS) 'Space Shuttle' program |
| | Apr | 16 | Launch Apollo 17 (sixth and final lunar landing) |
| | Oct | 9 | U.S. Launch Assurance Policy |
| 1973 | Jul | 31 | ESC decision to develop Ariane launcher |
| | Sep | 21 | Ariane Development Arrangement (concluded by ESRO/certain Eur governments) |
| 1975 | Jul | 15 | Apollo-Soyuz link-up |
| 1978 | Oct | 10 | Civil and further national space policy, Presidential Directive/ NSC - 42 |
| 1979 | Dec | 24 | First launch of Ariane (L01) |
| 1980 | Jan | 14 | Ariane Production Declaration |
| | Mar | 26 | Formation of Arianespace |
| | Oct | 30 | ESA (formal birthdate) |
| 1981 | Jan | | President Reagan takes office |
| | Apr | 12 | First flight of Space Shuttle (Columbia-STS 1) |
| | Nov | 2 | Arianespace first commercial launch contract signed with GTE Spacenet (U.S.) |
| 1982 | Jul | 4 | National space policy, Presidential Directive/ NSC - 42, incl. establishment Senior Agency Group on Space, "SIG-Space" |
| | | | Return to earth of Space Shuttle Columbia (4th flight): shuttle declared operational |

| | | | |
|---|---|---|---|
| 1983 | Mar | 29 | Launch of SDI program (Pres. Reagan's "Star Wars" speech) |
| | May | 16 | Commercialization of expendable launch vehicles, National Security Decision Directive (NSDD) 94 |
| 1984 | Jan | 25 | Pres. Reagan announces Space Station program (State of the Union) |
| | Feb | 24 | Commercial expendable launch vehicle activities, Executive Order 12,465 designating DOT as launch lead agency |
| | | | Establishment DOT Office of Commercial Space Transportation (OCST) |
| | May | 25 | Transpace Carriers Inc. (TCI) Sec. 301, Trade Act 1974, complaint against Arianespace |
| | Oct | 30 | Commercial Space Launch Act |
| 1985 | Jan | 2 | Application of SSI (with OCST) for approval of 60 launches of human 'cremains' |
| | Feb | 13 | OCST approval of SSI application |
| | Jul | 17 | Determination under Section 301 [re TCI complaint], Memorandum for the United States Trade Representative, The White House |
| | Jul | 30 | Shuttle pricing for foreign and commercial users, NSDD 181 |
| 1986 | Jan | 28 | Explosion Space Shuttle Challenger (STS-25) |
| | | | Pres. Reagan's announcement of National Aerospace Plane program (State of the Union) |
| | Dec | 27 | U.S. launch strategy, NSDD 254 (based on Presidential Directive Aug 1986) |
| 1987 | Nov | | ESA member countries approve Ariane 5 development |
| 1988 | Jan | 5 | Presidential Directive on National Space Policy (Reagan) |
| | Feb | 11 | The President's space policy and commercial space initiative to begin the next century, Fact Sheet, the White House Office of the Press Secretary (based on NSDD Jan 5, 1988) |
| | Feb | 12 | Model expendable launch vehicle commercialization agreement, Dept of the Air Force |
| | Jul | 26 | The Community and space, communication from the European Commission to the Council and the European Parliament |
| | Sep | 9 | Administration's decision to grant license for AUSSAT/Asiasat export to China, subject to conditions |

