

TRANSATLANTIC ARMAMENTS COOPERATION

Report of the
Military Research Fellows
DSMC 1999-2000

Lieutenant Colonel Richard C. Catington, USAF
Lieutenant Colonel Ole A. Knudson, USA
Commander Joseph B. Yodzis, USN

August 2000

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DISCLAIMER

This book was produced in the Department of Defense (DoD) school environment in the interest of academic freedom and the advancement of national defense-related concepts. The views expressed in this book are those of the authors and do not reflect the official position or policy of the DoD or those of the United States Government.

References in this report to the DoD 5000 series and life cycle phases reflect the use of terminology at the time our research was conducted on existing transatlantic cooperative programs. Our research concluded on 1 May 2000, prior to the release of updated Department of Defense 5000 series acquisition directives and instructions.

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PREFACE

This publication presents the results of an intensive 11-month program for three military research fellows. The Under Secretary of Defense (Acquisition) (USD (A)) chartered the Defense Systems Management College (DSMC) Military Research Fellowship Program in 1987. The program brings together selected officers from the Army, Navy, and Air Force for two primary purposes: first to provide advanced professional and military education for the participating officers; and second, to conduct research that will benefit the Department of Defense (DoD) acquisition community.

The fellowship program is conducted in three phases. In the first phase, the three officers meet at DSMC for four weeks to begin to determine their research goals, define a research plan, consult with the DSMC faculty, and initiate background research. During the second phase, the fellows attend the Program for Management Development at Harvard Business School. This comprehensive ten-week executive education program brings together a diverse group of functional-level executive and new general managers from over 30 countries to learn state-of-the-art management techniques and technologies necessary to become successful managers in today's global marketplace. In the third phase, the fellows return to DSMC to conduct their joint research, culminating in the publication of their research report.

This report focuses on transatlantic cooperative programs. Cooperation with Europe was chosen because of the important political, military, economic, and historical transatlantic ties, but most important, because America's relationship with Europe is rapidly evolving. There is substantial concern about a "Fortress America – Fortress Europe" syndrome. Political leaders and the public both here and in Europe are attempting to come to terms with the meaning of the NATO alliance in the post-Cold War era. European assertiveness and unity are clashing with dated perceptions about Europe held by Americans. Our intended audience is both the U.S. defense acquisition workforce and policy makers. For the former, we hoped to produce a useful guide that will make them more effective as members of a cooperative team. For the latter, we attempted to provide an updated comprehensive view of the salient features of transatlantic armaments cooperation and some ways in which the context is changing.

In researching our topic, we visited a number of government and commercial organizations in the U.K., Belgium, Germany, France, and the U.S. We interviewed numerous individuals for their insights on this fast changing and sometimes emotional area. These interviews were conducted under the non-attribution policy, unless permission was specifically sought and obtained.

We would also like to acknowledge with gratitude the help of our colleagues at DSMC as well as friends outside DSMC. While there are far more people to thank than room permits, we would like to single out a few for special mention. Richard Kwatnoski, Don Hood, Alberta Ladymon, Tony Kausal, Frank Kenlon, Charles “Chuck” Wilson, Greg Caruth, Pat Bartlett and Judith Greig have been particularly helpful in supporting our efforts. Special thanks to our friends overseas, Gertrud Humily, Trevor Taylor, Colonel Albert Garcia, Lieutenant Colonel Mike Krimmer, and Lieutenant Colonel Gary Allen, for their assistance in arranging in-country interviews. Thank you to the faculty, staff, and classmates at the Program for Management Development at Harvard Business School, whose rich experiences and knowledge sharpened our research perspective. Finally, thanks to all those we interviewed for taking the time to share their experiences and insights with us.

EXECUTIVE SUMMARY

Objective: To provide a comprehensive overview of transatlantic armaments cooperation relevant to both policy makers and members of the acquisition workforce. Policy makers will find an assessment of current cooperation, its historical background, future prospects, and suggested courses of action. Members of the acquisition workforce will find a helpful guide to the unique aspects of international cooperation in general and transatlantic cooperation in particular.

Background: Transatlantic armaments cooperation, defined as partnerships with two or more members spanning the Atlantic for the purpose of developing and producing defense articles, has about a 40-year history. The gains expected from this cooperation include cost savings through pooling of resources for development and economies of scale for production, and interoperability among the allies. It is a relationship born out of Cold War realities, a context that has changed dramatically in a short period of time. Throughout, the amount of cooperation achieved has been modest and fraught with difficulty.

