Assembly of Western European Union

DOCUMENT 1588 4 November 1997

FORTY-THIRD SESSION

Transatlantic cooperation on European anti-missile defence – Part II

REPORT

submitted on behalf of the Technological and Aerospace Committee
by Mr Atkinson, Rapporteur

ASSEMBLY OF WESTERN EUROPEAN UNION
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[1] Adopted unanimously by the Committee.

[2] *Members of the Committee*: Mr *Marshall* (Chairman); MM Lenzer, *Atkinson* (Vice-Chairmen), Mrs *Aguiar*, Mr *Arnau*, Mrs Blunck, Mrs Bribosia-Picard, MM Cherribi, *Cunliffe*, *Diana*, Mrs *Durrieu*, MM *Etherington*, Feldmann, Fillon, Mrs Gelderblom-Lankhout, MM *López Henares*, Lorenzi (Alternate: *Speroni*), MM Luís, *Martelli*, Olivio, Polydoras, Probst, Ramírez Pery, Sandrier (Alternate: *Le Grand*), MM Staes, *Theis*, Valleix, Mrs *Zissi*

Associate members: MM *Kıratglıoglu, Yürür.*

N.B. *The names of those taking part in the vote are printed in italics.*

Draft Recommendation

on transatlantic cooperation on European anti-missile defence

The Assembly,

(i) Recalling the need it has repeatedly expressed for the creation of a space-based surveillance and early-warning system, on the basis of which it would be possible to consider the option of a European anti-missile defence system;

(ii) Bearing in mind that steps, albeit modest, taken within our own Organisation to develop a European space-based observation system, nevertheless represent progress;

(iii) Noting that there has been no progress whatsoever as far as European early-warning and anti-missile defence systems are concerned;

(iv) Considering the reality of the threat from theatre missiles and also the emergent threat from medium-range missiles;

(v) Taking account, moreover, of the existing threat from missiles armed with chemical or biological warheads and of the fact that a nuclear threat is foreseeable in the medium term,

(vi) Bearing in mind other emergent threats such as, for example, that of land-attack cruise missiles (LACMs);

(vii) Welcoming the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies which, together with other existing regimes, can provide for genuine control over behaviour that represents or might come to represent a proliferation threat and a danger to security,

(viii) Noting, however, that all such regimes unfortunately cannot completely eradicate the risks and threats they are intended to counter,

(ix) Welcoming the existence of the Franco-Italian FSAF (Future Surface-to-Air Family) programme, known as Aster, for which approval has just been given for the industrialisation and production stage,

(x) Noting, furthermore, work carried out by the United States and Canada in the anti-missile defence field,

(xi) Welcoming also the MEADS (Medium Extended Air-Defence System) programme involving the United States, Germany and Italy,

(xii) Considering the studies carried out by NATO in the areas of Extended Air Defence and Theatre Missile Defence;

(xiii) Recalling, finally, Recommendation 571 on transatlantic cooperation on European anti-missile defence,

RECOMMENDS THAT THE COUNCIL

1. Pursue with far greater urgency than is currently the case its discussions on the development of a common anti-ballistic missile defence system;

2. Keep the Assembly informed of progress on the study on European anti-missile defence entrusted to the Special Working Group;

3. Bring together studies on anti-missile defence being conducted at national level by various member countries of the Organisation;

4. Examine the possibility of cooperation between the United States and Europe over anti-missile defence, especially theatre missile defence;

5. Urge France to rejoin the MEADS project and the United Kingdom to consider joining it under its Strategic Defence Review,

6. Keep the Assembly informed of progress on studies on the development of a European space-based observation system;

7. Inform the Assembly whether, in accordance with paragraph 38 of the Noordwijk Declaration, an independent early-warning capability has been studied and, if so, what conclusions have been reached;

8. Establish contact between WEU and the BMDO forthwith, so that all the above matters can be studied jointly.

Explanatory Memorandum

(submitted by Mr Atkinson, Rapporteur)

I. Introduction

1. The present report is intended as a follow-up to the research undertaken by our Committee, starting in 1992, on Europe's need to acquire an anti-missile defence system.

2. Assembly Document 1339 (6 November 1992, "Anti-ballistic Missile Defence", Rapporteur: Mr Lenzer) and the Symposium on Anti-missile Defence for Europe (Rome, April 1993) highlighted the need to create a space-based surveillance and early-warning system on the basis of which it would be possible to consider the option of an anti-missile defence system.

3. Such a system will need to take account, first, of European requirements and also research already undertaken in this field by the United States.

4 The first part of the present report (Assembly Document 1435, 9 November 1994), dealing with transatlantic cooperation on anti-missile defence, was drafted by your Rapporteur, after a visit by our Committee to the United States, where contacts of significant interest were made with the political and military authorities and with the US defence industry

5 In the ensuing Recommendation 571 on "Transatlantic cooperation on European anti-missile defence", the Assembly first asked to be kept informed by the WEU Council about progress made on the study on European anti-missile defence being conducted by the Special Working Group.

6. In its Reply, the Council stated that the study, entitled "A preliminary analysis of the risks of missile technology proliferation on the southern flanks of western Europe", had been temporarily suspended

7. The Council moreover recalled paragraph 25 of the "Preliminary conclusions on the formulation of a common defence policy", which stated that "WEU should strengthen its operational capability and develop military and operational aspects of security such as . the question of European anti-missile defence"

8. Lastly, the Council expressed confidence that work on the subject would soon be resumed by the Special Working Group. As far as your Rapporteur is aware, three years on, there has been no change whatsoever in the position.

9. The replies to the other recommendations made by the Assembly in Recommendation 571 were hardly more encouraging. Thus in relation to the request for contacts to be established between WEU and the Ballistic Missile Defence Organisation (BMDO) the Council replied that it would consider the issue once discussions on the possibilities of cooperation between the United States and Europe on anti-missile defence had been finalised.

10 Our colleague, Mr Blaauw, in his address to the 10th International Conference on Theatre Missile Defence (TMD) at Eilat on 23 June 1997, stated that "no ballistic missile risk analysis has yet been made and the WEU Council's Special Working Group has not conducted the study on European anti-missile defence which had been asked for. Neither has any serious study taken place regarding a European early-warning system".

11. In the meantime, our US allies have continued to make progress in terms of both theory and practice Recently, Mr Kaminsky, Defence Under-Secretary for Acquisition and Technology at the US Department of Defence, addressed the House Committee on National Security's Military Research and Development Subcommittee on the subject of ballistic missile defence (6 March, 1997)

12 He noted that the in-theatre threat to the allies and for deployed US forces abroad was real and increasing In his view thousands of short-range missiles were at present deployed on hundreds of missile launchers in at least 30 countries, some of which might be considered hostile The threat was here and now, widespread and should be taken very seriously

13. In parallel, there was another emergent threat from medium-range missiles According to Mr Kaminsky, some countries were developing their own medium-range missiles (he referred

particularly to North Korea and its No Dong missile); others, among them Iran, had already bought this missile or were intending to do so.

14. There was also the further threat of missiles armed with chemical and biological warheads. In Mr Kaminsky's opinion, this could come from North Korea, Iran and Libya, countries with extensive chemical weapons programmes.

15. A nuclear threat was also predictable in the medium term; Iraq and North Korea were in fact close to acquiring nuclear capability although the Gulf War, in the case of the first, and the Framework Agreement, as far as the second was concerned, had called a halt to those programmes. Iran was working towards the same end, but would not achieve it for many years to come.

16. Moreover, Russia had a major capacity for supplying strategic nuclear weapons and their delivery systems (land-based, submarine-launched missiles and long-range aircraft). China, too, was in the same position.

17. Another emergent threat was land-attack cruise missiles (LACMs). LACMs were at present deployed in the United States, France and Russia but these capabilities were being developed in a dozen or so countries. According to Mr Kaminsky, the nations giving rise to the greatest concern in this regard were at present working on short-range ballistic missiles, hence wide proliferation of high-technology LACMs was unlikely till some 10 to 15 years hence.

