REPORT TO THE CONGRESS
ON
PLAN TO COORDINATE DEVELOPMENT AND IMPLEMENTATION OF
THEATER MISSILE DEFENSE PROGRAMS WITH ALLIES

PURPOSE

The FY 1994 Defense Authorization Act directed that the Secretary of Defense develop a plan to coordinate development and implementation of Theater Missile Defense (TMD) programs with TMD programs of allies with the goal of increasing interoperability and reducing costs. Subparagraph (b) of Section 242 of the Act directs the Secretary to submit to Congress a report on this plan.

OVERVIEW

To address the security challenges posed by ballistic missiles and weapons of mass destruction, the Department of Defense (DoD) has refocused priorities guiding the Ballistic Missile Defense (BMD) program. The highest priority is assigned to the development and deployment of TMD systems to meet the present and growing threat from ballistic missiles to U.S. forward-deployed forces, allies and friends. In developing its missile defense program, the United States will be looking to cooperate in the development and deployment of theater defenses with many of its allies and friends who share the problems arising from the proliferation of ballistic missiles.

The DoD approach to international participation in the development and deployment of TMD systems builds on an earlier foundation of bilateral research and development (R&D) programs. These earlier R&D programs were intended to bring highly advanced technologies from abroad, i.e., from friends and allies, into the research effort together with a better understanding of political and military factors that would influence the defense architecture in various regions around the globe. Moreover, such participation provided our friends and allies added insights with which to make informed decisions regarding their own missile defense requirements.

The result of these initial cooperative R&D programs has been a wider agreement on the likelihood and impact of the use of missiles in a theater conflict and the recognition of the need for the development of an effective, layered response to that threat. The actions of Iraq in Desert Storm underlined the consequences of ballistic missile attacks by a hostile nation in a regional conflict.

Other nations now recognize the existing and emerging threats of ballistic missile attack and, as a consequence, commitments to TMD development/efforts by our friends and allies have been increasing. These commitments are evidenced both in unilateral actions by individual nations and multilaterally

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through the NATO Alliance.

Facing the most imminent threat, Israel, with the cooperation of the United States, has long pursued a BMD program centered around the ARROW missile. In Asia, the proliferation of ballistic missiles has prompted the Japanese government to enter into bilateral discussions with the United States on missile defense. In addition to long-term support of U.S. BMD R&D activities, the United Kingdom has recently initiated a pre-feasibility study to examine their specific requirements for national and forward-deployed missile defenses. Similarly, the French, in their 1994 White Paper (the first defense white paper in 22 years), have called for a redirection of research resources to BMD activities. In Germany, a decision is imminent regarding the course of action to develop and deploy the BMD-capable Corps Surface-to-Air Missile (SAM), or TLVS (German acronym for tactical air defense system) missile.

Other nations are also demonstrating their emerging interest in missile defense through activities within the NATO Alliance. In addition to several NATO studies on BMD, a NATO working group of eight nations (the United States, the United Kingdom, Germany, France, Canada, Netherlands, Norway, and Italy) has been established under the Conference of National Armaments Directors. This ad hoc working group has been chartered to deal exclusively with finding ways to cooperate in TMD programs.

To capitalize on this interest through all possible modalities of participation, including bilateral and multilateral programs, an evolutionary and tailored approach to accommodate varying national programs and plans, as well as the special capabilities of particular nations, is being taken. The approach may range from measures such as sharing early warning information to continued bilateral or multilateral R&D, to improvements to current missile defense capabilities, to more robust participation such as codevelopment and coproduction programs and subsequent deployment of advanced capabilities. Benefits of such international programs to enhance missile defense capabilities would include increased regional security; potential cost reductions for U.S. programs (to include reduced requirements for foreign deployments); improved security relationships; and enhanced operational interoperability as nations plan to procure and deploy defenses.

