

# CRS Report for Congress

## Theater Missile Defense: Indigenous Programs and Interest Among U.S. Friends and Allies

DISTRIBUTION STATEMENT A  
Approved for public release;  
Distribution Unlimited

19980513 077

Steven A. Hildreth  
Specialist in National Defense  
Foreign Affairs and National Defense Division

DTIC QUALITY INSPECTED 4

PLEASE RETURN TO:

July 27, 1993

BMD TECHNICAL INFORMATION CENTER  
BALLISTIC MISSILE DEFENSE ORGANIZATION  
7100 DEFENSE PENTAGON  
WASHINGTON D.C. 20301-7100

U4636



---

The Congressional Research Service works exclusively for the Congress, conducting research, analyzing legislation, and providing information at the request of committees, Members, and their staffs.

The Service makes such research available, without partisan bias, in many forms including studies, reports, compilations, digests, and background briefings. Upon request, CRS assists committees in analyzing legislative proposals and issues, and in assessing the possible effects of these proposals and their alternatives. The Service's senior specialists and subject analysts are also available for personal consultations in their respective fields of expertise.

Accession Number: 4636

Publication Date: Jul 27, 1993

Title: Theater Missile Defense: Indigenous Programs and Interest among US Friends and Allies

Personal Author: Hildreth, S.A.

Corporate Author Or Publisher: Library of Congress, Congressional Research Service, Washington, DC  
Report Number: 93-703F

Descriptors, Keywords: CRS Theater Missile Defense Indigenous TMD Allies Program Cooperation  
Europe UK Germany France Italy Japan

Pages: 00018

Cataloged Date: Aug 20, 1993

Document Type: HC

Number of Copies In Library: 000001

Record ID: 28051

**THEATER MISSILE DEFENSE:  
INDIGENOUS PROGRAMS AND INTEREST  
AMONG U.S. FRIENDS AND ALLIES**

**SUMMARY**

The threat posed by weapons of mass destruction and their means of delivery, especially missiles, is a growing international concern. Most nations seek to deal with this threat through a combination of arms control and military measures. Only a few allies and friends of the United States, however, appear apprehensive and are considering or seeking to acquire advanced theater missile defense (TMD) capabilities to deal with these threats.

Some nations are satisfied with the limited TMD capability they have in the Patriot antitactical missile system, which is designed to defend small areas. Some nations in Europe, such as France and Germany, are beginning to think about acquiring TMD to defend troops they may have deployed overseas in peacekeeping roles.

TMD efforts among U.S. allies and friends are revealing. Most countries who have acquired Patriot antitactical missile systems have negotiated offset agreements that ensure there is not an excessive flow of resources or money out of their country. A number of countries have also received contracts from the United States to conduct TMD research and development, investing relatively little of their own resources. There is little other TMD cooperation among U.S. allies and friends, and the only indigenous TMD programs in other countries remain simply options as they upgrade their air-defense capabilities.

The reasons these countries do not support TMD efforts with greater commitment are principally budgetary: defense budgets around the world are generally constrained. U.S. allies and friends also cite political sensitivities in openly debating regional threats, as well as a host of barriers to international technological cooperation with the United States.

U.S. allies and friends largely appear willing to accept the U.S. technological lead in pursuing TMD. But they do not appear eager or willing to share the resource burden in developing TMD systems. While some nations may acquire mature TMD systems in the future, with accompanying offset agreements likely in most cases, others may be satisfied with the various security guarantees provided by the United States, including possible deployment of TMD capabilities. Only a few may seek to purchase future U.S. TMD systems outright.

**PLEASE RETURN TO:  
BMD TECHNICAL INFORMATION CENTER**

## TABLE OF CONTENTS

INTRODUCTION AND OVERVIEW .....	1
ALLIED PERCEPTIONS OF THEATER MISSILE THREATS ...	3
NEAR-TERM THREATS GENERATING URGENT RESPONSE .....	3
LONG-TERM THREATS PRODUCING INDEFINITE RESPONSE .....	5
ROLE OF THEATER MISSILE DEFENSES .....	5
DETERRENCE AND THEATER MISSILE DEFENSE .....	6
THEATER MISSILE DEFENSE MISSIONS .....	6
Point Defenses of National Assets .....	6
Wide-Area or Nationwide Defenses .....	7
Defense of Expeditionary Forces .....	7
THEATER MISSILE DEFENSE EFFORTS .....	7
COOPERATION WITH THE UNITED STATES .....	9
Cooperative TMD Research and Development .....	9
Purchases of Patriot Systems .....	9
With Offset Agreements .....	10
Through Direct Purchase .....	11
Prospective Purchases .....	11
Other Possible Ventures .....	12
COOPERATION WITH REGIONAL PARTNERS .....	12
INDIGENOUS PROGRAMS .....	14
Air-Defense Upgrades .....	14
Dedicated Theater Missile Defenses .....	15
CONSTRAINTS .....	16
BUDGETARY .....	16
POLITICAL .....	17
BARRIERS TO TECHNOLOGY COOPERATION .....	17
CONCLUSION .....	18