18 However, there was a real threat here and now from anti-ship cruise missiles in over 70 countries, which could be modified to include ground attack capability in a year or two's time

19. The overall situation, undoubtedly worrying, does not appear however to concern the WEU Council unduly, as noted above, or the majority of European governments, since only three of them: those of Germany, France and Italy, have taken the threat seriously, as is clear from their involvement in the work on the medium extended air-defence system (MEADS) (France withdrew in 1996) MEADS will be discussed extensively in a later chapter

20. In the chapters that follow, your Rapporteur will attempt to describe the present position as regards anti-missile defence in Europe and North America (the United States and Canada) and transatlantic cooperation in this field

21. The table below shows existing anti-missile defence programmes worldwide. To them should be added the bilateral Japan-US study that will enable the Japanese Government to take a decision on possible ballistic missile defence (BMD) capabilities in the context of wider Japanese defence policy.

	Exoatmospheric programmes	Endoatmospheric programmes
Energy weapons	Space-based laser (US) Strategic Defence Intiative (US)	Airborne laser (US) Mid-infrared advanced chemical laser (US) Tactical high-energy laser (THEL) (US and Israel)
Kinetic weapons	Atmospheric interceptor technologies (US) Exoatmospheric kill vehicle (US) Lightweight exoatmospheric projectile (US) Theatre High Altitude Area Defence (US)	Arrow (Israel and US) Hawk System (US) Medium extended air-defence system (US, Germany, and Italy) Navy Area BMD programme (US) Patriot (US) Patriot PAC-3 (US) Medium-range anti-aircraft system (SAMP/T, Aster Missile) (Italy and France)

II. Missile proliferation control

The MTCR

22. The Missile Technology Control Regime (MTCR) has already been studied by our Committee on two previous occasions: the first in April 1992, in Document 1305 ("Arms export policy", Rapporteur: Mr Aarts) and subsequently, in 1994, in the first part of the present report (Document 1435: "Transatlantic cooperation on European anti-missile defence") by the present Rapporteur.

23. Little that is new can be added to what has already been said and your Rapporteur will therefore confine himself to recalling very briefly the philosophy underlying this informal arrangement.

24. The MTCR deals with transfers of equipment and technology connected with missiles. All requests for such transfers must take the following set of considerations into account:

- prevention of proliferation of weapons of mass destruction;
- the capabilities and objectives of the missile and space programmes of the recipient state;
- the significance of the transfer in terms of the potential development of systems for producing weapons of mass destruction;
- an assessment of the end use of the transfers, including the assurance of the recipient state that they are to be used only for the purpose stated, that neither such use nor the items transferred will be modified or duplicated without the prior consent of the supplier government and that neither the items, nor any replicas nor derivatives, will be re-transferred without the consent of the supplier government

25. The MTCR further provides that these principles will form part of the respective legislations of the signatory countries.

The Wassenaar Arrangement

26. The demise of the Coordinating Committee for Multilateral Export Controls (COCOM) in early 1994 led to the start of discussions on the creation of a successor organisation adapted to the new international situation.

27. Differences emerged from the outset between the former COCOM members (NATO countries excepting Iceland, plus Australia and Japan) over the intrinsic objectives of export controls and particularly as to which countries represented or could represent a strategic threat.

28. Such disagreements can be attributed to differing American and European perceptions. The list of products subject to control was another area of dispute.

29. In Document 1435, it was suggested that the new successor body to COCOM should cover conventional weapons and any relevant technology and should also concentrate on countries that constituted a threat in proliferation terms and a danger to regional stability: in other words, as far as the US was concerned, countries such as Libya, Iran, Iraq and North Korea

30. This was the spirit in which the so-called Wassenaar Arrangement was concluded. On 18-19 December 1995, the representatives of 28 countries[1], meeting in Wassenaar (Netherlands) agreed to set up the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-use Technologies.

31. Thus, for the first time, a multilateral global regime was created, covering both armaments and dual-use goods and technologies, in order to counter the new threats to security in the post-cold war world, by offering greater transparency and sharing information on armaments and technology transfer across the world.

32 The 28 original countries were joined by Argentina, Romania and South Korea. Bulgaria

[1] 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 Russian Federation, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States

and Ukraine were to join some months later. As indicated earlier, COCOM membership was confined to NATO members, apart from Iceland, and with the addition of Australia and Japan. Membership of the new regime was open on a general, non-discriminatory basis to all countries accepting the criteria laid down.

33. These stated that member countries should:

- be producers or exporters of armaments or technology and dual-use goods relating to armaments;
- have appropriate national policies such as, for example, not selling arms or sensitive dual-use items to countries whose behaviour was a source of concern,
- comply with international laws and standards on non-proliferation, and
- implement 100% effective export controls.

34. For all the member countries and in particular the United States, the Gulf War was a determining factor in the establishment of the criteria and in the negotiations leading to the Wassenaar Arrangement.

35. The arrangement was intended as a reminder of the dangers to international peace and security arising from the destabilising accumulation of conventional weaponry and indiscriminate exportation of armaments and sensitive dual-use technology.

36. The fault lay, as was generally acknowledged, both with eastern and western countries, which, by supplying arms to Iraq, had made possible the build-up of the military machine Saddam Hussein used to invade Kuwait.

37. To prevent future Iraqs, governments are to exchange information on potential threats to peace and international and regional stability, paying particular attention to undercover projects and dubious procurement methods

38. There will also be regular information exchange on transfers of certain sensitive dual-use technologies and goods to countries not party to the Wassenaar Arrangement. A list of over one hundred such products, including machine-tools, computers and telecommunications, has been prepared with a view to this exchange.

39. Such transparency in the transfer of sensitive technology and dual-use goods will help identify procurement that might threaten international or regional peace

40. Similarly there will be transparency as far as armaments are concerned. Information on arms transfers will be provided on the basis of a weapons list (in principle comprising categories of major weapons systems) already used for the CFE Treaty and the UN arms register The wish to redefine and extend this list to cover the latest weapons has also been expressed.

41. Finally it is worth pointing out that the Wassenaar Arrangement is based on national controls, as is the MTCR, and that it is not directed against any country or group of countries. Furthermore the arrangement will not prevent *bona fide* transactions going ahead, nor interfere with the right of states to acquire legitimate means of self defence Rather it focuses on behaviour, particularly dangerous behaviour

42. Thus one of the declared aims is strengthening cooperation to prevent procurement of arms and dual-use products for military purposes if the regional situation or conduct of the state is, or could become, a cause of serious concern to states party to the arrangement.

43. The first plenary session of the Wassenaar Arrangement was held in Vienna on 11-12 July 1996 There, the 31 member countries[2], with the approval of their respective governments, reached agreement on the proposals originally drawn up in Wassenaar.

44. The participant countries will control all the items referred to on the List of Dual-use Goods and Technologies and on the new munitions list, with a view to preventing non-authorised transfers or re-transfers of those items

45 This list has two appendices, one containing sensitive items and the other a limited number of very sensitive items

46 Finally, the list will be revised regularly to take account of technological development and

[2] Bulgaria and Ukraine were in the process of joining at this juncture.

reflect experience gained. It should be noted that missiles and the various components thereof are part of the list.

47. The Wassenaar Arrangement represents substantial changes in objectives and procedures as compared with its predecessor, COCOM. It should be recalled that the latter was established during the cold-war period in response to the threat posed by the Soviet Union and its allies. Through it the West sought to maintain its qualitative battlefield superiority by virtual prohibition of arms sales to communist countries and through export controls on strategic products and technical data.

48. Now the threat of the cold war has receded, other new threats have emerged – among them that of the proliferation of weapons of mass destruction. This has led to the development of non-proliferation regimes such as the MTCR, referred to earlier, the Nuclear Suppliers Group or the Australia Group.

49 The Wassenaar Arrangement extends and complements such regimes, but it should be noted that it is not as yet to the entire satisfaction of every country. A case in point is the United States, which complains of being alone in supporting advance notification of transfers Nor has the United States managed to prevail as regards its wish to concentrate information exchange on unstable regions where security risks are greatest, as other participants have raised objections to targeting specific regions or countries. The very nature of the Wassenaar Arrangement will in future make it possible to modify criteria and procedures.