Discussion: Despite the urgency of the Cold War, the Atlantic Alliance fielded different models of the same basic equipment types, often not mutually interoperable. Cooperation aimed at overcoming duplication of effort and proliferation of types is hindered by protection of national industrial bases, labor concerns, security considerations and a lack of harmonization of military requirements. Though the threat has receded, armaments have become more complex and therefore more expensive, underlining the need for cooperation. Moreover, the trend is unmistakably toward coalition operations, boosting the importance of interoperability. At the same time, Western military budgets are smaller, European unification is well underway, and there is a palpable desire to resist a perceived U.S. hegemony in culture, economics, and political-military affairs. The need for cooperation still exists, but the process promises to be as tough as ever.

Conclusions and recommendations:

- Cooperative programs are indeed more difficult, but can be conducted with proper attention paid to the appropriate areas.
- Motives for cooperation differ between Europe and the U.S.
- Time is working against the prospects for transatlantic cooperation.

- The U.S. has a reputation as a difficult partner in cooperation.
- The objectives of cooperation are only served by success. Abortive or acrimonious programs defeat those objectives.
- The transatlantic defense technology gap invites cooperation.
- The U.S. should persist in its support of transatlantic cooperation.
- The U.S. must cultivate an organizational culture supportive of international armaments cooperation, and...
 - emphasize exploration of cooperative opportunities.
 - select programs based on long-term prospects.
 - work toward funding stability to the extent possible.
 - make the export control process more responsive to cooperation.
 - avoid giving false impressions to partners.
 - educate the acquisition workforce in international cooperation.
 - pursue all avenues toward the easing of harmonization.
 - select leaders and participants in cooperation with care.
 - provide effective incentives for those participants.

INTRODUCTION

“An unidentified problem has an infinite number of solutions.”

— Robert H. Humphrey

The ability to perceive change, appreciate its implications, and then to chart an appropriate course are the marks of visionary government. Anti-trust legislation in the era of Teddy Roosevelt, the Marshall Plan, and Nixon’s rapprochement with China are several examples of such vision at the national level. U.S. relations with Europe at the close of the 20th Century are in a dynamic phase, calling attention to the component parts of that relationship. Transatlantic cooperative arms development is not a new idea, but its rationale and the context in which it is engaged have changed, prompting the need to reassess its place in U.S. acquisition policy.

The contextual changes for transatlantic cooperation are the rapid economic development of postwar Europe, the continent’s quickening pace of consolidation, the loss of a common threat, the cultural and political tensions across the Atlantic, unprecedented technical innovation, and increased emphasis on fighting in a coalition environment.

Despite the compelling reasons for transatlantic armaments cooperation in both the Cold War and post-Cold War eras, very little has been realized. The reasons for that lack of success are varied and some are also changing over time. Protection of technology, industrial interests, and political alignments are considerations that are always evolving. Some obstacles to cooperation are more mundane, however. The U.S. DoD lacks an organizational culture that is supportive of cooperative programs. There is also a corresponding lack of knowledge among the implementing management and workforce and so they tend to avoid these programs.

What is needed is a broad view that provides all involved with an appreciation of the salient differences that set transatlantic cooperative programs apart, their history, why such cooperation is important, and how and why it is changing. Members of the acquisition workforce also need the practical details that relate to the management of a cooperative program. The correct approach, therefore, is one that addresses both mechanics and the larger context.

Part I (Chapters 1 and 2) covers U.S. policies and procedures for cooperative programs. These chapters discuss differences between U.S.-only programs and cooperative programs. Three categories of differences are covered: harmonization of requirements, MOU development, and security procedures. A discussion of what program managers (PMs) need to know is provided in

these chapters. We found no other single source that provides a useful summary level reference for this information for the PMs and others in the acquisition workforce who need it.

Part II discusses transatlantic and intra-European programs and their context. The European environment has changed fundamentally in the last decade and all indications are that the Continent will continue to consolidate economically and politically over the next ten years. Many of these changes are significant to transatlantic armaments cooperation. Chapter 3 provides a broad view of the European environment, important to success in transatlantic cooperation. Chapter 4 provides a review of selected past and ongoing transatlantic programs. These programs provide many valuable lessons for those who will be involved in future cooperation, lessons that are summarized at the end of the chapter. Chapter 5 provides a study of selected aspects of intra-European programs and explains the significant conditions that promote and facilitate their success.