# **THEATER MISSILE DEFENSE: INDIGENOUS PROGRAMS AND INTEREST AMONG U.S. FRIENDS AND ALLIES**

## **INTRODUCTION AND OVERVIEW**

Missile attacks have become a notable feature of modern warfare. Within the past decade, a number of such attacks have occurred. French-built Exocet missiles launched by Argentina destroyed a British destroyer and damaged another in the 1982 Falklands (Malvinas) war. A U.S. guided-missile frigate also was damaged heavily by an Exocet missile launched by Iraq in 1987. In 1986, Libya launched Soviet-built Scud missiles against a U.S. facility in Italy. During 1980-1988, Iran and Iraq attacked each other with more than 600 Scuds. More recently, during the 1991 Gulf War, Iraq launched almost 90 Scud missiles against Israel and Saudi Arabia.

Generally, two basic approaches have been taken to deal with the threat of missile attacks. Many nations favor a range of arms control and export control efforts aimed at slowing or reversing the global proliferation of weapons of mass destruction and their means of delivery. Many nations also rely on a variety of military solutions to deal with these threats. These solutions include acquiring offensive military means to deter aggression and to be able to destroy another nation's ability to carry out missile attacks, and defensive means to destroy attacking missiles in flight. This latter capability is known as missile defense.

Theater missile defenses (TMD) are defensive military systems designed to attack and destroy short- and medium-range missiles. Typically, the launch point of these missiles and their intended target lie within a theater or region.<sup>1</sup> TMD systems generally would seek to engage and destroy short-range missiles with ranges of less than about 1,000 kilometers (about 620 miles), or in some cases medium-range missiles with ranges of less than 1,500 - 2,000 kilometers (about 930 - 1,240 miles).

The United States supports a number of TMD programs and initiatives within the Defense Department's Ballistic Missile Defense Organization (BMDO), known formerly as the Strategic Defense Initiative

---

<sup>1</sup> These include ballistic missiles, cruise missiles, or air-to-surface missiles.

Organization. These include several point defense interceptor capabilities, such as further upgrading the Patriot antitactical missile defense system (used during the 1991 Persian Gulf War), giving both the Navy's Standard Missile and the Army's Hawk air-defense missile systems limited TMD capabilities, as well as developing newer TMD systems such as the Extended Range Interceptor (ERINT) and CORPS SAM (surface-to-air missile). The United States also is pursuing several wide-area (to protect a relatively large portion of the country) defense interceptor programs, including the Army's ground-based THAAD (Theater High Altitude Area Defense), and a Navy upper-tier or high-altitude intercept system.<sup>2</sup>

The United States leads all other nations in terms of total resources spent on developing a wide range of TMD systems. Current Pentagon plans call for about \$17 billion in TMD spending from fiscal years (FY) 1994-1999. There are no current or prospective theater missile threats to U.S. territory, and the TMD program's basic rationale is "to provide highly effective TMD to forward deployed and expeditionary forces and to friends and allies of the United States."<sup>3</sup>

Some policymakers, however, recently have begun to question the Nation's resource commitment to TMD. Some ask, for example, whether the United States should pursue so many TMD programs, some of which are considered redundant. Others are beginning to question whether the United States alone should develop and deploy TMD systems that largely would benefit the interests of and defend the territory of U.S. allies and friends around the world. Some suggest that U.S. allies and friends should play a greater role in sharing the resource burden that will be incurred over this decade. Finally, others ask why U.S. allies and friends are not more concerned about threats of theater missile attacks and question whether the U.S. commitment to TMD is warranted.

This report summarizes some of the basic views held by U.S. allies and friends toward current and potential missile threats. The report also summarizes some of the current thinking in those countries about the role and utility of TMD systems. Transfers of TMD systems and current TMD

---

<sup>2</sup> For more details on theater missile defense programs, policy, and issues, see: U.S. Library of Congress. Congressional Research Service. Theater Missile Defense Policy, Missions, and Programs: Current Status. CRS Report No. 93-585F, by Steven A. Hildreth, June 10, 1993. Washington, 1993, and U.S. Library of Congress. Congressional Research Service. Theater Missile Defense: Issues for the 103rd Congress. CRS Issue Brief, updated regularly, by Steven A. Hildreth. Washington, 1993.

<sup>3</sup> P.L. 102-190, Sections 231-236. National Defense Authorization Act. These sections are known as the Missile Defense Act.

development programs and initiatives within these countries are examined. Finally, the report briefly discusses some of the perceived constraints shared by some U.S. allies and friends in supporting a greater commitment to TMD.