DOD TMD ACQUISITION STRATEGY

To succeed, our allied TMD strategy must be complementary to the existing DoD TMD Strategy. DoD's TMD acquisition strategy consists of three phases. In the first, near-term improvements are aggressively pursued by enhancing existing systems using low-risk, low-cost, and quick-reaction programs while simultaneously developing and refining TMD concepts of operation and tactics. In the second phase, a prudent acquisition approach is employed to procure a significant core TMD capability consisting of land-based defenses to protect critical assets and to provide theater-wide protection. The core capability also includes a sea-based defense to protect U.S. and friendly forces in ports and littoral areas. The core program utilizes user operational evaluation systems (essentially deployable prototypes) to provide an early contingency capability. In the final phase, advanced concept technology demonstrations and other risk reduction activities are used to develop capabilities to complement the core program with the emphasis on affordability and new technologies. These far-term capabilities are called "advanced concepts."

ALLIED STRATEGY: NEAR/MID-TERM PLAN

A key tenet in DoD's TMD program is the development of missile defense capabilities in an evolutionary manner, e.g., improving Patriot capabilities by deploying PAC-3, and building on existing AEGIS capabilities by adding the Standard Missile Block IVA to provide a sea-based lower tier defense against shorter-range theater ballistic missiles (TBM). This strategy is being extended into our foreign discussions with those nations operating export versions of U.S. equipment, producing U.S. systems under license, or contemplating possible codevelopment or acquisition of U.S. equipment in the future. The plan to coordinate development and implementation of TMD programs with friends and allies, shown in Figure 1, has the goal of avoiding duplication, reducing costs, and increasing interoperability.

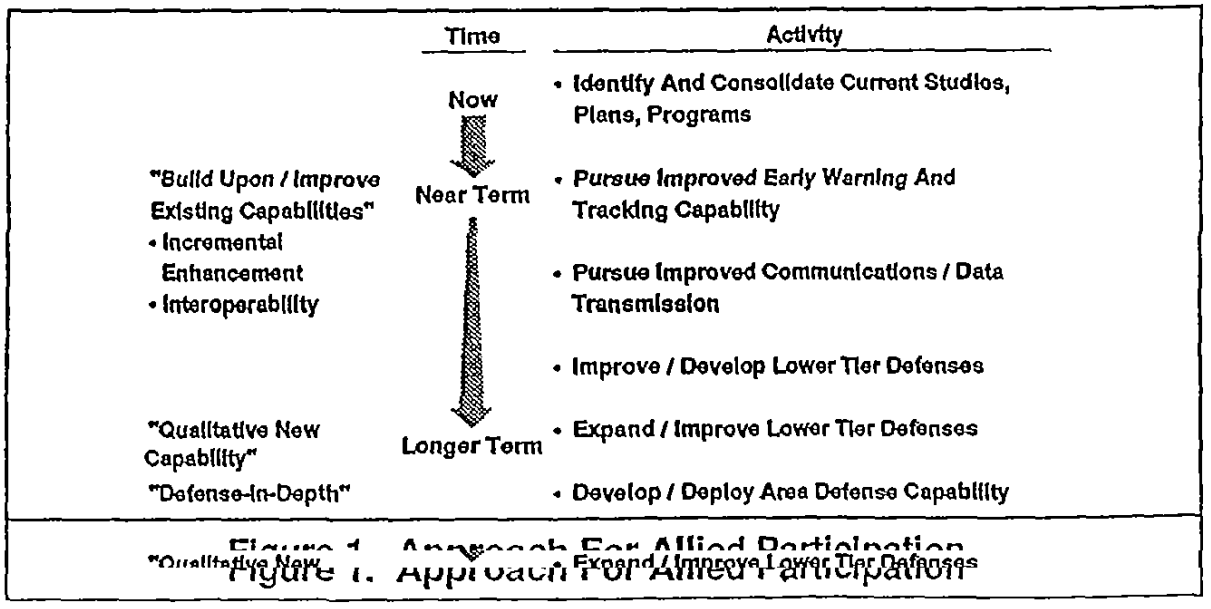

Figure 1. Approach For Allied Participation

This plan is the evolutionary approach that builds on the success of earlier programs, to include those sponsored by external organizations such as NATO. The plan proceeds from a foundation where the responsible political and military authorities set forth the need for defenses. Coordination is effected (e.g., by the NATO Air Defense Committee) to ensure that TMD is properly integrated into the existing air defense and airspace command/control systems. The plan draws on the results of numerous baseline analyses such as NATO's Advisory Group on Aerospace Research and Development (AGARD) and the Ballistic Missile Defense Organization (BMDO) supported missile defense architecture studies for Europe, the Middle East and Japan. It includes the definition of technology alternatives as identified in these baseline architecture studies and further supplemented by reports such as those prepared by the NATO Industrial Advisory Group (NIAG). As individual nations complete their own studies (Israel has finished, the United Kingdom and France are underway), bilateral discussions provide the basis for future cooperative actions.