50 In any event, the Wassenaar Arrangement provides a suitable framework, and one that can be improved on, for countering threats to security in today's world. It provides an appropriate instrument in the fight against proliferation, although one which clearly cannot completely eradicate the risks and threats it endeavours to combat. Both the Arrangement and the MTCR are tools suited to combating missile proliferation.

III. Research carried out in Europe on anti-missile defence

51 In a study prepared by Lieutenant-Colonels Schmidt of the German Air Force and Verschuur of the Royal Netherlands Air Force for the Air War College of the Air University (Maxwell Air Force Base Alabama) in April of this year, entitled "the European theatre missile defence programme – a field for international cooperation", it was suggested that the very considerable extent to which Europe lags behind with regard to a future anti-missile defence is fundamentally due to budgetary causes.

52. While these are of major importance, your Rapporteur nevertheless regards reasons of a political order as the main ones preventing this issue being tackled in an in-depth and resolute fashion.

53 Terence Taylor, Assistant Director at the International Institute for Strategic Studies, notes[3] that "there is a confused situation about what is the real threat and what we would defend in Europe and who is European" adding that "the threat is there and if it becomes more obvious the pitch could then change But you can't just switch on a missile defence programme in a short time"

54. The WEU Council's Reply to Recommendation 571 from the Assembly, to which we referred in the introduction to this report, stating that a preliminary analysis of the risks of missile technology proliferation on the southern flanks of Western Europe had been temporarily suspended is merely the result of a lack of political will in Europe, compounded by cuts in the defence budgets of practically all of our countries.

55 Alongside the transatlantic cooperation programmes, which we will consider later, or the work carried out by NATO, which will also be discussed in a later chapter of this report, and apart from the studies undertaken by France on early-warning and anti-missile defence (EPAMINONDAS) and those being carried out by the United Kingdom, the only tangible reality in Europe as regards anti-missile defence is Aster

56. What initially began as a Franco-Italian anti-aircraft defence eventually turned into an anti-missile defence system in view of the fact that while the earlier system was being developed, it became clear that here was an intrinsic

[3] *Aviation Week and Space Technology*, 3 March. 1997

capability which could be extended to anti-missile defence. Germany was also involved in the initial studies but withdrew from the project to concentrate primarily on the MEADS system.

57. In 1989 the Eurosam consortium was formed to manage the Future Surface-to-Air Family (FSAF) also known as Aster. The consortium members are Aerospatiale, Alenia and Thomson CSF

58. FSAF was designed for anti-aircraft, anti-air-to-surface missile, anti-surface-to-surface missile and anti-cruise missile defence to attack ship targets and there is a possibility of its being developed for short range anti-ballistic missile defence. For the moment four versions of FSAF missiles are planned, the SAAM (Naval surface-to-air anti-missile system) which will use the Aster 15 missile; the SAMP/T (land-based medium-range surface-to-air missile) and the SAMP/N (ship-based medium-range surface-to-air missile), both of which will use the Aster 30, and a fourth version capable of intercepting tactical ballistic missile targets. The SAMP, both in the land-based and ship-based versions, will carry extra sensors to increase its ARABEL radar capability which means that the system can work in a medium where jamming devices are being used.

59. FSAF is a bilateral programme, as an anti-aircraft system, capable of possible ABM extension, which implies some practical advantages such as VAT exemption.

60 In 1988, a full development contract was signed covering ARABEL radars[4] and EMPAR, the fire control system and the Aster 15 (SAAM). A second contract, in 1990, covered the Aster 30 SAMP/T and the ARABEL radar systems. The French and Italian Governments envisage procuring the SAAM, SAMP/T and SAMP/N systems and in 1993 the British Government reached agreement with the French and Italian governments on the Principal Anti-air Missile System (PAAMS), based on an upgrade of the Aster 30 to be installed on frigates in the Horizon programme, which is itself a joint programme involving the same three countries

61. To complete development of this system a new consortium was set up which included the three original Eurosam contractors, plus British Aerospace Dynamics, GEC-Marconi and Siemens Plessey, the new consortium being known as EUROPAAMS. A Spanish consortium made a bid to join FSAF in 1991 but the attempt failed to due to lack of financial support from the Spanish Government.

62. The French aircraft carrier *Charles de Gaulle* will be equipped with SAAM Aster 15 missiles, complete with ARABEL (SAAM) radar. The Italian Garibaldi SAAM/F cruisers will also carry the SAAM Aster 15 fitted with EMPAR radar (SAAM-I).

63. Lastly, in early June 1997 good news on Aster was mounting[5]. First the award was announced of an export contract for Saudi Arabia to fit out three SAWARI II frigates with anti-aircraft weapons. Secondly PAAMS was validated by the authorities of the three countries, hence the formation of the EUROPAAMS group referred to above, and lastly, the French and Italian Governments have definitely agreed to the industrialisation and production stage of the Aster system. Aster has already proved its efficiency. On 8 April 1997 at the French DGA's Landes Test Centre, the Aster 15 intercepted a simulated Sea Skimmer (anti-ship missile flying at the surface of the water) The Aster 15 intercepted the target, a C22 travelling at a speed of 1 000 kilometres per hour and at a height of 10 metres above the surface.

64. In June of the same year another Aster 15 intercepted an anti-ship Exocet missile MM38 flying at an approximate speed of Mach 1 launched from the French frigate *Tourville*. The French daily *Le Monde*[6] stated that the cost of the research and development phase was approximately FF 10 billion between 1990 and 2000 and the industrialisation and initial production stage estimated originally at FF 8 billion had been reduced to FF 5 billion after an agreement with the producers in both countries Costs are to be shared equally between France and Italy, and according to Aerospatiale, the programme will impact on a market which until now has been a United States monopoly and whose value can be

[4] *Jane's Strategic Weapons*, January 1997.

[5] See *Air et Cosmos/Aviation International* No 1616, Friday, 6 June 1997.

[6] *Le Monde*, 17 June 1997.

estimated at some FF 50 billion, systems, munitions and environment included.

IV. Anti-ballistic missile defence in the United States and Canada

65 Within the United States there are two principal operational areas of ballistic missile defence (BMD). The first is national missile defence (NMD) which mainly encompasses the 50 states of the US. The second is theatre missile defence (TMD) relating to weapons and other systems that support US military forces, the US Allies, coalition partners and friendly nations outside the boundaries of the United States itself.

66. Assembly Document 1435 refers mainly to the NMD programmes and the purpose of this chapter is to examine how the situation has developed, analyse new projects and assess cooperation with Canada. To this end, two areas will be taken into consideration: early warning (land and space-based) and missile defence (land, sea, air and space-based).

67 First of all, it is important to understand why the United States feels the need for a BMD and why it pushes its allies in this direction by offering final products and cooperation programmes. The ballistic missile threat emanates from different regions of the world.

68. For example, Russia retains the capability to threaten the United States, despite the end of the cold war The Russian Government is not considered to be hostile any longer but at the same time its military and economic instability gives rise to concerns about the possibility of accidental launches or the seizure of one or more missiles by a group of rogue officers. It is not feasible to consider the possibility of the US and Russia agreeing to re-target intercontinental ballistic missiles (ICBMs) because Russia can retarget its missiles against the US in about 30 seconds and the time the Americans require is almost the same. In addition, it is important to stress that such an agreement could not be verified. Moreover, the Russian Government is selling its technologies to Third World buyers.

69. Despite its commercial partnership with the United States and the good relations both countries enjoy, China is nonetheless considered as a threat because of its technological capabilities. In fact, it is estimated that it has more than a dozen ICBMs and the Chinese Government is looking towards independently targeted re-entry vehicles, which, from a military point of view, allow multiple warheads to be carried on a single missile. Finally, it is also acquiring components of the core Russian missiles arsenal. China's main strategic objective is probably not the US but should rather be envisaged as being directed at other Asian regions. In any event, it is part of US policy to be ready to take action if necessary.

