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Barbara A. Stone

Director of Plans, Policy & Evaluation Division, Office of Commercial Programs, National Aeronautics and Space Administration, Washington, DC 20546

John L. Emond

Plans, Policy & Evaluation Division, Office of Commercial Programs, National Aeronautics and Space Administration, Washington, DC 20546

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DEVELOPMENT OF A COMMERCIAL EXPENDABLE LAUNCH VEHICLE INDUSTRY

Barbara A. Stone, Ph.D.
Director of Plans, Policy & Evaluation Division
Office of Commercial Programs
National Aeronautics and Space Administration
Washington, DC 20546

and

John L. Emond
Plans, Policy & Evaluation Division
Office of Commercial Programs
National Aeronautics and Space Administration
Washington, DC 20546

POLICY BACKGROUND

A ground rule in the development of the Shuttle was that expendable launch vehicles (ELV) would be phased out and eventually terminated and that the Shuttle would be the single transportation system for the nation. Subsequently, President Reagan announced a National Space Policy on July 4, 1982, which called for continuation of U.S. ELV activities until the Shuttle was fully operational.

Several private firms expressed interest in providing ELV services on a commercial basis. This interest resulted in the 1983 Commercialization of Expendable Launch Vehicles Policy which laid the foundation for a U.S. commercial ELV industry. This policy declared that the U.S. Government fully endorsed and would facilitate commercial operations of ELV's by the U.S. private sector in order to ensure a flexible and robust U.S. launch posture to maintain space transportation leadership. However, it also stated that the Shuttle would also be available to all authorized users.

A National Space Strategy was issued in 1984, implementing the National Policy on Commercial Use of Space. This policy identified the encouragement of commercial ELV's as one of the nation's high priority national space goals.

As a means of coordinating the development of commercial ELV operations, the 1984 Commercial Space Launch Act (Public Law 98-575) designated the Department of Transportation as the lead agency within the Federal Government for encouraging and facilitating commercial ELV activities by the U.S. private sector, as well as regulating those activities. This Act provides that the U.S. Government will not subsidize the commercialization of ELV's, but will price the use of its facilities, equipment, and services consistent with the goal of encouraging viable commercial ELV activities.

The loss of Challenger in 1986 resulted in a number of space policy re-examinations. In August 1986, the White House announcement that NASA would no longer routinely launch private commercial communications satellites which are capable of being launched on ELV's. Exceptions to this policy are payloads important to national security and foreign policy. This decision has led to an increased market for private ELV's, both domestic and worldwide.

Later that same year NASA was directed to contract for ELV services, rather than hardware, when such services are required for NASA missions. These ELV decisions represent the most significant policy changes in the history of the space program.

NASA SUPPORT TO COMMERCIAL ELV'S

NASA endorses the development of U.S. private sector launching capabilities and has proceeded to transfer authority to the private sector to use NASA-controlled facilities and capabilities for commercial launchings. NASA facilitates the private sector operations of ELV's by identifying the necessary support and determining the transition means. Agreements are negotiated to provide assistance, services, and facilities as may be available. A number of these agreements either have been executed or are in various stages of negotiation.

NASA employs two basic types of agreements in the commercial ELV area. Under the first type, called an "umbrella" agreement, the parties agree to the general scope of their commitments. This agreement includes a general description of NASA resources which would be made available on a noninterference basis, means of handling disputes and other necessary understandings. Under the authority of the umbrella agreement, NASA field installations can enter into secondary "subagreements" which specify the NASA facilities and equipment which will be made available and the specific charges for use of such equipment. These subagreements are negotiated by the NASA field installations having responsibility for the facilities and equipment to be used.

NASA provides support in both the privatization and the commercialization of ELV's. Since there is at times some confusion concerning the terms "privatization" and "commercialization," it is important to define them at this point. "Privatization" is defined as shifting to the private sector for the acquisition of goods or services required to conduct NASA programs. In the context of ELV's, privatization is turning over to the private sector ELV's which were developed under past NASA contracts. ELV's in this category include Atlas/Centaur, Delta, and Scout.

"Commercialization" is defined as encouraging and facilitating domestic private sector applications of the products, knowledge, or services resulting or derived from space activities. In the context of ELV's, commercialization is the development of ELV's by the private sector. An ELV in this category is the Conestoga launch vehicle.

As of the date of this paper (January 1988), NASA has executed one privatization and one commercialization ELV agreement, and a number of others are in various stages of negotiation and coordination.

ELV PRIVATIZATION

General Dynamics - Atlas/Centaur

NASA published a Request for Expressions of Interest (REI) for privatization of the Atlas/Centaur which appeared in the June 21, 1983, edition of Commerce Business Daily (CBD). This led to publication of a Request for Proposals (RFP) which appeared on September 9, 1983. General Dynamics (GD) was the only responder to the RFP, submitting their original proposal in November 1983.