The near/mid-term program identifies the potential for immediate, low cost, low development, feasible improvements to existing systems and/or operational concepts that will result in measurable improvement in early warning and TMD capability. Figure 2 lists friendly and allied nations with one or more existing systems which could provide an infrastructure for an advanced TMD capability.

The near/mid-term strategy attempts to build on the existing capabilities listed in Figure 2 and establishes the way ahead for incremental improvement and/or the introduction of new capabilities. Key to initial improvements is the acquisition and dissemination of ballistic missile launch information. Therefore, the first element of the DoD plan for international coordination includes the delineation of all current early warning capabilities and the current planned and possible future means to share the information from these systems. Specifically, this would include the following:

- Examination of space-based sensors and the means to share their data;

- Identifying ground- and sea-based sensor capabilities for theater surveillance (U.S. and foreign) and associated modifications to enable improved detection and tracking of missiles. This element of the program should include the integration of U.S. maritime and ground-based assets with foreign systems to provide an improved surveillance capability for a particular region. Programs would include consideration of U.S. AEGIS sensors (AN/SPY-1 radar), forward deployed ground-based radars such as the AN/TPS-59 or the export version, the FPS-117, and other national or Alliance air defense and missile defense surveillance systems.

defense surveillance systems.

Nation	TPS-59	HAWK	PATRIOT	AWACS	AEGIS
	FPS-117				
Belgium	XXXXXX	XXXXXX			
Canada	XXXXXX				
Denmark		XXXXXX			
France		XXXXXX		XXXXXX	
Germany	XXXXXX	XXXXXX	XXXXXX		
Greece		XXXXXX			
Iceland	XXXXXX				
Italy	XXXXXX	XXXXXX			
Luxembourg					
Netherlands		XXXXXX	XXXXXX		
Norway		XXXXXX			
Portugal		XXXXXX			
Spain		XXXXXX			
Turkey	XXXXXX				
United Kingdom	XXXXXX			XXXXXX	
United States	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
Sweden		XXXXXX			
NATO				XXXXXX	
Egypt	XXXXXX	XXXXXX			
Israel		XXXXXX	XXXXXX		
Jordan		XXXXXX			
Kuwait	XXXXXX	XXXXXX	Contract		
Saudi Arabia	XXXXXX	XXXXXX	XXXXXX	XXXXXX	
UAE		XXXXXX			
Japan		XXXXXX	XXXXXX	XXXXXX	XXXXXX
Singapore		XXXXXX			
South Korea	XXXXXX	XXXXXX			
Taiwan	XXXXXX	XXXXXX			

Figure 2. Friends And Allies: Existing TMD-Related Capabilities

- Pursuing possible modification of airborne surveillance systems, such as the E-3 AWACS with an infrared search and track capability, to provide more precise tracking of ballistic missiles. We are trying to develop a cooperative program with NATO, the United Kingdom and France (who already have operational aircraft) for the first step, namely, a flight demonstration.

- Determination of the adequacy of existing battle management/command, control, communications and intelligence (BMC3) systems (and planned improvements), e.g., the NATO Airspace Command/Control System (ACCS), to handle the short time-of-flight ballistic missile threats; specifically, implementation of standard message formats and message protocols to ensure the most rapid and efficient exchange of information. Changes will be made to Joint Tactical Information Distribution System (JTIDS) messages to support Cueing, Command & Control, and Situational Awareness. Tactical Ballistic Missile Defense (TBMD) messages derived for current JTIDS use will be incorporated into the NATO Improved Link Eleven System (NILES) as NILES development progresses between NATO countries.