70. Other countries may also represent a strategic and tactical threat to the US because of their ICBM capabilities and their rogue politics: among the Third World countries, North Korea is believed to present the greatest danger because of its efforts to develop long-range missiles and carry out nuclear, chemical and biological armaments programmes However, it is thought that it will not have the capability required to strike the United States until after the first decade of the next century

71. According to some US sources, Iran is a country that poses a great threat to regional stability in the Middle East, not only because it has already used ballistic and cruise missiles as well as chemical weapons, but mainly because its logic is different from Western logic in that it is based on the principles of jihad, the Muslim holy war. Iraq too represents a regional threat, mainly as a result of the Gulf War. It is important to remember that the Persian Gulf is a region rich in oil, a very important strategic resource both from an economic and a political point of view. It is in the American interest for the region to be stable and its business partners there to be secure because the essence of US resources policy is that it tries to save its own resources by importing the same raw materials from abroad.

72 In conclusion, the ballistic missile threat from the Middle East does not constitute a direct threat from a territorial point of view but rather a threat to the economic and political interests of the United States in that region The situation might change in the future but at this stage it is the main reason why the US is also interested in a theatre missile defence system that could be deployed in the area

73 The same concepts may also be valid for Libya, even though that country could be seen as a potential threat mainly because it already tried

to launch a missile against Italy about a decade ago. Moreover, it has programmes for the development of biological and chemical weapons as well as ballistic missiles, even if such programmes are proceeding at a slow pace.

74. Other countries that have ballistic missile capabilities are Japan, Israel and India but the first two are close allies of the US, and moreover have cooperation programmes with the Americans in the field of ballistic missile defence. India might be considered a threat to the US on account of its technological capabilities. But in any case, in the field of international politics today's friends could easily turn into tomorrow's enemies and it is difficult to foresee how the international environment will develop in the long term, particularly as far as a possible world power like India is concerned.

75. There are several reasons why the US Government is pushing its allies towards cooperation programmes in this field First of all, from an economic point of view, cooperating means sharing costs as well as risks. For those allies, cooperating with the US means having access to American technology and know-how. The Americans, for their part, can assess their allies' technological and financial capabilities

76. It is important to remember that US strategic needs are different from European strategic needs and in this sense it is only logical that the United States should be developing its own systems and trying to sell them to its allies, partly because it is in its economic interest to do so and partly because European countries are also seeking to develop specific technologies in this field.

77. As far as NMD is concerned, the Ballistic Missile Defence Organisation (BMDO) has defined an architecture that could defend all the states in the US from a single site located in North Dakota. This system is able to handle only a small number of warheads and it is the Americans' response to the new risks that are emerging in the wake of the end of the cold war. In fact, the US Government and military had to live with the threat of multiple warheads being used by the other superpower during the cold war, but the situation has changed and the risk is now spread among several small rogue nations, so the United States has had to adapt the cold-war standards of its defence architecture

78. The current NMD architecture as proposed is based on a system that relies on existing space-based assets, upgrades existing early-warning and X-band radar facilities, and foresees the deployment of an initial capability of 20 ground-based interceptor missiles tipped with exoatmospheric kill vehicles and based at Grand Forks, North Dakota. These elements will be combined with the battle management command, control and communications (BM/C3) system. The architecture will be under the control of the Commander-in-Chief of US Space Command (CINC Space), which means he will also have the authority to release a ground-based interceptor missile. The estimated cost of developing such a system is US $2.5 billion

79. The architecture of any ballistic missile defence (BMD) system is divided into two main segments early warning and operational defence. In the next section they will be analysed from a mainly political point of view

Early warning

80. In order to destroy a target, it is important to be able to see and track it, and that is what the early-warning segment does In fact, its main purpose in the BMD architecture is to give the alert that a missile has been launched and specify its direction. This makes it possible to take countermeasures or strike back. This kind of activity entails the use of ground-based radar and telescopes, airborne systems and space-based technology

81 As far as North American aerospace defence is concerned, responsibility for aerospace warning and control lies with a bi-national (United States and Canadian) organisation the North American Aerospace Defence Command (NORAD). Aerospace warning includes the monitoring of man-made objects in space, and the detection, validation, and warning of an attack against North America whether by aircraft, missile, or space vehicles, utilising mutual support arrangements with the other commands

82. The commander in chief (CINC) of NORAD is appointed by, and is also responsible to, the President of the United States and the Prime Minister of Canada His headquarters are located at Peterson Air Force Base (Colorado) which also accommodates the 21st Space Wing

of the 14th Air Force that is responsible for operating satellites and ground-based missile sensors world-wide in order to provide data to NORAD for assessment of threats to North America, and the US Space Command for assessment of threats to US and Allied troops deployed worldwide Finally, the command and control centre is not far away, at Cheyenne Mountain Air Station, Cheyenne Mountain (Colorado) and serves as a central collection and coordination facility for a world-wide system of sensors designed to provide the CINC and the National Command Authorities of the United States and Canada with an accurate picture of any aerospace threat.

83 In conclusion, CINCNORAD is responsible for providing integrated tactical warning and attack assessment (ITW/AA) but information is needed in order to accomplish this mission. The system architecture consists of several segments. one is under the control of CINCNORAD and the others are operated by commands supporting NORAD, such as the US space command. For the purpose of ensuring a timely flow of warning information, CINCNORAD and CINC Space are one and the same person

84. The US Space Command supports NORAD's activity by providing missile warning and space surveillance It is the duty of the Space Defence Operations Centre (SPADOC), located in the Colorado Springs area, to receive information from the Space Surveillance Centre (SSC) that is based on a world-wide network of active and passive sensors used to track anything that overflies or might overfly North American territory at an altitude lower than that of deep space This international network is called the Space Detection and Tracking System (SPADATS) and each day it makes about 30 000 observations, all of which are transmitted to the SSC's computers Once the data arrives in Colorado, it is analysed and particular attention is of course paid to any unknown objects

85 The space-based early warning system is also managed by the US Space Command and comprises several constellations of satellites in high orbit In fact, high resolution technology is not necessary to accomplish an early-warning mission but a wide field of view is extremely important. Since missiles are boosted by hot gases, infrared (IR) camera are the best tools to use Early warning satellite payloads are typically IR camera programmed for the specific wavelengths of heat emitted by combustion elements. Backup payloads are also provided in order to avoid false warnings.

86. In the event of a missile attack against the US, the alert takes about five minutes to arrive in Washington That does not leave enough time to organise a defence or move the population into safe shelters but it does provide sufficient warning for the purposes of striking back. This kind of strategy was possible during the cold war since Soviet logic was in many respects similar to Western logic. In contrast, the phenomenon of religious fanaticism makes the logic of a second strike completely useless since the adversary is not afraid of death and devastation. In this sense the architecture of the US ballistic missile defence system must change and when it comes to developing such a system in Europe, consideration should be given to the fact that European countries are not far away from rogue nations in which this phenomenon is rife.

87. One example of a US Department of Defence (DoD) early-warning programme is the DSP-647s (Defence Support Programme series 647) which is so important that the DoD has financed the establishment of the ground station of Nurrungar (Australia) Another example is the Buckley Air National Guard Base (Colorado) where the 821st Space Group of the 14th Air Force is stationed. The 21st Space Wing of the Peterson Air Force Base also has units that operate early-warning satellites and report warning information.

88 The early-warning programme had in the 1960s been called MIDAS; its mission objective was the detection of nuclear experiments and it also had meteorological capabilities, but after some information had been unintentionally released, the programme's name was changed to DSP-647 and some of its characteristics were modified

89 In 1969, the Pentagon provided the following information about the system the weight of the satellite was between 800 and 1300 kg depending on what payload was chosen, its sensors were similar to the VELA satellite sensors and therefore consisted of particle-detection sensors, electromagnetic radiation-detection sensors, equipment capable of X-ray and gamma-ray

measurements – i.e. able to detect a nuclear explosion in the atmosphere as well as underground – a secondary payload with the mission of avoiding confusion between solar radiation refraction and the launch of a missile or a laser attack against its early-warning sensors, and so on.

90. The core of the DSP-647 is an IR telescope and the satellites orbit at about 35 000-36 000 km from the earth's surface, inclined at an angle of 0° with respect to the equatorial plane. Usually the constellation is composed of three satellites: one located over the Indian Ocean, the second over the Pacific Ocean and the third over the Atlantic Ocean. Naturally, their positions may vary depending on the strategic, operational and tactical needs of the United States.