Findings and conclusions follow in Part III, many of them relevant to PMs and policy makers alike. The U.S. can unilaterally improve the transatlantic cooperative relationship to make it more fruitful. Several of these findings and conclusions in Chapters 6 and 7 have been exposed in previous studies of international cooperative programs, but some have not.

This study focuses on international cooperative development programs where there is shared management of the project with follow-on co-production or at least plans for co-production. The terms “cooperation” and “collaboration” are sometimes used interchangeably when describing these types of programs.

PART I

COOPERATIVE PROGRAM POLICIES AND PROCEDURES

1

HARMONIZATION OF REQUIREMENTS AND DEVELOPMENT OF PROGRAM MEMORANDA OF UNDERSTANDING

*“There are only three obstacles to Allied Cooperation—
the Americans, the British, and the French.”*

— General L. Norstad, Former SACEUR

Introduction

The basis for international armaments cooperation is to address mutual military needs. But since each nation has its own process for generating military requirements and its own priorities for fulfilling them, agreeing to common requirements that conform to the same timetable is hard. It is very unlikely that the military requirements and priorities of one nation will precisely align with those of another. Yet, in many cases, the equipment will perform essentially the same function. In order, therefore, to develop equipment cooperatively with other nations, the differences in these military requirements and priorities must be harmonized. In harmonizing military requirements for a

system, the potential partners must find a way to interweave all of their individual requirements and priorities in a manner that is satisfactory to all. This is the foundation of any international armaments cooperative program. Harmonization is usually difficult largely because of the extreme importance that military equipment has to each nation's military and to the nation itself.

Equally important to success in an international cooperative program is harmonization of the management aspects of the program and of the expectations of all the cooperative partners. This is normally accomplished through the development of a comprehensive international agreement called a program MOU. In

international programs, work share—which equates to jobs and industrial benefits for the nations involved—is always a major concern, as are management controls, decision making processes, and many other program aspects. These matters are agreed on through the program MOU. The final MOU and the negotiations to reach it must thoroughly address all of the partners' concerns and reflect agreement and harmonization in terms of both program requirements and expectations.

PMs should be aware of the difficulties inherent in harmonizing military requirements and developing MOUs for cooperative programs. Such awareness is beneficial to gaining an appreciation of the motivations and priorities of cooperative partners. The considerations for and the difficulties associated with harmonization and MOU development are derived largely from the corporate memory of those who have trodden the same path in the past several decades. Historic knowledge will help avoid past mistakes and achieve future successes.

This chapter describes the legal and policy basis for cooperation, discusses the various fora and activities as well as the difficulties and considerations related to harmonizing requirements and the development of MOUs.

Laws/Policies Affecting International Armaments Cooperation

For many years, Congress and the DoD have emphasized the need for armaments cooperation to improve interoperability and standardization with the North Atlantic Treaty Organization (NATO) and other allied partners, and to save on weapon systems development, production, and logistics support costs. Congress has enacted laws and DoD has formulated policies toward this end. PMs and other acquisition

personnel must be aware of these requirements. They affect most PMs, not just those involved in international cooperative programs, because in most U.S. acquisition programs, PMs are required to consider cooperative opportunities as part of the program's acquisition strategy. This requirement is implemented through instructions in the DoD 5000 series of acquisition program regulations. A summary of the applicable U.S. laws, regulations, and policies that provide the basis for and affect DoD cooperative programs is provided at the end of this chapter starting on page 1-10.

Fora/Activities for Harmonizing Military Requirements

The U.S. currently maintains several organizations and participates in a number of fora and activities that support harmonization of military requirements. Although these fora and activities have yielded far fewer cooperative programs in the past than ideally possible, they continue to provide a means to work toward cooperation in the future. The most significant are identified below.

- **Conference of National Armament Directors (CNAD)**

The CNAD serves as the primary NATO forum for discussions on armament cooperation possibilities. Its objective is to achieve maximize armaments cooperation among the NATO members. The U.S. National Armaments Director (NAD) is the Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD (AT&L)). The CNAD is structured with major groups from each of the Services, termed Army, Navy, and Air Force Armaments Groups, as well as a NATO Industrial Advisory Group. Each of these major groups has subgroups to facilitate

discussions at a level of detail necessary to discern where cooperation is possible. The members of these groups and sub-groups, while mostly drawn from the Military Departments (MILDEPs) or Services from each nation, are ultimately representatives of the NADs from each NATO nation.