It should be pointed out that most U.S. allies and friends are not interested in pursuing theater missile defenses. The scope of this report is therefore limited to friends and allies who have expressed some interest in TMD. In Europe, these countries are the United Kingdom, France, Germany, Italy, and the Netherlands. In the Middle East, they are Israel, Saudi Arabia, Kuwait, and Turkey. And in Asia, the countries include Japan, South Korea, and Taiwan. Although Russia has an operational TMD capability and other development programs underway, it is not included in this report.

Among many friends and allies of the United States, there is some level of discussion and debate over theater missile defenses. Oftentimes, these discussions take place within academic communities, private industry, or among interested groups or decisionmakers, or some combination of them.<sup>4</sup> This report strives to identify interest and support for TMD at the national policymaking level among U.S. allies and friends.

## **ALLIED PERCEPTIONS OF THEATER MISSILE THREATS**

This section summarizes some of the basic views held by U.S. friends and allies toward current and prospective theater missile threats. These views can be placed into two groups: 1) near-term threats, requiring some urgent TMD response, and 2) longer term threats, which apparently do not produce an urgent commitment to TMD.

### **NEAR-TERM THREATS GENERATING URGENT RESPONSE**

Among U.S. allies and friends, several countries appear to be quite concerned about ballistic missile threats and have acquired some TMD

---

<sup>4</sup> Two very useful reviews of public statements made by various political and other leaders supporting some role for TMD are: National Institute for Public Policy. Recent Selected Statements by European Leaders in Support of Ballistic Missile Defense. Fairfax, VA. May 11, 1993; and National Institute for Public Policy. Proliferation and Missile Defense: European-Allied and Israeli Perspectives. Fairfax, VA. June 1993.

capability in the Patriot antitactical missile system.<sup>5</sup> These countries are Israel, Saudi Arabia, Kuwait, Japan, and South Korea (through the presence of U.S. Patriot systems there).

At the moment, Israel is the only country strongly interested in acquiring further advanced TMD capabilities. Israel is very concerned about the immediate threat and the potential threat of missiles and the weapons they could carry. Israel has viewed this threat as serious for some time. Syria, Libya, Iran, Yemen, Egypt, and Iraq have short-range ballistic missiles with ranges up to 600 kilometers (about 375 miles). Saudi Arabia has intermediate-range Chinese-built missiles. North Korea is supplying missiles and production facilities to countries in the region and is developing a 1000-km missile that it may eventually export.

In addition, several countries in the Middle East have programs to produce, develop, or buy weapons of mass destruction. Iran and Libya are trying to acquire nuclear weapons, materials, or technology. Iraq had an aggressive program to develop nuclear weapons using large quantities of western materials and technology. The military operations of Desert Storm and the activities of the UN Special Commission have destroyed most of Iraq's known nuclear weapons facilities, as well as its chemical weapons program, but Iraq retains the knowledge and, perhaps, the network of suppliers that would enable it to revive these programs in the absence of international monitoring. Syria, Libya, and Iran also reportedly have chemical and biological weapons programs at varying levels of development; Egypt has only a chemical weapons stockpile (consisting of bombs and artillery rounds).

Other than Israel, the countries most concerned about possible missile threats are Saudi Arabia, Kuwait, South Korea, and Japan. Because they were attacked repeatedly throughout the 1991 Gulf War, Saudi Arabia and Kuwait remain sensitive to regional missile threats, but have not expressed publicly any support for wide-area defenses. Because of recent developments, South Korea and Japan have become increasingly interested in acquiring additional TMD capabilities. Both South Korea and Japan expressed anxiety over North Korea's development and recent testing of the No-Dong missile (range of about 1,000 kilometers). A newer version of the missile (No-Dong 2) reportedly may attain a range of about

---

<sup>5</sup> For a broad, global review of missile and weapons of mass destruction proliferation, see U.S. Library of Congress. Congressional Research Service. Missile Proliferation: A Discussion of U.S. Objectives and Policy Options. CRS Report No. 90-120F. Washington, D.C. February 21, 1990. pp. 3-6. Also, U.S. Department of Defense. Strategic Defense Initiative Organization. Ballistic Missile Proliferation: An Emerging Threat. 1992. Washington, D.C.

1,500-2,000 kilometers. In addition, North Korea has a nuclear program whose scope and purpose remain uncertain, controversial, and of mounting worry to the region and the world. Reportedly, North Korea also has a chemical weapons capability.

### **LONG-TERM THREATS PRODUCING INDEFINITE RESPONSE**

Among most U.S. allies and friends there is growing general concern and some discussion over the global proliferation of weapons of mass destruction and their means of delivery, especially missiles. But for most countries there is little apparent urgency in developing or acquiring TMD systems for defense of national territories. For example, the United Kingdom and Germany do not see such threats developing until well into the future. Current U.S. assessments of missile proliferation seem to bear this out. Germany has a limited TMD capability in the Patriot system, while the United Kingdom currently has no such capability.