91. All the US remote-sensing satellites are called "Keyhole" and one of the latest ideas for early-warning space-based architecture consists of an unmanned and multi-function space station called KH-13, able to observe the earth constantly It is possible to imagine that a number of the characteristics of the Strategic Defence Initiative technology of the mid-1980s could be included in this project Up till now, the KH-13 has existed on paper only and given the financial problems affecting several defence programmes in the US, it will probably go on existing in that form for some time to come

92 Since the DSP-647 programme is on the verge of becoming obsolete, the DoD is planning a new architecture for an early-warning capability that would also be able to carry out its mission in a post-cold war environment where it is crucial to reduce the timeframe from a launch to an alert to action since, as has already been observed, enemies may be closer and not scared by a second strike. The programme that is supposed to replace the DSP-647 is the space-based infrared system (SBIRS) Its space architecture consists of two satellites in a highly elliptical orbit or Molnya orbit and four satellites in geostationary orbit (GEO) for the purpose of providing early warning capabilities The first delivery is planned for 2001 It is also planned to put a constellation of satellites called the Space and Missile Tracking System (SMTS) Brilliant Eyes into low earth orbit (LEO) to track missiles once launched Initial delivery of this system is planned for 2004. For the SBIRS in GEO, an application as a satellite-tracking system is also planned in addition to the ground-based system currently deployed world-wide by the US Space Command.

93. In the field of theatre ballistic missile defence, it is important not only to have an early-warning capability regarding a missile launch but also to make such information available at operational level. To this end the US Army and Navy have created Joint Tactical Ground Station (JTAGS) units to provide any operations theatre with information from the DSP satellites. In fact, their mission is to give attack warnings so that fighter aircraft and ground artillery can attack the transporter erector launchers (TELs). These stations had been planned before the Gulf War and the only reason why they were not deployed at that time was that they were not available.

94 In conclusion, it is important to underline that the space-based and ground-based early-warning systems are not the only ones available Airborne sensors can also provide inputs in this field even if their usefulness is confined to the theatre area The use of laser remote-sensing is quite interesting because in these sensors because it represents a new application of laser technology.

95. Laser remote-sensing is based on the principles of optical absorption spectroscopy that involves passing the light of known spectral characteristics through a target medium and observing which wavelengths are absorbed by the medium Particular molecules will resonate at specific wavelengths and in doing so they absorb light at those wavelengths, since each chemical compound may emit characteristic spectra if suitably excited.

96 The reason why this technology is not space-based is because the atmosphere, together with dust and vapour, influences the performance of such systems. If the architecture were space-based it would require an enormous amount of power, which would pose management problems However, this technology can be used for atmospheric studies, for damage assessment in the event of strikes and also for early-warning for TMD, since some missiles produced by rogue countries are still using liquid fuel that partially evaporates when the missile is prepared for launch

97. Once a missile launch has been detected and its trajectory tracked, the only thing that remains to be done is to destroy it and move the population into safe shelters. The focus here is on neutralising the incoming missile but it is also important to remember that bunkers for people can be a form of ABM defence, although the main problem is how to prevent missiles from destroying the infrastructure as well.

Anti-ballistic missile defence

98. This section contains a description of US choices in the field of ABM defence, taking into consideration the fact that it is possible to choose between two kinds of architecture: endoatmospheric defence architecture (i.e. within the atmosphere) and exoatmospheric defence architecture (i.e. outside the atmosphere). In general, it is possible to say that the US programmes are mostly based on exoatmospheric architecture. The reasons are numerous and include the fact that in order to attack the US with a missile, the adversary must use an intercontinental missile. The US Government is no doubt doing everything possible to avert a threat from a hostile country possessing ballistic missile capabilities within the American continent. In fact, part of the trajectory of an intercontinental missile lies in the upper atmosphere or beginning of outer space. Moreover, the advantage of intercepting missiles there is that atmospheric drag will destroy all the pieces of a missile that has been attacked, which means that even a low-precision interceptor can accomplish the mission Also, because interception of a weapon of mass destruction (fitted with a nuclear or other warhead) takes place in space, it is probably sufficiently far away to prevent much damage on earth

99. It is also possible to use a kinetic kill vehicle, or a high-energy beam, to destroy a missile and electronic support measures (ESM) can be taken to misguide the missile but there are no specific programmes for this particular purpose.

100. As well as having its own programmes, the United States is involved in various ABM programmes in cooperation with Europe, through the Medium Extended Air Defence System (MEADS) and Israel, through Arrow. It also conducts joint studies with Japan. Its own programmes focus on US self-defence against the ballistic missile threat. It could well be the case that Canada relies on American defence proficiency, since the extent of its involvement in ABM defence programmes is not known, other than its joint early-warning capabilities with the US.

Exoatmospheric programmes

101. These programmes began in the mid-1980s under the Strategic Defence Initiative (SDI), also nicknamed Star Wars. The main architecture of the system consisted in constellations of early-warning satellites, which could also destroy ICBMs in their exoatmospheric trajectory before they released their multiple warheads. The rationale and architecture of the SDI was described in Assembly Document 1435. It is worth repeating here that the architecture of the SDI was developed in response to cold war threats and to promote an American economic effort that the Soviet Union could not afford

102. One of the elements of the SDI architecture was the use of lasers to counteract the ballistic missile threat. In fact, the usefulness of lasers for air defence has been under investigation since the 1970s Work on such systems continued through the 1980s with the Airborne Laser Laboratory, which completed the first test laser intercepts above the earth The space-based laser (SBL) programme will build on a wide variety of technologies developed by the Strategic Defence Initiative Organisation (SDIO) in the 1980s. The SBL platform achieves missile interception by focusing and maintaining a high-powered laser on a target until it is destroyed. The energy necessary to perform this mission is generated by a chemical reaction of the hydrogen fluoride molecule.

103 Research on the large optics demonstration experiment (LODE), completed in 1987, provided scientists with the means to control the beams of large, high-powered lasers, and under the large advanced mirror programme (LAMP) a 4-metre diameter space mirror with the required optical figure and surface quality was designed and built.

104. In this context, the satellite relay mirror experiment (RME) was launched in 1990 with the purpose of experimenting with the targeting techniques of space laser mirrors. Its mirror in-

tercepted a laser beam from Mount Haleakaia in 1991 before the satellite was deactivated.

105. In the same year, the Alpha laser achieved megawatt power at the requisite operating level in a low-pressure environment and numerous acquisition tracking and pointing/fire control (ATP/FC) experiments are taking place in order to provide the SBL platform with stable aim-points. In 1995, trials conducted under the space pointing integrated control experiment demonstrated a performance close to weapons level.

106. Future projects concerning the SBL include the SBL readiness demonstrator (SBLRD) to test all the components of the system together in their planned working environment. The SBLRD satellite will comprise four major sub-systems:

- the ATP system, which will provide not only acquisition, tracking and targeting capabilities but also stabilisation and assessment capabilities;
- the laser device;
- the optics and beam control systems to enhance the capabilities of the laser device;
- the space system to provide a stable platform and furnish electrical power (other than for the laser) and so on.

107. Current SBL planning is based on a 20-satellite constellation since it is estimated that a 12-satellite constellation with the same characteristics, i.e. kill times per missile ranging from one to ten seconds and re-targeting times as low as 0 5 seconds, can negate 94% of all missile threats in most theatre scenarios

108. As far as kinetic weapons are concerned, the development of ground-based interceptors (GBIs) is the main component of the American NMD programme. The exoatmospheric kill vehicle (EKV) is expected to undergo intercept flights in 1998 and, at the moment, work is focused on the technical aspects of the interceptor seeker.

109. It is possible that the architecture of the EKV system will consist of a ground-based interceptor guided by a space-based seeker, or by a ground-based or airborne missile launched outside the atmosphere in order to destroy a missile before it releases its multiple warheads. Current international law prohibits the use of missile-armed satellites even though the 1967 Outer Space Treaty and subsequent treaties do no more than prohibit the use of weapons of mass destruction In any case such systems are too costly and the same performances can be obtained using ground-based and airborne technology.