- **International Cooperative Opportunities Group (ICOG)**

The ICOG is an ad hoc forum among the NADs of the five power nations (U.S., U.K., France, Germany, and Italy) on armaments cooperation. ICOG's charter is to explore future system-level cooperative opportunities before national military requirements have been formulated. The intent is to start very early so that common military requirements will be developed to serve as the basis for cooperative programs. Starting early helps prevent parochial support from developing for a particular nation's solution or contractor's design, either of which then decreases the potential for cooperation. These discussions are intended to augment the existing Senior National Representative (SNR) fora (see below), facilitate the long range programming of funds by nations, and harmonize military requirements for potential system-level cooperative programs.

- **Senior Level Bilateral Military Talks**

The Services conduct senior level (flag or general officer level) staff talks with selected NATO and non-NATO allied nations. These talks are primarily focused on doctrine and training issues, but also serve as a venue for considering areas for armaments cooperation.

- **Senior National Representative (SNR) Fora**

Each Service has a flag or general officer SNR who meets on a bilateral (or in some cases, multilateral) basis to discuss armaments cooperation matters associated with their Service's research, development, and acquisition efforts. While past efforts have been more science and technology cooperation-oriented, SNR activities, in conjunction with the ICOG, are now placing additional emphasis on the system-level armaments cooperation area.¹

- **Mid-Level Discussions**

Periodic discussions at middle management level (O-6 level or O-6 equivalent level) among operational users' representatives and materiel developers have been employed by some elements within DoD to consider cooperative opportunities. Several branches of the Army hold periodic bilateral discussions of this type. These discussions are focused on potential armaments cooperation in specific areas such as Armor, Field Artillery, and Air Defense. Notable recent successes between the U.S. and the U.K. include the harmonization of the military requirements for the Army's Future Scout Cavalry System (FSCS)/Tactical Reconnaissance Armoured Combat Equipment Requirement (TRACER) and the Lightweight 155 Towed Artillery (LW155) Digitization programs.²

- **Ongoing Cooperative Program Management Meetings**

Discussions that are held as part of the periodic management meetings for ongoing cooperative programs have provided

the genesis for the harmonization of military requirements for follow-on improvements or upgrades to these programs. Nearly always, these management meetings formally involve mid-level (O-6 level or O-6 equivalent level) operational users' representatives as part of the international program management structure. Participation of the users' representatives from all the program's participants is the key to the success of harmonization efforts. Several follow-on cooperative programs have resulted directly from these types of discussions. Examples are the Guided MLRS (GMLRS), Enhanced Sea Sparrow Missile (ESSM), F-16 Mid-Life Update (MLU), and Rolling Airframe Missile (RAM) Block I programs that are discussed in Chapter 4.

- **Cooperative R&D Organizations and Activities**

Each of the Services has organizations that are dedicated to international cooperative research and development (R&D) activities. The Office of the Secretary of Defense (OSD) International Cooperation Handbook, which is available in the Defense Acquisition Deskbook, provides a summary of these R&D organizations and activities. Cooperative R&D efforts can be beneficial in harmonizing military requirements since those requirements are usually based on the technology that is available or thought to be possible. The more sharing of technology with potential partners, the more likely that common equipment requirements will be developed. Cooperative R&D can also serve as an essential building block for promoting interoperability and developing standards such as NATO Standardization Agreements (STANAGs) when

the ultimate goal of initiating cooperative development programs is not achieved.

Difficulties and Considerations in Harmonizing Military Requirements

Operational users' representatives, PMs, and other acquisition personnel involved in harmonizing military requirements and cooperative development activities should be aware of some of the important factors to consider and common difficulties that are encountered in harmonizing military requirements. Inherent in the difficulties is the importance of military equipment in protecting each nation's interests. Acquiring the best possible equipment in sufficient quantities as soon as possible from national industrial assets is the ideal for any military organization. Budget constraints, insufficient national capabilities, political objectives, or military interoperability considerations, however, lead nations to seek cooperation and harmonization of military requirements.