When the agreement was signed on March 26, 1987, it became the first U.S. Government agreement transferring operation of a Government-developed ELV to the private sector. A subagreement is being developed to incorporate the use of specific services and property including: security and communications; payload calibration; institutional support; and technical assistance for payload processing and pre-launch mission management.

Since signing the agreement, GD has announced that they will start construction of 18 commercial Atlas G/Centaurs. The vehicle, which will be commercially available in 1989, can deliver a 5,200-pound payload to geostationary orbit. The company also announced future plans to develop an advanced version which can send 6,650 pounds to geostationary orbit.

McDonnell Douglas Astronautics Corporation (MDAC) - Delta

NASA published an REI and an RFP for the Delta at the same time as the Atlas/Centaur. Transpace Carriers, Incorporated (TCI), was the only responder for the Delta. A Preliminary Agreement was signed with TCI in April 1984. This preliminary agreement expired (after six extensions) in May 1986. Subsequently NASA made the decision to deal only with manufacturers of its ELV's when entering into privatization agreements. Negotiations with MDAC were initiated in October 1986.

MDAC announced its decision to offer the Delta launch vehicle after winning the Medium Launch Vehicle (MLV) contract from the U.S. Air Force in January 1987. Since NASA has agreed to turn over the Delta program to the Air Force the current negotiations with MDAC are only for support to their commercial operations at NASA John F. Kennedy Space Center (KSC).

NASA support of MDAC's commercial ELV program will be in the areas of payload processing and encapsulation at KSC as well as NASA-accountable government support at Cape Canaveral Air Force Station. Because NASA transferred to the Air Force program responsibility for Delta ELV production, government production tooling and equipment support will be provided through a separate agreement between the Air Force and MDAC.

LTV - Scout

Within five years NASA expects to complete its production program of the Scout sounding rocket. During this period, the manufacture of Scout, LTV Missiles and Electronics Group, will be authorized through a negotiated agreement to market the Scout on a commercial basis. Scout launches take place at NASA's Wallops Flight Facility, Virginia. The Scout rocket, used since the early 1960's can place up to 300 pounds into a circular orbit of approximately 300 nautical miles.

Martin Marietta - Titan

NASA is also negotiating with Martin Marietta, which builds the Titan series of ELV's, originally developed under U.S. Air Force contract. Under the proposed agreement, NASA would support Martin Marietta's commercial operations at KSC. NASA support to Martin Marietta will be comparable to that provided to MDAC and will be in the areas of payloads processing and encapsulation.

ELV COMMERCIALIZATION

Space Services, Incorporated (SSI) - Conestoga

An agreement was signed last year with SSI, allowing use of NASA facilities for launch of the privately-developed Conestoga launch vehicle. The Conestoga II can deliver a 500-pound payload to geostationary orbit or up to 3,000 pounds into low Earth orbit.

SSI recently announced that it has secured its first contract for launch services. The contract calls for the Conestoga II to orbit a series of five navigational satellites intended for use by commercial customers. The target for the initial launch is late 1988.

USE OF COMMERCIAL ELV'S FOR NASA LAUNCHES

NASA completed a mixed-fleet study in late 1986 which shows a need for more than 30 ELV's prior to 1995 for launching approved and planned NASA missions. This requirement should provide a strong impetus for the new industry.

In May 1987, NASA announced a multiphased implementation plan for fulfilling NASA ELV needs identified in the mixed-fleet study. In Phase I, NASA will

procure services noncompetitively to support critical spacecraft launch needs. The missions are mainly scientific missions whose spacecraft are in existence and which, therefore, can be transferred to an ELV with minimum impact. Services for these missions will be procured commercially where the required ELV is commercially available. Launch services for types of ELV's the Department of Defense (DOD) currently has under contract with industry may be acquired through DOD.

Beyond Phase I, NASA intends to procure launch services competitively from the private sector whenever they are available on a commercial basis. NASA plans to contract with industry for multiyear service contracts for each class of ELV requirement. Launch services for specific missions will be ordered on an annual basis as new programs are approved and funded. This approach will provide industry with the long-term business base needed for sustained operations while at the same time assuring NASA of quantity-buy cost savings and scheduling flexibility when it is required.

CONCLUSION

The fledgling U.S. commercial ELV industry represents a major milestone for business investment in space, much like the first communications satellite companies whose goal was to develop a market for satellite-based breakthroughs in communication technology. Competition from foreign launch vehicles will be a clear and growing challenge to these emerging commercial endeavors. ELV firms, for years under contract to the U.S. Government, have mastered the technology required to send payloads into orbit. The challenge to these firms in the last decade of the 20th century will be to demonstrate the commercial viability of private sector space launches. NASA must, and will, be there to help.