110. Still in the field of exoatmospheric kinetic kill vehicles, the theatre high altitude area defence (THAAD) system is designed to become a land-based upper tier TMD system and is also described in Assembly Document 1435. For this reason, the discussion here will be limited to a brief reminder of the basis of this programme and its development since 1994. Three initial phase tests took place in 1995 and two in 1996 but unfortunately the results were not satisfactory.

111. The THAAD is an army programme whose architecture consists of four major segments:

- truck-mounted launchers to protect and transport the interceptors;
- interceptors which consist of a single-stage booster and a kinetic kill vehicle;
- the THAAD radar system which supports the full range of surveillance, target tracking and fire control functions, and provides a communication link with the interceptor in flight,
- the battle management command, control, communications, computer and intelligence system (BM/C4I) which manages and integrates all the architecture segments by providing instructions and communications and by processing data gathered by sensors.

112. In 1996, the Department of Defence (DoD) restructured the programme by militarising the user operational evaluation system (UOES) and upgrading certain components, such as the infrared seeker, and the remaining segments. Moreover, a UOES capability that includes two THAAD radars, four launchers, two BM/C4I systems, 40 missiles, and 295 soldiers is planned to be available for developmental testing by Fiscal Year (FY) 1999 and the first unit equipped (FUE) date for THAAD is scheduled for FY 2006

113. In addition, the navy is also carrying out a theatre-wide defence programme, with the aim of providing the US forces with an upper-tier ballistic missile defence capability without the need for land bases. This is the second evolutionary stage of the navy area defence programme, and it is planned to use an interceptor with an exoatmospheric capability, such as the lightweight exo-atmospheric projectile (LEAP) During intercepting tests against targets outside the earth's atmosphere, LEAP technology components performed well, which probably means that technical demonstration flights will be possible by 2000.

Endoatmospheric programmes

114. As far as endoatmospheric programmes are concerned, the devices used for ABMD purposes can be divided into two categories: energy weapons and kinetic weapons. As has already been explained, energy weapons are characterised by the fact that energy concentrated into beams is used to destroy missiles With kinetic weapons on the other hand, the same goal is achieved using an object that explodes near the missile and destroys it. It is important to underline the difficulties involved in such kinds of missions because destroying a missile amounts to launching one projectile against another while trying to intercept the first. However, it has been demonstrated that it is possible to do this, even if the failure rate is usually high, it is therefore worth listing the kind of programmes being carried out in the United States

115. In the field of energy weapons there is just one programme: the airborne laser system. Its mission architecture is composed of a ground segment for command, control and communication (C3) purposes and an aeroplane, the Boeing 747 that carries the laser device.

116 The purpose of the ABL programme is to design and develop concepts to minimise engineering risks for airborne, high-energy laser weapons capable of acquiring, tracking and killing theatre ballistic missiles in boost phase. This system is developed by the USAF Phillips Laboratory and the final user is the Air Combat Command (ACC). Boeing and Rockwell International proposed competing engineering design concepts. The system architecture is composed of a nose-mounted turret, a chemical oxygen-iodine laser, and a 747 aircraft The contract to build the laser was awarded to the Boeing-led contractor, which also includes TRW and Lockheed Martin, last November.

117. One milestone has been the successful demonstration of the active tracking system built on a ground-based illuminator tested against a navy F-14D. In addition, a demonstration of the full-power flight-weighted laser module will take place in April 1998..

118. It is planned that the ABL mission will comprise the following phases:

- the target is visualised by nine infrared search and tracking sensors situated on the aeroplane;
- a tracker/illuminator laser is fired from the turret of the ABL to illuminate the nose of the target booster,
- a beacon/illuminator is activated to mark a narrow spot on the target fuel tank in order to provide the path for the lethal shoot;
- the signal of distortion due to the atmosphere is sensed by wavefront sensors that send the signal to deformable mirrors,
- the deformable mirrors pre-distort the high-energy laser beam so that it is refocused by the atmosphere to become lethal once it hits its target,
- the high-energy laser beam is activated against the target.

119. All information concerning ranges and missions is classified but it is known that it is planned that the aircraft will fly at 12 000 m because, nominally, the laser must attack the missile within about 40 seconds if the nominal burnout is 80 seconds for a 90-km range missile The ABL will be just one of the components of the NMD architecture and of the theatre missile defence architecture

120 Still in the field of laser weapons, the mid-infrared advanced chemical laser (MIRACL), which is a deuterium fluoride chemical laser, is the highest average power laser in the US. It can be used against any object that passes within its field of view both inside and outside the atmosphere TRW has built the MIRACL for the navy, which will test it against cruise and ballistic

missiles. At the time of writing, a test of its anti-satellite capabilities was scheduled for October 1997.

121. The United States and Israel are also co-operating on a tactical high-energy laser system THEL) which this year received US$ 15 million. It is planned that this system will be a key component of the integrated air defence system (IADS) where the United States Marine Corps (USMC) doctrinally employs an IADS for all active defence based upon multi-role fighter aircraft and the Hawk missile In this scenario the THEL will perform the role of detecting, acquiring, identifying, and destroying short and medium-range targets, in addition to operating in a conventional and electronic warfare environment.

122. Where kinetic weapons are concerned, the improved Hawk provides an excellent TBM core defence for marine ground forces. The new Hawk system will consist of three major components·

- the TPS-59 radar that provides target detection, discrimination, and tracking,
- the Hawk launcher that transports, protects and launches the missiles, and the Hawk missile,
- the air defence communication platform (ADCP) that connects the TPS-59 with the Hawk and the remainder of the theatre missile defence architecture in order to create missile defence in depth

123 The Navy and the BMDO have been working together to develop a sea-based area defence capability which builds on the existing Aegis/Standard missile air defence system, in order to extend its anti-air capabilities to enable the detection, tracking and engagement of TBM

124. The main advantages of the navy area BMD programme include

- conflict deterrence,
- protection of US forces deployed to crisis areas,
- in-depth defence to reassure allies,
- a reduction in the demand for sea and airlift, since a sea-based ABM will enable the theatre commander to concentrate available lift capabilities on anti-armour tanks, troops, ammunition and other operations in order to stop the enemy advance.

125 The US army's endoatmospheric kinetic weapon ABM programme is the famous Patriot missile, now upgraded to advanced capabilities in the PAC-3 version. Today it is considered to be the core of the TMD programmes, and also has one of the highest priorities in the development of BMD systems within the US.

126. The PAC-3 version presents a number of improvements, especially in the field of BM/C4I, and incorporates the guidance enhancement missile (GEM). The first unit was equipped with configuration 1 in December 1995

127. In 1997 the army began to field configuration 2 which features further improvements and modifications to the radar, communications and other systems In February 1997, the PAC-3 configuration 2 system successfully engaged a theatre-class ballistic missile.

128. The PAC-3 architecture is based upon four basic segments

- the radar set that provides warning and tracking of incoming threats.
- the engagement control station (ECS) that computes fire solutions for the interceptor, and provides fire control and communication links with the other units.
- the launch stations which transport, protect and launch the missiles Each of them can be equipped with four GEMs or earlier missiles and selected stations are able to carry 16 PAC-3 missiles;
- the interceptors that are highly manoeuvrable and are considered efficient on the basis of the tests that have been conducted

129. Compared with the Patriot, the PAC-3 version is smaller but characterised by an enhanced radar. improved survivability, increased range and a launch point determination capability, resulting in increased firepower and lethality.

National ballistic missile defence

130 As was noted at the beginning of this chapter. the United States' BMD programmes are divided into TMD and NMD The first of

these has maximum priority and includes all the programmes described above.

131. The trends in international policy, mostly in the field of the spread of weapons of mass destruction and long-range missile capabilities, represent a threat for the US and for this reason, the BMDO drew up the NMD programme. An NMD Joint Programme Office (JPO) was established to manage the multiple-service components of an NMD system and oversee their integration into an efficient architecture.