Harmonization encompasses a collective assessment of the threat and agreement on the timeframe in which new equipment is needed and can be obtained based on national resources available. Harmonization then involves agreeing on the functions the new equipment must perform (i.e., how far it must shoot, how fast it must go, etc.), the characteristics it must possess (i.e., weight and size dimensions, etc.), and the environmental conditions that it must operate in (i.e., cold, heat, sand, rain, etc.) to counter the threat. The partners must then cooperatively determine the technical means to achieve the military performance requirements. Some of the common difficulties and considerations in achieving harmonization of military requirements are:

- **Understanding a Potential Partner's Military Requirements**

Most nations follow a set procedure to formulate and approve formal military requirements. The formats in which these requirements are set forth are not common between nations, and hence can lead to a degree of misunderstanding of their commonality. Analysis processes are based on national modeling and simulations (M&S) that include many variables. Some of the most significant of these variables are the potential threat scenarios, the operational doctrine of the particular branch of the military or the nation, and the technological assumptions about performance characteristics. Each nation's M&S can generate different solutions to a common scenario. Thus, when undertaking to harmonize military requirements, enough details must be flushed out to ensure there is sufficient commonality before initiating a cooperative effort. The differences in how the requirements were derived must be recognized and thoroughly accounted for to fully achieve harmonization.³

- **Timing**

A fundamental principle of harmonizing requirements is that all the participants should have a common timeframe for when the equipment is needed. The amount of time available in a development program is one of the most significant drivers for the technological solutions pursued. So partners that need equipment at the same time are more likely to agree to the technical approaches and to be more willing to reach mutually agreeable technological compromises, if necessary, later in the program.

- **Gold Plating**

The tendency in harmonization is for the potential partners not to budge from any of their original requirements, which leads to partners adding on to their original requirements the requirements of the other partners. This is termed "gold plating." The more rigorous the national requirements generation process, the less likely that that potential partner(s) is going to be willing to compromise. In general, gold plating drives up both development and production costs and adds technological complexity.

- **National Variants**

When harmonization cannot be reached by compromise, and gold plating is deemed unsuitable, an alternative is to develop national variants. A common base system is produced upon which each nation then makes individual or (with a subset of the program's participants) collective modifications to meet their national needs. National variants dilute some of the potential cost advantages, resulting in increased development cost and production unit costs.

- **Key Performance Parameters (KPPs) and Cost As an Independent Variable (CAIV) Objectives**

An important part of the harmonization of military requirements in a cooperative program is to decide which requirements cannot be compromised and those where compromises will be considered. During harmonization, the partners should agree on the KPPs and CAIV objectives. Identification of KPPs and CAIV objectives during harmonization provides the baseline for making difficult decisions, if necessary,

later in the program. Currently, KPPs and CAIV objectives are normally identified in U.S. acquisition programs. However, the principles of KPPs and CAIV objectives may not be familiar to foreign partners. In order to form acceptable compromise solutions during the development process with its attendant technological uncertainty, the U.S. and its partners should lay the groundwork by reaching agreement on KPPs and CAIV objectives.

NOTE: The U.S. Requirements Generation System, as specified by the Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01A, dated 10 August 1999, requires that the potential for inter-Service or allied cooperation be discussed in paragraph 4, Potential Materiel Alternatives of the Mission Need Statements (MNSs). However, this is the only reference to allied cooperation in CJCSI 3170.01A and consequently, efforts to harmonize requirements with our allies are not emphasized in the generation of U.S. requirements. On the other hand, CJCSI 3170.01A, places heavy emphasis on the harmonization of U.S. requirements among the DoD components for the purpose of generating joint programs. CJCSI 3170.01A requires standardized formats across the DoD components for the MNSs, Capstone Requirements Documents (CRDs), and Operational Requirements Documents (ORDs) which are the formal documents used in the requirements generation process. It states that “this standardization instills discipline in the process and provides both the validation and approval authorities, and the acquisition management system, with efficient and consistent information to use in reviews, certifications, and decision deliberations.”⁴

Development of MOUs

When harmonized military requirements are achieved through the fora and activities discussed above or by some other means, the PM must then harmonize programmatic requirements, normally through the development of an MOU. A program MOU is an international agreement (IA) and U.S. participants involved in developing an MOU must follow DoD’s rigorous approval process. PMs should seek expert assistance and advice from their respective Service’s international program organization in developing MOUs.

The roles of the most significant Office of the Secretary of Defense (OSD) level organizations and non-DoD organizations in the MOU approval process are listed below.

- **OSD General Counsel** – Reviews the MOU for U.S. legal and OSD policy considerations, including the legal requirements for equitability.
- **OSD Comptroller** – Reviews the MOU for compliance with DoD financial management policies, availability of U.S. funding requirements, equitability both in terms of financial and nonfinancial contributions (i.e. background information including technical data, manpower, facilities, equipment, hardware, software, etc.) of the participants, and compliance with U.S. fiscal law.⁵
- **Deputy Under Secretary of Defense (DUSD) Policy** – Reviews the Summary Statement of Intent (SSOI) and MOU for all policy, information security, and technology transfer considerations.