| | | | |
|---|---|---|---|
| | Sep | 23 | |
| | | 27,28 | Cong. Hearings on AUSSAT & Asiasat launches with Chin. Long March |
| | Sep | 29 | Resumption of shuttle flights (STS-26) |
| 1989 | Jan | 26 | U.S. - Chinese launch trade agreement (M.o.U) |
| | Mar | 16 | Approval export licenses Asiasat & AUSSAT: entry into force U.S.-Chinese M.o.U. |
| | Jun | 4 | Tiananmen Square, Beijing |
| | Nov | 2 | National space policy, Presidential Directive (Bush) |
| 1990 | Jan | | Establishment within State Dept of the Center for Defense Trade |
| | Sep | 5 | Commercial space launch policy, Presidential Directive (Bush) |
| | | | U.S. Missile Technology Control Act |
| | | | Launch Services Purchase Act |
| | Nov | 16 | Executive Order 12735 on chemical and biological weapons proliferation, incl. directive for additional export control measures |
| 1991 | Feb | 12 | U.S. commercial space policy guidelines, White House Office of the Press Secretary |
| | Mar | 9 | National Space Policy Directive 6: Space Exploration Initiative (Bush) |
| | Apr | 30 | Approval exports AUSSAT & Freja satellites to China for Long March launch |
| 1992 | | | Renewal Ariane Production Declaration of 1980 |
| | May | 6 | US sanctions ISRO & Glavkosmos |
| | May | 18 | 100th Arianespace launch contract |
| | Sep | 23 | The European Community and space, communication from the European Commission to the Council and the European Parliament |
| | Oct | 23 | ESA Council resolution on European space policy on launch services |
| 1993 | Jul | 22 | EC - Russia launch trade agreement (proposed text) |
| | Sep | 2 | Signing of US-Russia launch trade agreement and missile export control agreement |
| | Sep | 27 | Space launch and missile exports, Presidential Decision Directive ("non-proliferation and export control policy") (Clinton) |
| 1994 | Feb | 4 | Launch of Japanese H-2 rocket |
| | Mar | 31 | Demise of COCOM |
| | Aug | 5 | National Space Transportation Policy (Clinton) |

| | | | |
|---|---|---|---|
| | Nov | 15 | GATS decision European Court of Justice |
| 1995 | Mar | 13 | New launch trade agreement US-China |
| | Jun | | Lockheed Martin & Khrunichev form International Launch Services (ILS) to market Proton & Atlas |
| | Dec | 14 | US-Ukraine launch trade agreement |
| | Dec | 19 | 28 countries, incl. the former COCOM members and Russia conclude new multilateral export control arrangement (Wassenaar) |
| 1996 | Jan | 30 | New US-Russia launch trade agreement |
| | Jun | 4 | Failure Ariane 5 maiden flight |
| | Jul | 17 | Starsem agreement signed in Moscow by French & Russian governments |
| | Sep | 19 | National Space Policy (Clinton) |
| | Oct | 1 | United Space Alliance (Lockheed Martin + Rockwell Int'l) assume responsibility for day-to-day space shuttle processing |
| | Dec | 4 | The European Union and Space: Fostering applications, markets and industrial competitiveness, Communication from the Eur. Commission to the Council and the Eur. Parliament |
| 1997 | Apr | 2 | Total objects in earth orbit 8.546. of which 2.313 satellites and 6.233 debris (US Space Command |
| | Sep | 23 | 100th Ariane launch |
| 1998 | Oct | 17 | Strom Thurmond National Defense Authorization Act |
| | Oct | 28 | Commercial Space Act |
| 1999 | Feb | 22 | U.S. Government disapproves sale of Hughes commercial communications satellite to APMT |
| | Mar | 15 | Transfer of commercial communications satellites from CCL to USML |
| | | | E.i.f. of ITAR amendments |
| | Sep | 30 | Oral defense "The international trade in launch services, the effects of U.S. laws policies and practices on its development', Leiden University |

CURRICULUM VITAE H. PETER VAN FENEMA

| | |
|---|---|
| May 14, 1944 | - Born in Zeist, the Netherlands |
| 1963-1969 | - Law studies, Leiden University |
| 1969-1971 | - Assistant legal advisor, Air Staff, Royal Dutch Air Force, The Hague |
| 1971-1973 | - Post-graduate studies air and space law, McGill University, Montreal<br>- LL.M. |
| 1974-1997 | - KLM Royal Dutch Airlines, Foreign Relations and Cooperation Bureau<br>- 1990-1997 Vice president foreign relations |
| Present functions | - Adjunct Professor of Law, McGill University, Institute of Air and Space Law<br>- Member, Board of Directors, International Institute of Air and Space Law, Faculty of Law, Leiden University<br>- Member, Board of Editors *Air and Space Law* (Kluwer Law International)<br>- Air Transport Expert for Mediation/Dispute Resolution, ICAO, Montreal |