132. The main purpose of this programme is to protect the US against limited attack by long-range missiles and to provide a quick response to such attacks. The NMD programme has a deployment readiness posture that involves developing hardware that will be used in FY 1999 integrated system test (IFT-5)

133. This programme is composed of a number of segments that include the USAF SBIRS, the ground-based interceptor (GBI) able to destroy missiles outside the atmosphere and the ground-based radar (GBR) which provides the primary fire control sensor to support integrated NMD system testing on the US Army Kwajalein Atoll missile test range. An in-flight interceptor communications system (IFICS) prototype is planned for development with the aim of linking the various defence and management segments. In addition, the NMD BM/C3 project is focused on integrating the NMD interceptor and sensor operations in support of informed decision-making and to facilitate programme integration.

134. As can be seen, the United States is extremely concerned about missile defence and it is also involved in pushing NATO in this direction. This concern is visible not only in the number of programmes covering this area but also in the funds being made available For this reason it is worth taking a look at the following tables showing a break-down of budgets by programme, year and user.

135. The BMDO budget presents several interesting aspects, particularly if considered from the point of view of different sources, as can be seen from the following tables:

BMD programmes budget

US $ million

Early warning	1997 requested	1997 approved	1998 requested
SBIRS-Low	237 5	222 4	217 4
SBIRS-High	189 6	338.4	338 4

Source: Space News, 6-12 October 1997, p. 18.

US $ million

RDT & E	1997 approved	1998 requested
Corps SAM (MEADS)	30	48
Navy area TMD	302	268
Navy theatre-wide	304	195
PAC-3	382	206
THAAD system	622	556
NMD	883	504
Other	916	805
Procurements		
PAC-3	215	0
Navy area-wide	9	0
BMC3	19	0
HAWK	19	0

Source BMDO Fact Sheet 97-36, July 1997, The Ballistic Missile Defence Fiscal Year 1997 Budget.

Ballistic missile defence programmes (US $ million)

	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03
THAAD	619	561	595	603	618	949	980
Navy theatre wide	304	195	192	191	191	145	149
SMTS	231	219	158	172	244	419	925
Airborne laser	54	157	297	323	157	183	445
Joint aerostat	26	86	134	110	133		
NMD	829	505	406	310	310	392	392
Patriot PAC-3	601	555	471	459	445	433	397
Navy area TMD	310	283	271	351	318	287	263
Joint TMD (BMDO)	508	545	516	546	551	540	523
Other	498	384	327	282	285	282	282
TOT	3980	3490	3367	3347	3232	3630	4356

Source BMDO, FY 1998 President's Budget Press Release

FY 1998 BMDO funding (US $ million)

Field	Funds
NMD	504
TMD	1835
Support technologies	249

Source BMDO, FY 1998 President's Budget Press Release

FY 98 BMDO funding by executing agent (US $ million)

Executing agent	Funds
BMDO	738
Navy	513
Army	119
Air force	133
NTB/JNTF, DNA, SPACECOM	85

Source BMDO, FY 1998 President's Budget Press Release

Moreover, your Rapporteur is aware that the BMDO also has funds for foreign policy use and to support foreign BMD programmes In each FY an amount in US dollars is devolved to western Europe (66 million for FY 1997), East Asia (3 million for FY 1997), also, latterly, following the signature of a Memorandum of Understanding, to Japan, to counter the threat represented by North Korea and maintain a balance in view of the rapid growth of the Chinese economy, and to Israel (59 million) for obvious political reasons.

V. Transatlantic cooperation – MEADS

136. In February 1995, France, Germany, Italy and the United States signed an international Memorandum of Understanding setting up a NATO agency for the purpose of cooperation in the joint surface-to-air missile programme known as the Medium Extended Air-Defence System (MEADS). In May 1995, France withdrew from the programme on account of budgetary difficulties and the three remaining countries signed a Memorandum of Understanding covering the project definition and validation phase.

137. The aim of the programme is to develop a surface-to-air missile system (SAM) capable of defending troops and installations against a range of threats: tactical ballistic missiles, cruise missiles, aircraft and UAVs. Programme costs are shared as follows: United States 60%, Germany 25% and Italy 15%. The possibility of other NATO countries joining MEADS is envisaged, with the approval of the participant countries.

138. The programme, which is administered by a NATO agency, NAMEADSMA, based in Huntsville in the United States, is currently in its project definition and validation (PD-V) phase, which runs from 1996 to 1998. Phase 2, Design and Development (D and D) will run from 1999 to 2005 with Phase 3, Production, possibly starting in 2003.

139. In the present initial PD-V phase, the aim is to produce a system specification, a primary end item specification document and a cooperative programme plan for the common development and production of MEADS. This phase involves two industrial teams, one comprising Lockheed Martin, Daimler-Benz, Siemens and Alenia and the other Hughes and Raytheon, Daimler-Benz, Siemens and Alenia. Both teams must compete with one another for the final contracts.

140. The part played by MEADS in ballistic missile defence architecture will be to fill the gap between man portable systems like the Stinger and the higher levels of the anti-missile defence structure such as the PAC-3 or the THAAD. Moreover MEADS will provide continuous cover for rapidly advancing manoeuvre forces. The particular characteristics of MEADS are its strategic and tactical mobility for easy in-theatre deployment and to provide support for forces on the move.

141. Once in service, MEADS will be the only anti-missile defence system capable of being transported alongside troops and of being brought into service immediately. It will also have greater fire-power but require less manpower than its predecessors. Finally, the fact that the system is based on a joint design should contribute to interoperability.

142. Integral to the MEADS system will be an airborne radar sensor providing early warning against low-altitude cruise-missile attack against aircraft targets, which can either be aircraft or helicopter-borne or UAV or aerostat-mounted. Furthermore MEADS will be fully interconnected with other systems such as Patriot, THAAD and FSAF Aster.

143. MEADS will replace the Hawk air defence system. In the late 1980s and the early 1990s, the US Army and Navy embarked on the CORPS SAM programme as an intended replacement for Hawk. Germany showed an interest in joining and France and Italy did likewise shortly afterwards. Once the international MoU was signed in February 1995, the CORPS SAM programme became known as MEADS.

144. MEADS is an important initiative in transatlantic cooperation. The international nature of the programme means it has enormous potential for promoting transatlantic interoperability. According to the BMDO (Ballistic Missile Defence Organisation), MEADS "reaffirms the United States' commitment to stay involved in European security affairs and could spark a renaissance in transatlantic cooperation".

145. General Joulwan, the then Commander-in-Chief of the US European Command, in July 1995 wrote a letter to the American Senator, Sam Nunn, in which he stated that "Politically, MEADS is a visible and important illustration of the US commitment to missile defence, to NATO and to Europe. MEADS is a model for future transatlantic cooperation efforts. Terminating MEADS now would have serious ramifications in other ongoing cooperative ventures and raise yet another round of poignant questions about US intentions regarding leadership in NATO". Finally, General Joulwan, in his determination to obtain the necessary budget support from the

Senate, remarked that TMD systems were so dear that developing them unilaterally would put them way out of reach, and cooperation thus offered additional advantages: "it appears that we can protect our forces and interests while realising potentially large savings".

VI. NATO and anti-missile defence

146. As far as Tactical Ballistic Missile Defence (TBMD) is concerned, there are two directorates within NATO's Defence Support Division: the Air Defence and Airspace Management (ADAM) and Armaments Planning, Programmes and Policy (APPP) Directorates The ADAM Directorate supports the NATO Air Defence Committee (NADC) chaired by the Deputy Secretary-General, consisting of member country representatives at senior level and responsible for advising the North Atlantic Council (NAC) on the air-defence policy of the Alliance

147. The NADC has oversight of NATO's air defence plans and submits recommendations to the NAC on priorities for the organisation's future air defence system.

148 The NADC has two sub-panels, the Panel on Air-Defence Philosophy and the Panel on Air Defence Weapons (PADW), both of which have worked on TBMD in recent years. The PADW has concentrated in particular on maintaining a balanced air defence system which can cope with the complete spectrum of potentially threatening air vehicles since TMBD forms but part of what in total is termed Extended Air Defence (EAD).