- **Director, Defense Procurement** – Reviews the MOU for contracting considerations including work share and industrial teaming arrangements with particular attention to how these arrangements will affect competition in contracting activities of the program.
 - **Director, International Cooperation** – Processes the SSOI and MOU through DoD-interagency staffing.
 - **Department of Commerce** – Reviews the SSOI and MOU for impacts on the U.S. industrial base.
 - **Department of State** – Reviews the MOU for foreign policy, technology security, and regional stability impacts.
- A plan of action and milestones for a typical MOU scenario for a cooperative development program are shown below in Figure 1-1.⁶

Calendar Days	Actions and Milestones
0	Statement of Intent (SOI)
0-30	Formation of exploratory team
30	Arrangements for initial exploratory or technical discussions meeting
45	First exploratory or technical discussions (more sessions may be held if necessary)
50-60	Preparation of Request for Authority to Develop (RAD) and SSOI
50-60	Formation of negotiation team
60-81	Submission and staffing of RAD
65	Meet with OSD to resolve RAD comments if necessary
85	Receipt of authority to develop and prepare to negotiate
60-85	Preparation of the MOU
115-200	Negotiation Sessions (number of sessions needed depends on the complexity of the program and the number of partners involved)
140	Briefing to OSD
200-260	Request for Final Authority (RFA) i.e., to conclude and staffing of RFA; Congressional notification (if required by the Section 27 of the Arms Export Control Act)
270	Signature of MOU

Figure 1-1. Actions and Milestones

For cooperative development programs, the MOU process formally begins when the Service component prepares and submits a Request for Authority to Develop (RAD) to the OSD Director of International Cooperation. However, before this step is reached, exploratory or technical discussions will have been held with the potential partner(s). Exploratory discussions determine the viability of a cooperative program and can take place prior to DoD's approval. During this phase, reasonable program alternatives can be explored but no commitments can be made. However, draft MOUs, no matter if prepared by the U.S. or the potential partner(s), may not be presented or discussed until OSD (or in some cases, MILDEP) approval to begin negotiations has been granted.⁷ This is a commonly made mistake during exploratory discussions.

MOU negotiations cannot begin until the RAD is approved by OSD. MOU negotiations are defined by DoD 5530.3, International Agreements, as:

Communication by any means of a position or an offer, on behalf of the United States, the Department of Defense, or on behalf of any officer or organizational element thereof, to an agent or representative of a foreign government, including an agency, instrumentality, or political subdivision thereof, or of an international organization, in such detail that the acceptance in substance of such position or offer would result in an international agreement. The term "negotiation" includes any such communication even though conditioned on later approval by the responsible authority. The term "negotiation" also includes provision of a draft agreement or other document, the acceptance of

which would constitute an agreement, as well as discussions concerning any U.S. or foreign government or international organization draft document whether or not titled "agreement." The term "negotiation" does not include preliminary or exploratory discussions or routine meetings where no draft documents are discussed, so long as such discussions or meetings are conducted with the understanding that the views communicated do not and shall not bind or commit any side, legally or otherwise.⁸

When the RAD is submitted to OSD it must include an SSOI. The guidelines for preparing an SSOI are contained in Appendix A. Items of particular interest in the SSOI will be potential industrial base impacts, funding availability, equitability and cost share arrangements including nonfinancial contributions (i.e., background information including technical data, manpower, facilities, equipment, hardware, software, etc.), justification of any non-equitable cost sharing (if applicable), and technology transfer issues.

A summary Technology Assessment/Control Plan (TA/CP) and Delegation of Disclosure Letter (DDL) as discussed in Chapter 2, page 2-9, must be prepared prior to the SSOI to provide the basis for the information security and technology transfer proposals. In the SSOI, an explanation and justification must be provided for any section of the MOU where the DoD IA Generator is not expected to be followed in the MOU. Equitability must be specifically justified in the SSOI unless one of the standard calculations contained in Volume 12, Chapter 9 of the DoD Financial Management Regulation provides an unambiguous quantitative basis (e.g., equal cost share) for a program equitability determination.⁹ The

Department of Commerce will review the potential U.S. industrial base impacts that are identified in the SSOI.