- The identification of evolutionary command and control operational concepts, such as the Navy Cooperative Engagement Concept (CEC) and their possible integration into Alliance command and control procedures.

- The distribution of improved early warning information which could significantly enhance the performance, i.e., coverage, of fielded TMD systems, particularly as the TMD systems themselves are improved. While U.S. systems constitute the majority of fielded anti-missile systems today, other allies also have the potential to achieve TMD capability, especially for use with their military forces were they deployed in a crisis situation or coalition effort.

- Planned modification to PATRIOT beyond the fielded PAC-2 with consultations centered on allied plans to incorporate near-term improvements for PAC-2, their planning for PAC-3, etc.

- HAWK improvements and the intent of some of the nations that currently deploy improved HAWK (with FPS-117s) to upgrade their systems with the improvements planned by the U.S. Marine Corps (USMC). This would achieve an interim and point defense capability against short-range theater missile threats.

- Upgrades will be made to the AEGIS Combat System to support detection, tracking and engagement of theater ballistic missiles using the SM-2 Block IVA missile. Modifications will be made to data links to support the receipt and transmission of TBM cues to/from Joint Allied Units. There is a current FMS case with Japan involving the sale of AEGIS Combat System for integration into Japan's DDG 2313 Class destroyers.

- AEGIS Standard Missile Block IVA, or an indigenous

integration into Japan's DDG 2313 Class destroyers.

missile incorporating similar TBMD capabilities. This type of missile, together with the CEC concept and an AEGIS or indigenous phased array radar system, could be incorporated into the new air defense frigates now planned by several European countries. The Japanese have made inquiries indicating their desire to participate in the Navy's Theater Wide Program.

Another near/mid-term opportunity for allied involvement is the Commanders-in-Chief's (CINC's) Experiments Program to improve current TMD command, control, and communications capabilities in the field. This program is designed to increase the understanding of TMD capabilities, to develop and refine tactics, and to implement TMD force operations as developed by the theater CINC. The CINC's TMD Experiments Program helps the CINC perform TMD missions by subsidizing the cost of including realistic TMD activity into existing and planned exercises, providing expertise to the CINC in exercise planning and communications connectivity, and bringing new ideas and capabilities to the field during exercises.

The exchange of information between the users and developers has fostered great interest among the Commanders-in- Chief during the past two years. Additional Program goals include the fostering of interoperability with our allies and the development and refinement of TMD concepts of operations. The CINC's Experiments Program builds bridges among our allies, our joint forces and the TMD system architect, BMDO. The program has substantially increased current and near/mid-term TMD capabilities without the addition of a new weapons system. The presence and use of the Tactical Surveillance Demonstration (TSD) in the European Command (EUCOM), and use of both TSD and TALON SHIELD in the Korean theater exercise ORNATE IMPACT (August 1993) are prime examples of surveillance and warning enhancements provided via this program.

ALLIED STRATEGY: FAR-TERM PLAN

The far-term plan will build on these near/mid term achievements with the objective of further enhancing lower tier capabilities and adding the upper tier capability necessary to counter more advanced theater missiles for both (a) defense-in-depth of military forces and (b) territorial theater defense. The potential for foreign involvement in a far-term program and the extent of such involvement, will depend upon where that particular program is in the acquisition process. A key determinant is when the U.S. and individual nations engage in discussions on participation in a program. Generally, the earlier that the ally becomes involved, the better the opportunity for cooperative activities. Detailed technology transfer determination will be made for each prospective program.

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of the system, or development of a system variant with the infusion of allied technology. For example, the U.S. Corps SAM program is presently in the Concept Definition (CD) phase and, therefore, offers an excellent opportunity for international participation. During CD, allied requirements can be harmonized with U.S. requirements, responsibilities and contributions can be determined, and terms and conditions of requisite international agreements can be negotiated.

THAAD on the other hand is a fast-moving, high priority program well into the Demonstration and Validation phase and, for now, offers little opportunity for foreign involvement. While the US prime contractor might be able to include limited foreign subordinate contractors for some special requirements, the schedule does not allow interruptions for negotiations or prime contract modifications. At and beyond the Engineering and Manufacturing Development (EMD) phase, the THAAD program would present opportunities for foreign participation. These opportunities can involve including foreign technologies as product improvements, elements of manufacturing risk reduction, or dual sourcing of system components or elements.