Other countries may publicly acknowledge the potential risks of missile proliferation in general terms, but appear reluctant to discuss potential threats in more specific terms. For example, some observers note that France someday could face missile threats from North Africa (i.e., Algeria and Libya), yet French decisionmakers are reluctant to discuss this openly. There appears to be similar reluctance for such debate in Italy (where missiles from Egypt, Libya, Saudi Arabia, or Israel could reach Italy) and Turkey (from Iran, Iraq, Egypt, Syria, Libya, Saudi Arabia, or Israel). Italy and Turkey have limited TMD capabilities in the Patriot system, while France currently has no such defenses.

### **ROLE OF THEATER MISSILE DEFENSES**

In terms of broader national security strategies, U.S. friends and allies assign different roles and importance to TMD. One country views TMD as subservient to its nuclear deterrent strategy. In another country, there is some discussion that TMD systems themselves could play a dominant deterrent role. Among most U.S. friends and allies, however, TMD is viewed as one element of larger national policies supporting arms control efforts and other military capabilities designed to slow or reverse global proliferation and deter regional aggression. These are discussed below.

## **DETERRENCE AND THEATER MISSILE DEFENSE**

France is alone in asserting the primacy of its independent nuclear retaliatory force.<sup>6</sup> France believes this capability is sufficient to deter others from attacking France with ballistic missiles armed conventionally or with weapons of mass destruction. Hence, in large part, there appears to be little official public support for TMD. This view may be changing, however; France is looking at potential roles for TMD systems.

Most allies and friends interested in TMD, however, do not believe that the threat of offensive retaliation will deter all hostile states from considering or using ballistic missiles in a crisis or during war. Therefore, there is a greater willingness for some to consider TMD systems as part of their national security strategy. These countries include: Turkey, Israel, and Saudi Arabia (all of whom apparently believe their neighbors view ballistic missiles and weapons of mass destruction little differently from conventional weapons), as well as the United Kingdom, South Korea, Taiwan, and Japan. Two other countries have acquired a limited TMD capability (i.e., Patriot systems) as part of their formal alliance responsibilities--the Netherlands and Germany.

Within Italy, another perspective is seen. Here there is some support for the idea that missile defenses can serve not only to protect the country from missile attacks, but may well deter such attacks and even proliferation.<sup>7</sup>

## **THEATER MISSILE DEFENSE MISSIONS**

Because each of these countries believe there is some role for TMD, it is useful to examine the major missions these countries envision for TMD. These missions include point defenses of specific assets or very small areas, wide-area or nation-wide defenses, and defense of troops deployed overseas. These are discussed briefly below.

### **Point Defenses of National Assets**

To date, several countries have acquired or purchased Patriot missile systems for defending specific military assets or for use in defending small

---

<sup>6</sup> Interviews with French officials. May-June 1993.

<sup>7</sup> This argument was made recently by Salvatore Ando (then Italy's Minister of Defense) at a meeting of the Western European Union on missile defense issues in Rome, April 1993. See, *Defense Week. European Ballistic Missile Defense: Big Plans, Lots of Talk, But Not Much Cash*, by Joseph Loveche. April 26, 1996. pp. 1, 11.

areas, such as cities. These countries include: Germany and the Netherlands (as part of their NATO responsibilities), Italy, Israel, Saudi Arabia, Kuwait, and Japan. U.S. Army Patriot units are deployed in South Korea. Several countries are looking to upgrade their air-defense capabilities with limited TMD capabilities. These countries include France, Germany, the United Kingdom, and Taiwan.

### **Wide-Area or Nationwide Defenses**

Several countries are interested in acquiring a nationwide missile defense capability. Not surprisingly, these countries are among those identified earlier as being most threatened: Israel, South Korea and Japan. Whether Saudi Arabia or Kuwait are interested has not been made manifest. Some countries, however, do not foresee acquiring any wide-area defense capability. For example, Germany is specifically not interested for several reasons:<sup>8</sup> 1) there are no current or prospective threats that require such a system; 2) there are no alliance obligations requiring such a system; and 3) a wide-area defense of Germany is problematic--missile interceptions would probably occur outside German territory, with debris falling (unacceptably) on other European countries.

### **Defense of Expeditionary Forces**

Over the past few years, there has been increasing willingness among some friends and allies to consider deploying troops outside their own countries as part of larger international peacekeeping forces. At the same time, there is concern that in some crises or regional hotspots, these troops may be at risk of attack from missiles. Hence, there is growing interest in some countries, such as France, Germany, and the United Kingdom, to consider the acquisition of TMD capabilities to defend their troops overseas.

## **THEATER MISSILE DEFENSE EFFORTS**

So, what exactly are these countries doing? This section describes ways in which U.S. allies and friends have cooperated with the United States in acquiring TMD systems and conducting U.S. funded TMD research and development. The section describes further a few TMD programs being pursued collaboratively between regional partners. Finally, a review is made of indigenous TMD programs among U.S. allies and friends. Chart 1 summarizes the various TMD efforts being pursued.

---

<sup>8</sup> Interview. June 13, 1993.