With RAD approval by OSD, the MOU negotiations can begin. The MOU will cover all aspects of the program such as cost shares, work shares, industrial teaming arrangements, technology sharing, data and patent rights uses, security arrangements, management and organizational structure, etc. Depending on the individual Service, the PM may or may not determine the make up of the MOU negotiating team. However, even though the PM may not determine the team composition or serve as the chief negotiator, he/she performs a key role in the negotiation process and should be thoroughly familiar with the MOU provisions since the MOU serves as the foundation for execution of the cooperative program. The U.S. negotiating team must be knowledgeable of the DoD positions on all standard MOU issues. The negotiators from potential partner(s) may be very experienced negotiators relative to their U.S. counterparts; therefore the U.S. team must be thoroughly prepared to be effective. The other participants' negotiators will probably also have considerably more flexibility since they are not severely bound by laws, regulations, and policies, as are the U.S. negotiators.¹⁰

The DoD IA Generator is a tool that greatly assists in developing MOUs. The IA Generator language must be tailored for the specifics of the program. For standardized sections such as security, customs, duties, and taxes, liabilities and claims, etc., the IA Generator provides guidance and suggested text. For project-specific sections of the MOU, the IA Generator provides general guidance. Deviations from the IA Generator must be justified and approved by OSD either as part of RAD approval or later in the MOU process. Every sentence and word in the final MOU will receive great scrutiny

during the OSD review and consideration for approval. Use of other than the IA Generator language is likely to cause delays in staffing the final negotiated MOU.

MOU negotiations are delegated to the Services and OSD representatives will not normally participate in the actual negotiations. Throughout the negotiations, therefore, the PM should seek OSD staff advice on potentially controversial areas in the MOU. The amount of experience on the negotiation team is an important factor to consider. The more inexperienced the negotiation team, particularly regarding the legal nuances of MOUs, the more advice should be sought from either the Service international program organization or OSD experts. This advice can come from briefings, discussions, or reviews of draft MOU language. The PM should ensure that affirmative OSD feedback is received before proceeding with the MOU negotiations and resolve any differences with the OSD staff as they arise. PMs should not expect to receive favorable resolution with the OSD staff experts without considerable effort, or even at all, in disagreements that exist on the final MOU because of the U.S. national policy implications of MOU provisions. Each MOU serves as precedent for future MOUs. The OSD staff's emphasis, therefore, is to ensure that bad national policy precedents are not established. The effects on the current program under review are of much lesser concern than are the effects on the overall U.S. policy. Finalizing MOU negotiations with the potential partners without informal OSD staff approval can set up a very embarrassing situation if OSD does not concur with the final draft MOU during the formal RFA step. If this occurs, the PM can expect to encounter considerable delays in resolving the disagreements or may have to re-open negotiations in order to arrive at an MOU that is acceptable to OSD.

When negotiations are completed, the Service component sends the RFA to OSD. When OSD completes staffing and approves the MOU, it is sent to the Department of State for forwarding to Congress with the required certification statement (if applicable). OSD will provide the Service proponent authority to conclude upon completion of the congressional notification process (if applicable). The MOU is then formally put into effect by the signature of each participant. Based on the typical MOU timeline, the entire MOU development process is expected to take at least 270 days but has often taken 18–24 months. For this reason, program funding, contract award dates, and start of work packages are usually planned based on the expected MOU signature date. Significant delays in the MOU approval/signature process can jeopardize time-sensitive national funding from all the participants for a given fiscal year. Likewise, contracts that have been negotiated on the basis of a cooperative program cannot normally be put into effect until all the parties have signed the MOU. So delays in the MOU approval and signature process are likely to delay program initiation and PMs should make contingency plans in the event that MOU delays occur.

U.S. Laws, Regulations, and Policies

Below are the U.S. laws, regulations, and policies that provide the basis for and affect DoD cooperative programs.

Section 27 of the Arms Export Control Act (22 USC 2767) provides the authority for DoD to enter into cooperative acquisition programs with NATO countries and friendly non-NATO countries.

Title 10 USC 2350a (Nunn) provides the authority for DoD to enter into cooperative R&D projects with major U.S. allies. This law

also requires the preparation of an arms cooperative opportunities document for all acquisition programs subject to review by the Defense Acquisition Board and any new project for which a MNS is prepared. This document must include:

- identification of similar development efforts or production of similar equipment by U.S. allies;
- an assessment as to whether or not an allied system could meet or be modified to meet U.S. requirements;
- an assessment of the advantages and disadvantages with regard to program timing; development and life cycle cost; technology sharing; and Rationalization, Standardization, and Interoperability (RSI) of cooperating on the project with U.S. allies; and
- a recommendation on whether or not to explore a cooperative program with U.S. allies.