Initiating discussions early ensures that both sides will be able to take advantage of opportunities to reduce cost, avoid redundancies, and improve operational concepts. Such a process would not negatively impact the aggressive schedules established for the U.S. program, which is predicated on putting new, improved capabilities into the force structure as soon as possible.

STATUS

The United States has long pursued active programmatic and policy dialogue with European and Asia/Pacific allies, as well as with Israel, on BMD. A "core group" of allies has been involved: NATO countries, Australia, Japan, South Korea and Israel, largely working in the area of TMD technology and concept developments. The Bottom Up Review (BUR) decision to emphasize TMD has tended to move our activities with allies from exclusively basic R&D more toward development and procurement programs. We are now exploring opportunities for cooperation with our allies consistent with our existing security relationships and guarantees.

In the area of technical cooperation, a number of allies have been participating in missile defense research and development programs going back as far as 1985. Such R&D technical cooperative activities continue and are encouraged consistent with fiscal, policy, and legal constraints. The United States earlier signed Memorandums of Understanding on participation in Strategic Defense Initiative research (umbrella agreements addressing information, security, rights on use of technology generated, etc.,) with five nations: the United Kingdom, Germany, Italy, Israel, and Japan. In addition to these

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overarching agreements, the United States has also signed project-specific Memorandums of Agreement with France, The Netherlands, and the SHAPE Technical Center. Figure 3 shows total foreign participation including all contracts and subcontracts since the beginning of the program. Figure 4 shows major cooperative (i.e., cost share) programs with allies; all of these programs have been for R&D activities.