**Chart 1**  
**TMD Efforts (active defenses) of the United States and its Friends and Allies**

	U.S. Programs	Cooperation with United States	Cooperation with Regional Partners	Indigenous Programs
<u>Air-Defense/TMD</u>	Hawk Navy SM-2 Patriot PAC-2 Growth Program Patriot PAC-3 Upgrade	TMD R&D Contracts many countries Purchases of Patriot systems (with offsets) The Netherlands, Italy, Germany, Israel, Japan (direct purchases) Saudi Arabia, Kuwait	SAMP-T? France and Italy	TLVS? Germany MSAM? U.K. CHU SAM? Japan Tien Kung? Taiwan
<u>Dedicated TMD</u> Point Defenses	ERINT CORPS SAM			Arrow/ACES? (Israel)
Wide-Area Defenses	THAAD Navy Upper-Tier	TMD R&D Contracts Israel		

## **COOPERATION WITH THE UNITED STATES**

There are two ways in which U.S. allies and friends have traditionally cooperated with the United States on theater missile defense. First, U.S. friends and allies have received U.S. contracts for research and development of theater missile defenses. Second, U.S. allies and friends have purchased U.S. Patriot antitactical missile systems. These two basic forms are discussed below.

### **Cooperative TMD Research and Development**

Since 1985, U.S. allies and friends have participated in more than 300 missile defense contracts. They have received about \$925 million from the United States for this work. Most of this money was spent on TMD-related studies and for research and development (primarily to support the Israeli Arrow missile program). Reportedly, U.S. allies and friends contributed over \$100 million of their own to these projects.<sup>9</sup>

According to the BMDO, foreign participation has helped the U.S. missile defense effort. Basically, BMDO "has received widespread access to foreign technical expertise and innovative technology contributions."<sup>10</sup> The extent to which any of this work may be incorporated into U.S. missile defense systems, especially TMD, is not known. (The Arrow program is discussed further under "Dedicated Theater Missile Defenses.")

### **Purchases of Patriot Systems**

Several countries have purchased Patriot Air Defense Missile Defense Systems (often referred to as Fire Units),<sup>11</sup> which are produced by the

---

<sup>9</sup> U.S. Department of Defense. Report to Congress: Conceptual and Burden Sharing Issues Related to Space-Based Ballistic Missile Defense Interceptors. Washington, DC. March 1992. p. 27.

<sup>10</sup> BMDO provided CRS with answers to questions about foreign contributions to U.S. missile defense in interviews, June 1993.

<sup>11</sup> The basic U.S. Army Patriot configuration is a fire unit, consisting of several components physically separated from each other:

- 8 missile launchers (typically), each of which has 4 missiles (factory sealed in canisters) and 4 reload missiles (for each launcher), for a total of 64 missiles;
- a ground-based phased array radar for surveillance, target detection, tracking, and target engagement;
- an Engagement Control Station (ECS), manned by Army personnel, to provide either manual or automated command and control of the

Raytheon Company.<sup>12</sup> Most of these contracts were made with accompanying offset agreements between the United States or Raytheon (or both) and the purchasing country. Two direct purchases of Patriot systems were made. A number of other countries are reportedly also interested in acquiring Patriot. These are addressed below.

### ***With Offset Agreements***

Most purchases of the Patriot system include offset agreements.<sup>13</sup> Offsets include various forms of compensation as a condition of purchase.<sup>14</sup> In two cases where the Patriot system was purchased, offset agreements are required by laws in that country.<sup>15</sup>

- The Netherlands purchased four Patriot Fire Units valued at about \$200 million and required a \$197 million offset, which consisted of direct and indirect forms of technology and military cooperation, as well as logistics offsets.

---

system; and

- communications equipment and an electrical power generator.

Fire unit configurations may differ from country to country.

<sup>12</sup> Information about whether these countries possess Patriot PAC-1 or more capable PAC-2 (Patriot Antitactical Missile Capability) systems remains classified and cannot be provided here.

<sup>13</sup> Information regarding details of Patriot system sales and offsets was provided to CRS from the Raytheon Company, July 1993.

<sup>14</sup> "Offsets are a range of industrial and commercial compensation practices required as a condition of purchase in either government-to-government or commercial sales of defense articles and/or defense services as defined by the Arms Export Control Act and the International Traffic in Arms Regulations." The various types of offset agreements include coproduction, licensed production, subcontractor production, technology transfer, countertrade, and counter-purchase. Offsets result from a number of considerations that seek to improve the overall value of the sale from the buyer's perspective. See, Executive Office of the President of the United States. Office of Management and Budget. Offsets in Military Exports. April 16, 1990. pp. 8-9.

<sup>15</sup> Most NATO countries require offsets. See North Atlantic Council. Initial Investigation of the Feasibility of Improving the Conditions of Defense Trade Between NATO Allies. Conference of National Armaments Directors. Report by the Task Group. Document AC/259-D/1437. March 12, 1991. Annex VI, p. 3.