149. PADW's primary responsibility is to advise and assist the NADC develop a rational air defence (including command and control aspects) and a coordinated programme for air-defence weapons. the Alliance Long-term Air-Defence Programme The programme keeps abreast of national air defence procurement plans, maintains regular oversight of the same in order to identify areas where they might cause an imbalance in the Alliance's air defences and makes recommendations to avoid this happening

150. Thus, as far as TMBD is concerned, note will be taken of any national plan to develop or procure a given capability and an opinion given on the impact such action could have on the Alliance's air defence policy

151. The PADW has conducted a series of conceptual and operational studies on TBMD and sponsored other technological studies carried out by the NATO Industrial Advisory Group (NIAG).

152. Lastly, concerning NATO's internal organisation of work on the TBMD, it should be noted that the APPP Directorate supports the Conference of National Armaments Directors (CNAD) which has responsibility for armaments cooperation. Within the same directorate, the Planning and Policy Section is tasked, *inter alia* with providing support to an ad hoc CNAD group with special responsibility for examining possible TBMD systems and identifying opportunities for multinational industrial cooperation.

153. Proliferation of ballistic missiles has been a source of growing concern in the Alliance for some years – a preoccupation reflected in its 1991 Rome Declaration and in the New Strategic Concept, published in November of the same year In June 1992, the NAC indicated that the NADC would study various approaches towards meeting requirements for a tactical ballistic missile defence system. The NADC thus developed a conceptual framework for providing the Alliance and its forces with an extended air defence, paying particular attention to risks from ballistic missiles.

154. The framework envisages development of an extended air defence complementary to the existing integrated air defence system The framework was approved by the Council in August 1993 and included a multinational integrated structure for surveillance and early warning against the threat of tactical ballistic missile attack and to support active and passive countermeasures.

155. The NADC also produced a report on tactical ballistic missile countermeasures and presented its Air Defence Programme for 1995-2010 At that same juncture. the Supreme Headquarters Allied Powers Europe (SHAPE) began work on a formal military operational requirement for theatre missile defence in Allied Command Europe.

156. The summit of Alliance heads of state and of government in Brussels in 1994 took an important step towards laying down a framework for the Extended Air Defence/Theatre Missile

Defence (EAD/TMD) by its formal recognition of the threat to security presented by the proliferation of weapons of mass destruction and ballistic missiles. As a result, the NAC established the Senior Politico-Military Group on Proliferation (SGP) and the Senior Defence Group on Proliferation (DGP).

157. The work carried out by both groups led to the drawing-up of the Alliance Policy Framework on proliferation of weapons of mass destruction, made public at the June 1994 NAC meeting This highlighted the fact that a number of states on the periphery of the Alliance were continuing their attempts to develop or procure production capabilities for weapons of mass destruction, which implied a direct threat to member states and their forces. It also noted that proliferation could still occur, notwithstanding international non-proliferation legislation and treaties. Lastly it emphasised that the Alliance's response to such threats must be to endeavour to deter proliferation and the use of such weapons and, if necessary, defend NATO territory, populations and forces by political and military means.

158. From a political point of view the main Alliance objective is to deter proliferation, or, should it succeed, try and reverse it by diplomatic means. The international weapons control and non-proliferation regimes are instruments available to prevent or counter proliferation. Nevertheless the Alliance recognises that political means are not always sufficient. It has therefore tasked the DGP to study what capabilities are necessary to deter proliferation of nuclear, biological and chemical (NBC) weapons, to assess the threat from them or their use and to identify the means necessary to protect territory, populations and forces.

159 The DGP's work was divided into three phases During the first, studies were made of risks for the Alliance deriving from proliferation of weapons of mass destruction and the June 1994 Summit Declaration referred to above, stressing that the proliferation of such weapons and their delivery means presented a real challenge in terms of NATO's security, was ratified. The Declaration also made reference to risks due either to illicit production or transfer

160 The second phase, which was completed in November 1995 considered the implications of proliferation for Alliance plans, and identified a series of capabilities necessary to support the organisation's stance to contend with proliferation In order to assess the implications of proliferation risks the Alliance studied threats and possible attacks on both NATO territories and populations and on forces deployed out of area (including humanitarian and peacekeeping missions). Among the most important capabilities identified for countering proliferation was extended air defence which includes tactical ballistic missile defence for deployed forces. It thus became clear that layered defences against tactical ballistic missiles could make a major contribution to the political and operational objectives of the Alliance.

161 DGP's third phase identified the areas in NATO's current military posture, including air defence, where progress must be made to counter proliferation risks

162. In line with the above, Dr J David Martin, Deputy for Strategic Relations in the BMDO, concludes that an Alliance framework for EAD/TMD can provide guidelines for Alliance members as they continue to develop their respective national approaches to the proliferation problem.

163. Dr Martin also points out that in developing a framework for anti-missile defence, the Alliance must take into account present limited resources, leading to the assumption that cooperation in this area must be considered when it comes to finding a solution to proliferation problems. In his view such cooperation should take place at the levels of development, production and of fielding EAD/TMD systems and, in addition, that it is also essential from a military point of view since, if a common system design is taken as the starting point, forces can effectively be interoperable wherever they are deployed in any operation where their intervention is required

164. Finally Dr Martin stresses the importance of the Alliance giving thought to the benefits of a layered missile defence system for deployed forces, which could incorporate both ground and sea-based assets; and as the delivery range of ballistic missiles grows longer, NATO will also have to consider multi-tiered, wide area defences for the protection of NATO territory and population.

VII. Conclusions

165. All of the specific studies on proliferation of weapons of mass destruction, undertaken at national or at NATO level, and the White Papers on security and defence published by different countries are in agreement in stating that this form of weapons proliferation represents a threat to international security and therefore in regarding it as necessary to establish an extended air defence/theatre missile defence (EAD/TMD) framework.

166. It is clear that in order to make progress in this direction and respond adequately to existing risks and threats, European governments have to make clear their political will and provide the necessary budgetary resources. Once the costs of such an undertaking have been evaluated, it can be brought to fruition only through cooperation – cooperation that has to be primarily European and transatlantic.

167. A few weeks ago at the symposium our Committee organised in Munich, Rear-Admiral Leira (NATO, Director of Armaments Planning, Programmes and Policy), stated that that NATO would be strengthened, not weakened, by greater European cohesion on defence and that such cohesion should rest on a solid foundation consisting essentially of its defence industrial base. In this connection he observed that unfortunately there were signs of asymmetric development on either side of the Atlantic. Rear-Admiral Leira went on to say that there was a growing technology gap between North America and Europe which could result in different doctrines, different force structures, and different operational concepts. If this were to occur, interoperability and the ability to mount joint NATO operations would, in his view, become academic.

168. In the first part of this report, submitted three years ago (Document 1435, to which we have referred several times) the need was stressed for WEU to stimulate debate on a European early-warning system to follow up the studies already under way on developing a European space-based observation system. This debate has still not taken place.

169 It is necessary to make the point that a European early-warning system must be regarded as essential if a European anti-missile defence system is being proposed. It seems realistic to assume that the United States would not make its early-warning satellites available to NATO.

170. Europe must begin by acquiring its own early-warning system, comprising two geostationary satellites, initially with a single frequency and infrared sensors, leaving open the possibility of later supplementing these by a second, ultraviolet frequency

171. Moreover, a whole series of European studies on anti-missile defence (in France, United Kingdom, Germany, Italy...) are currently being completed or have already been completed It is possible that some northern European countries think that a threat to the southern flank of the Continent would not affect them. Will they be able to make the same assumption 10 or 15 years hence?

172. A European study is absolutely necessary and here WEU should bring together studies done at national level and draft a genuinely European study on the basis of them Such a study could consider two types of defence. ground-to-air and air-to-air. The Aster or MEADS systems could provide a satisfactory answer in the first of these cases.

173 Finally, your Rapporteur regards as entirely relevant and sustainable, the conclusions and recommendations contained in the first part of the present report, to which the WEU Council, three years after their submission, has still not replied. It is to be hoped that the present report and the recommendations that follow from it will lead the Council to agree to proceed in the direction that we have attempted to outline in its pages

IMPRIMERIE ALENÇONNAISE
Rue Édouard-Belin : 4e trimestre 1997
N° d'ordre : 40506

PRINTED IN FRANCE