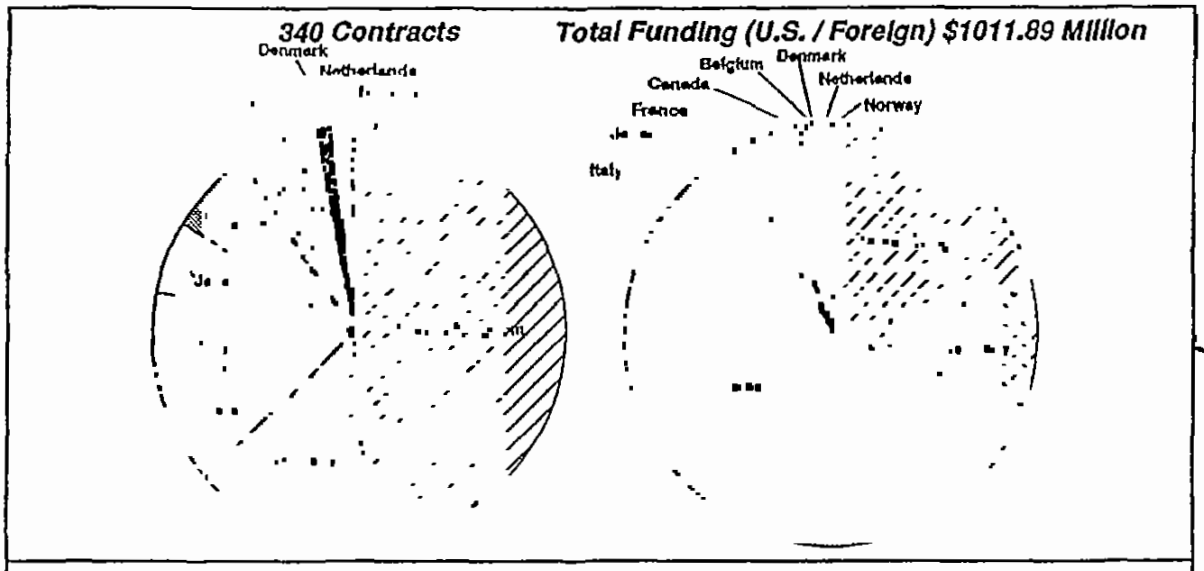

Figure 3. Foreign Participation

Country	Program	Total Value $ In Millions	U.S. / Ally Funding (Approximate)
UK	Data Fusion	26.00	42% / 58%
UK	2 Flight Test Series	65.0	59% / 41%
UK	Extended Air Defense Test Bed	19.20	58% / 42%
UK	Artificial Intelligence	3.50	80% / 20%
Israel	Arrow Experiment	158.00	80% / 20%
Israel	Arrow Continuation Experiments (ACES)	322.00	72% / 28%
Israel	System Engineering And Integration	3.15	75% / 25%
Israel	Theater Missile Defense (TMD) Test Bed	33.00	72% / 28%
Israel	TMD Test Bed Enhancement	5.20	80% / 20%
Israel	TMD Test Bed Experiment Program	6.00	50% / 50%
Israel	Hypervelocity Launcher Program	4.06	75% / 25%
Israel	Boost Phase Intercept (BPI)	5.7	75% / 25%
Japan	Free Electron Laser (FEL) MOA	6.50	90% / 10%
Netherlands	Hypervelocity Gun Test	17.25	30% / 70%
SHAPE	EADTB	32.3	59% / 41%
France	EADSIM	.68	35% / 65%

Figure 4. Major Cost Share Cooperation Arrangements With Allies

SELECTIVE STATUS OF NATIONS AND NATO:

United Kingdom

The United States has been involved with the United Kingdom on BMD research experiments and flight trials and information exchanges since 1985 under an overarching memorandum of understanding. This has led to a strong relationship on BMD issues with the U.K. defense establishment and industry. As shown in Figure 4, the British government has already cooperatively funded a number of key R&D programs.

The British government is now about to proceed on a 14-month study to determine national BMD requirements, including TMD for protection of its military forces deployed abroad; note that the British will also command the new NATO Allied Command Europe's (ACE) Rapid Reaction Corps (ARRC). American contractors will be invited to support British industry as part of the UK strategy effort. Their requirements will necessarily include area defenses. The DoD will work closely with the U.K. Ministry of Defence to ensure that the government modalities associated with possible cooperation on, or direct sales of, U.S. TMD systems are properly reflected in their study results.

Germany

Germany's involvement in anti-missile programs began with its implementation of the U.S.-German Roland Patriot Agreement in 1984. Germany was to provide funds in support of specific anti-missile programs and thereby contribute to defense improvement of U.S. airfields in Germany; German funds and technology were used in the design and demonstration of an adjunct seeker for use on the Patriot missile--the multimode seeker. Germany is currently a key partner in the weapon lethality area.

Moreover, Germany with its Medium Surface to Air Missile (MSAM) program called by the German acronym TLVS (tactical air defense system), is a strong candidate for cooperative development of the Corps SAM system. The DoD has worked closely with the German MOD over the last six months to ensure harmonization of requirements between TLVS and Corp SAM. We anticipate a German government decision on whether to proceed with a cooperative program with the United States (as described) by mid-summer. BMDO and the Army will also work closely with the German MOD with respect to their planning for the incorporation of PAC-3 with their existing systems.

Israel

Israel has been involved in U.S. missile defense programs since 1987. Related activities have included architecture studies, participation in several technology experiments, examination of boost phase intercept concepts, and the development of its indigenous interceptor, ARROW. Israel was the first nation to declare its intent to field national missile defense systems to counter the proliferated missile threat of SCUD and AL Hussein missiles. Israel and the United States have shared technology in these efforts and Israel has funded its share of ARROW development as agreed by the governments. Neither project, ARROW Experiments or ARROW Continuation Experiments (ACES), included a commitment by the United States for follow-on development or procurement funding to support the deployment of the ARROW system in whole or in part. Israel is also committing resources, beyond DoD funding, to develop the fire control system, surveillance, and battle management systems needed to make ARROW an operational system.

Japan

The No Dong flight test by North Korea several months ago has heightened Japanese government and public concern. The United States and Japan have initiated a bilateral TMD Working Group to discuss possibilities for future Japanese involvement (including scope, architecture, candidate systems). Japanese involvement could include, for example, any combination of THAAD, sea-based systems (AEGIS) upgrades, AWACS upgrades, and further upgrades to PATRIOT. Japan has been producing, under license to Raytheon, the PATRIOT PAC-1 missile system since 1985. In 1992, the Japan Defense Agency and the Defense Security Assistance Agency authorized production of the upgraded version of PATRIOT, i.e., PAC-2, to be operational beginning in 1995.