- A U.S. agreement with Italy calls for the transfer of twenty Fire Units. The United States will provide Italy with Patriot ground equipment (radars, ECS, etc.) in return for Italy providing short-range air-defense of U.S. assets located in Italy. Italy will purchase Patriot missiles, launchers, and other equipment from Italian industry in a coproduction agreement with Raytheon.

Although not required by law, several other countries negotiated offsets as part of their Patriot contract.

- Germany agreed to procure 14 Patriot Fire Units at a value of \$1.16 billion and the United States agreed to provide Germany with 14 Fire Units (Germany will operate 12 of these units). The production and logistics offsets to German industry are valued at about \$1 billion.
- The United States provided Israel with two Fire Units, absorbing the costs of this grant under the Arms Export and Control Act. A third Fire Unit was funded by a grant from the German Government (valued at about \$105 million). In support of this contract, Raytheon agreed to meet the Israeli offset requirement of 30 percent of Raytheon's part of the procurement.
- Japan negotiated a direct commercial contract for the technology transfer of information and materials necessary for manufacturing the Patriot Missile System in Japan. Japan plans to manufacture 32 Fire Units.

### ***Through Direct Purchase***

Only two countries, Saudi Arabia and Kuwait, have made direct purchases without any sort of offset agreement. Saudi Arabia purchased twenty Patriot Fire Units valued at about \$1.5 billion. Kuwait purchased five Fire Units valued at about \$780 million.

### ***Prospective Purchases***

Several other countries are reportedly interested in acquiring Patriot systems, including United Kingdom, Greece, Turkey, Egypt, UAE, Qatar, Bahrain, South Korea, Taiwan, and Singapore. Details of these negotiations and likely outcome remain unavailable.

## Other Possible Ventures

Several countries could acquire more advanced U.S. TMD capabilities in the future. The pattern of cooperation with the United States to date shows that U.S. allies and friends prefer to acquire missile defense systems that are already deployed, and want accompanying offset agreements. For example, if France determined that it required an effective, wide-area defense system, it might enter into some collaborative acquisition arrangement with the United States once this country had acquired such a system.<sup>16</sup>

Although any U.S. ally or friend could probably acquire some future U.S. TMD capability, some countries are in a better position than others to take advantage of current U.S. TMD programs. For example, Japan is in a position to purchase or enter a cooperative production arrangement for systems being developed by the United States. More specifically, Japan already has Patriot systems that could be upgraded with the more advanced PAC-3 missile when it is deployed. Japan plans to acquire four Aegis-class destroyers that could be upgraded with advanced U.S. maritime TMD missiles (if the United States decides to develop and deploy that capability). Also, Japan has purchased a number of AWACS early warning planes that could be used as sensors in a TMD system. U.S. estimates for upgrading Japan's TMD capabilities range from \$2 billion to \$10 billion.<sup>17</sup>

Many U.S. allies and friends, however, may be satisfied with existing U.S. alliance and security commitments. This means that future advanced TMD capabilities might be provided or guaranteed by the United States. Under these conditions, the costs to allies and friends would probably be minimal.

## COOPERATION WITH REGIONAL PARTNERS

For the most part, U.S. allies and friends argue that they can not go it alone on TMD for several reasons. Israel may be the single exception. First, allies and friends do not believe they possess the technological capability to build advanced TMD systems better or more affordably than the United States. Second, they do not believe they have the resources to conduct an expensive TMD effort by themselves. As a result some believe

---

<sup>16</sup> Interviews with French officials. June 1993.

<sup>17</sup> See, \$2 Billion Would Give Japanese Scud-Busting Capability. Defense Week. Joseph Loveche. July 12, 1993. p. 7.

that acquiring advanced TMD capabilities should await completion of current U.S. TMD initiatives. At that point some countries may choose to purchase U.S. systems outright (i.e., Japan, Saudi Arabia, and the United Kingdom). Others, such as France, suggest that if such defenses were required they might pursue some cooperative production arrangements with the United States. As mentioned earlier, Germany apparently is not interested in acquiring a dedicated TMD system (for use against ballistic and cruise missiles only).

Because of these strongly held perceptions, there are few cooperative TMD-related efforts among the allies. France and Italy are proceeding with something called the EUROSAM program, which is a joint venture by Aerospatiale, Thomson-CSF, and Alenia, aimed at developing a naval (SAMP-N) and ground-based (SAMP-T) follow-on to the U.S. Hawk air-defense missile system.<sup>18</sup> The SAMP-T could eventually have some TMD capability, but France and Italy stress they have not yet made this commitment.<sup>19</sup> Both countries' budget support for the air-defense follow-on is currently minimal. Precise research and development costs are not available, although estimates range from about \$50 million to \$150 million over the next several years. Germany had once expressed interest, but believed the system would be too limited. Meanwhile, Germany awaits the outcome of this research and later may determine SAMP-T can be adapted for German use.