PAC-2 was not designed to defend against a No Dong with a 1000km range. Upgrading PAC-2 to PAC-3 and/or upgrading Japan's AEGIS systems with the Standard Missile Block IVA would result in an improved lower tier TMD capability against the evolving threat, such as the No Dong and other threats in the region with similar ranges. For more effective defenses, the Japanese would need a more capable anti-tactical BMD system such as THAAD or a sea-based upper-tier system. The Secretary of Defense has offered Japan the opportunity to cooperate in TMD via codevelopment, coproduction or licensed production (which would require Japanese dual-use technology in return); alternatively, Japan may later purchase new systems off-the-shelf (with no reciprocal request for dual-use technology).

France

France, with the currently planned modifications to their "EUROSAM" system, has an on-going effort (in concert with Italy) to develop an improved air defense system with a TMD capability based on the Future Surface-to-Air Family (FSAF) of missiles which uses their Aster missile and Arabel and Empar radars. Earlier this year both France and Italy suggested a data exchange agreement with the United States to facilitate improved interoperability with Corps SAM. France is also studying the possibility of developing an upper tier TMD system. In addition, France has an interest in developing space-based surveillance and early warning capability for the European region.

The recently published French "White Paper", their first in 22 years, recognizes the myriad geopolitical changes, and, as a result, France should no longer rely exclusively on their independent deterrent as the basis of their security. Among the emerging new requirements for the French military capabilities is ballistic missile defense. Accordingly, the French have embarked on an aggressive five year BMD technology development program, to be accomplished indigenously and cooperatively.

NATO

Discussions with NATO continue on the problems of proliferation, emerging defense requirements and program information in meetings of NATO Defense Ministers and meetings regarding the improvement of TMD. The NATO Conference of National Armaments Directors (CNAD) recently established an Extended Air Defense/Theater Defense Ad Hoc Working Group (AHWG) composed of interested nations with resources to contribute to TMD. The AHWG's charter is to exchange views on the tactical ballistic missile threat to the Alliance and to define future opportunities and methods of collaboration in the area of TMD. The nations participating in the AHWG are the United States (chair), Canada, France, Germany, Italy, Norway, the Netherlands, and the United Kingdom.

Topics under discussion include the improvement of early warning, BMC3, lethality, infrared plume phenomenology, HAWK upgrades, modelling/simulation and exercises, and upgrades to existing air defense systems such as putting an infrared search and track sensor on AWACS aircraft. Some of the far-term areas of cooperation to be discussed include maritime TMD, and area defense interceptors. Fourteen areas of cooperation have been identified to date where now interested nations will need to put in place the necessary agreements to proceed. The United States will be involved in a number of these programs.

The Netherlands

The Dutch have been particularly active participants in the NATO Ad Hoc Working Group efforts. They are studying their requirements with a view toward possible purchase of PAC-3 for their operational Patriot Systems. Furthermore, they have expressed strong interest in the Navy's planned Standard Missile Block IV-A developments and so-called Cooperative Engagement Concepts for inclusion in the capabilities for their next generation air defense frigate, to become operational around the turn of the century.

FOREIGN CONTRIBUTION

Section 242 of the 1994 Authorization Act also enabled the establishment of a special account in the Treasury that would be able to accept any contribution of money from any nation or any international organization for use by the Department in support of TMD programs. The potential for contributions to this account does exist, but none has been realized to date. This element of potential foreign support or contribution to the U.S. TMD program is being discussed with nations and their participation may include such contributions in the future in accordance with their budget approval process.

SUMMARY

The need for missile defense in the face of the proliferation of ballistic missiles and weapons of mass destruction is recognized by the international community and governments are now taking steps to resolve their defense deficiencies with regard to the threat. DoD has established a sound plan to enable evolutionary improvement of national capabilities and is fully engaged in international discussions on the merits of collaborative programs. Significant international participation in the program will insure that our goal of improved missile defense systems at reduced cost, while avoiding redundancy and improving interoperability, can be achieved.