Although not being developed specifically as an element of a future TMD system, France, Spain, and Italy, are developing and deploying the Helios reconnaissance satellite, which could contribute to a TMD early warning system supporting intelligence requirements. Its costs are estimated to be about \$1.4 billion.<sup>20</sup> The first satellite is planned for launch in 1994 and the second in 1998-99.

In addition to these efforts, NATO and the Western European Union (WEU) have examined theater missile defense issues for several years. But to date, no European commitment to pursue TMD has been made.

---

<sup>18</sup> For example, see: Europe Debates its Own ATBM System. Defense News. Giovanni de Briganti. April 26-May 2, 1993. pp. 3, 29; and Two French Contracts Will Explore New ATBMs. Defense News. Giovanni de Briganti. Sept. 30, 1991. p. 24.

<sup>19</sup> Interviews. June 1993.

<sup>20</sup> See, Proliferation and Missile Defense: European-Allied and Israeli Perspectives, p. 10.

Nonetheless, recently the WEU has been seeking to develop a joint unified position or requirement for TMD.<sup>21</sup>

## **INDIGENOUS PROGRAMS**

Only a few U.S. allies and friends are pursuing TMD projects by themselves. All these efforts are related to upgrading existing air-defense capabilities within these countries. One other program, the Israeli Arrow missile, might be pursued indigenously if the United States ends its budget support of the program. These programs are discussed briefly below.

### **Air-Defense Upgrades**

There are several programs underway to replace aging air-defense systems. According to research and development plans, each program has potential for acquiring limited TMD capabilities. Most of the research budgets support the air-defense upgrade; relatively little supports the TMD growth path.

Germany is pursuing the TLVS (Taktische Luft Verteidigungs System) to meet their requirements for a follow-on to the Hawk air defense system and to provide defenses against tactical, air-to-ground, and cruise missiles. This year, the program is preparing to enter the demonstration and validation phase, which would precede a procurement decision in about 1997. This phase, 1994-1996, will cost about \$63 to \$125 million; the total research and development program is estimated at about \$410 million. Germany, however, is not committed to TLVS procurement, which is estimated at \$1.9 billion to equip 9 battalions with four TLVS systems each.<sup>22</sup> Rather than make a commitment to TLVS at this time, Germany awaits the outcome of the French and Italian EUROSAM effort and the U.S. CORPS SAM program.

The United Kingdom wants to replace its aging Bloodhound missiles with the MSAM (Medium Surface-to-Air Missile). Reportedly, MSAM could acquire limited TMD capabilities through additional research and

---

<sup>21</sup> See, Union Calls for Antimissile Network. Agence Europe. April 23, 1993. Translated in JPRS--TND-93-004-L, May 13, 1993. p. 21. Assembly of WEU Asks Council to Come Up With European Position on GPALS. Inside the Army. Jan. 11, 1993. pp. 19-20; and WEU to Look Into Early Warning Center, European Defense System. Inside the Army. June 28, 1993.

<sup>22</sup> Cost figures were provided by the German Government to CRS, June 1993.

development. Although the United Kingdom will spend about \$3 million this year to examine the need for giving MSAM a capability for TMD, it has not committed yet to that requirement. Various international aerospace groups are just now competing for the MSAM contract.

Through the Japanese Defense Agency, Japan is developing a HAWK air-defense replacement using the concept developed under a program called CHU SAM or FUTURE MISSILE. This system also has growth potential as a TMD system against short-range missile threats after the year 2000. Reliable budget figures for this effort are not available, but are reported to be minimal. Some assume the Japanese will build on their experience with production of the Patriot system.<sup>23</sup>

Finally, Taiwan is developing an upgraded air-defense system that might possess some TMD capabilities. Reportedly, the Tien Kung 1 (Sky Bow 1) missile successfully intercepted a short-range missile in 1985. The Tien Kung 2 missile (Sky Bow 2) is designed for higher altitude interceptions. More recently, Taiwan has expressed interest in a Modified Air Defense System (MADS) concept.<sup>24</sup> The costs of these programs are not available.

### **Dedicated Theater Missile Defenses**

The Israeli Arrow missile is included in this discussion because it may become an indigenously produced system. There are two reasons for this. First, continued U.S. support is in doubt. The BMDO has indicated that it will not provide continued support of Arrow beyond some point in the research and development phase.<sup>25</sup> They argue that the United States has gained what it can technologically from funding the Israeli effort to date, and that the United States has no plans to deploy the system itself. Second, at the same time, there appears to be a growing commitment within Israel to continue with production and eventual deployment of a nation-wide Arrow system in the mid-to-late 1990s.<sup>26</sup>

---

<sup>23</sup> See, ATBMs and Beyond. Duncan Lennox. Jane's Defense Weekly. May 22, 1993. p. 22.

<sup>24</sup> Ibid. Also, see Taipei Confirms MADS talks in Progress. Robert Karniol. Jane's Defense Weekly. July 17, 1993. p. 9.

<sup>25</sup> Interviews with BMDO officials. June 1993.

<sup>26</sup> See, Israel Decides to Purchase the Arrow Scud-Busting Missile. Joseph Loveche. Defense Week. May 17, 1993. p. 9; and Big Boost for IAI. Neal Sandler. The Jerusalem Report. March 25, 1993. pp. 36-37.

Thus far, the United States has provided most all of the funding for the Arrow program.<sup>27</sup> The United States provided \$126 million for its share of the first Arrow contract, as well as 25 percent of Israel's \$31 million share of the contract from U.S. grant aid. The United States will provide \$231 million for its share of the current (second) Arrow contract; "100 percent of Israel's \$90 million share will likely be funded from U.S. grant aid. In addition, the United States is funding \$36.6 million in project management costs . . . [and is additionally funding] smaller contracts related to the Arrow system."<sup>28</sup>

It has not yet been decided, however, who will continue to fund the Arrow program, whether it be Israel or some partner, or both. Recently, it was reported that completion of Arrow's development and production might cost \$1.2 to \$5.9 billion.<sup>29</sup>

## CONSTRAINTS

U.S. friends and allies give many reasons for not supporting TMD efforts with greater commitment. These reasons can be placed into three categories: budget constraints, political constraints, and barriers to international technology cooperation with the United States. These points are discussed briefly below.

## BUDGETARY

Almost all the countries discussed, especially those in Europe, feel constrained in their development of TMD systems by the need to reduce defense budgets overall. Hence there is little resource commitment to TMD among U.S. allies and friends. Israel's defense budget is similarly constrained, but it may decide that TMD takes priority among current and prospective defense needs. Some have argued that European

---

<sup>27</sup> See, General Accounting Office. Letter to Hon. Howell Heflin (on Arrow program costs). April 19, 1993.

<sup>28</sup> Ibid.

<sup>29</sup> According to Defense News, one Israeli source said \$1.2 billion would be needed over the next ten years to develop and build 300 Arrow missiles and associated infrastructure. Another Israeli source, however, put the costs at between \$3.9 billion and \$5.9 billion. See Opall, Barbara and Parnes, Sharone. Test Halt Casts Shadow on Arrow. Defense News. July 19-25, 1993. pp. 4, 50. Previous estimates of completing the Arrow program and fielding the system ranged from \$2 billion to \$10 billion.

countries should take a similar position: declining defense budgets could include vigorous TMD development if TMD were indeed a national priority. Japan has one of the few defense budgets that is still growing, albeit at a pace slower than in the 1980s. It is believed that Japan could support a strong TMD effort within its defense budget.

## **POLITICAL**

As mentioned earlier, a few countries may feel constrained politically from open debate over TMD (i.e., France because of its large population of North Africans, Italy, and perhaps Turkey). Most all the other countries do not appear to be similarly constrained. In some cases, a few countries, such as France and Italy, are going through a change of political leadership. Some have suggested that interest in TMD will be put on hold until such leadership issues are settled. Soviet opposition to advanced Western missile defense programs, and therefore some European reluctance to pursue such programs, has disappeared.

## **BARRIERS TO TECHNOLOGY COOPERATION**

Several countries have identified the following factors as barriers to international technological cooperation in theater missile defense:<sup>30</sup> 1) international restrictions on technology transfer, 2) differing TMD requirements among potential partners, 3) the U.S. export control process (i.e., cumbersome export licensing procedures and the decentralized nature of the system), and 4) the need for greater unity of effort regarding U.S. policy (proliferation of agencies and interests involved in foreign technology cooperation projects). Another reason cited has been the traditional (perceived) lack of U.S. commitment to cooperative programs. This may be changing, however, based on new policies announced by Clinton Administration officials.<sup>31</sup>

---

<sup>30</sup> See, *Overcoming the Many Barriers to International Cooperation in Theater Missile Defense*, by Wayne T. Fujito (Vice-President, International Technology and Trade Associates, Washington, D.C. (White Paper). 1993.

<sup>31</sup> In an April meeting in Brussels, the U.S. Undersecretary of Defense for Acquisition, John Deutch, announced greater willingness to foster cooperative initiatives and multilateral cooperation. See, *Pentagon Presses Burden Sharing on Theater Missile Defense Efforts*. *Defense News*. May 17-23, 1993. p. 12.

**CONCLUSION**

While a few U.S. friends and allies are very concerned about theater missile threats in the near-term, most are not, and their priorities for developing advanced TMD systems are, in part, a major reflection of their lack of concern. Most appear willing to accept the technical lead of the United States and then take advantage of U.S. technological achievements at a later date. Most do not appear willing to help fund U.S.-led TMD research and development. Some friends and allies may continue to rely on the United States to provide TMD protection under the rubric of alliance and security guarantees. Still others are likely to acquire U.S. TMD systems through purchase with offset agreements that ensure there is not a significant net flow of money out of the country.