DoD Regulation 5000.2-R, 15 March 1996 (Incorporating Change 1, 21 May 1999), Para 3.3.6.2, implements the above legal requirements by requiring a discussion of cooperative opportunities in the program's acquisition strategy.

DoD Directive 5000.1, 11 May 1999 (Includes Change 4), Para 4.2.2, specifies a hierarchy of materiel alternatives as: (1) the procurement (including modification) of commercially available systems or equipment, the additional production (including modification) of already-developed U.S. military systems or equipment, or Allied systems or equipment; (2) cooperative development program with one or more Allied nations; (3) new joint Service development

program; and (4) a new Service-unique development program.

12 March 1997 DoD Memorandum on International Armaments Cooperation Policy signed by Secretary Cohen directs that DoD apply maximum efforts toward cooperation to include:

- engagement of allies in discussions at the earliest possible stages on harmonization of requirements;
- designation of appropriate defense acquisition programs as international cooperative programs;
- emphasis on favorable technology transfer decisions to allied cooperative partners;
- adequate training for acquisition personnel on policies and procedures pertaining to cooperative acquisition programs; and
- funding priority for initiating cooperative programs.

International Agreements

Case Act (Title 1 USC section 112b) provides that in most cases “the Secretary of State shall transmit to the Congress the text of any international agreement, other than a treaty, to which the United States is a party as soon as practicable after such an agreement has entered into force with respect to the United States but in no event later than sixty days thereafter.” It also provides that an international agreement, such as a cooperative program MOU, may not be signed or concluded on behalf of the United

States without consultation with the Secretary of State.

DoD Directive 5530.3, 11 June 1987 (Incorporating Change 1, 18 February 1991) International Agreements establishes DoD procedures for establishing an IA.

NOTE: Deputy Secretary of Defense and the OUSD (AT&L), have issued various streamlining memoranda to provide detailed procedures that supplement DoD Directive 5530.3 procedures for IAs under OUSD (AT&L) cognizance.

DoD Financial Management Regulation, Volume 12, Chapter 9 provides requirements for determining equitability in international agreements, including funds provided, as well as nonfinancial contributions (i.e., background information, manpower, facilities, equipment, hardware, software, etc.).

Summary

The harmonization process to initiate international cooperative programs is not an easy undertaking. It is the alignment of defense priorities of two or more nations, and is the test of whether the basis for cooperation exists. PMs must be cognizant of the many issues, laws, and policies related to armaments cooperation and development of MOUs in order to be effective and proceed with confidence.

Chapter 2 will outline in further detail security requirements, export controls, and technology transfer considerations for all international cooperative programs.

ENDNOTES

1. Interview with Frank Kenlon, Office of Under Secretary of Defense (Acquisition, Technology & Logistics)/ International Cooperation, by authors (May 00).
2. Interviews with multiple officials involved in harmonization discussions for Army Field Artillery and Armor systems by the authors (Jan–Mar 00).
3. Challands, Guy, *Sense About Europe: Affordable Interoperable Arms Procurement Through Collaboration*, December 1999, Oxford University, pp. 28-36.
4. Requirements Generation System, Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01A, 10 August 1999, p. B-8.
5. Financial Management Requirements for International Agreements, Office of the Under Secretary of Defense (Comptroller), Briefing Slides, pp. 1-9.
6. Guidance for Preparation and Negotiation of International Armaments Cooperation, Memoranda of Understanding (MOU), Volume 2, Defense Systems Management College Press, Fort Belvoir, VA, p. III-19 with modifications by Frank Kenlon, OUSD (AT&L/IC).
7. *International Armament Cooperation Handbook*, Office of the Deputy Under Secretary of Defense, International and Commercial Programs, June 1996, pp. 5-4 – 5-5 and the Kenlon interview.
8. International Agreements, Department of Defense Directive 5530.3, 11 June 1987 (Incorporating Change 1, 18 February 1991), Enclosure 2, paragraph E2.1.2.
9. Financial Management Regulation, Department of Defense, Volume 12, Chapter 9, pp. 9-9 – 9-10.
10. Guidance for Preparation and Negotiation of International Armaments Cooperation, Memoranda of Understanding (MOU), Volume 2, Defense Systems Management College Press, Fort Belvoir, VA, p. III-29.

2

SECURITY

“Nations do not have friends. Nations have interests.”
— Henry Kissinger

Introduction

This chapter is a summary of the security-related requirements for an International Acquisition Program (IAP). An IAP is defined as armaments cooperation that includes co-development followed by co-production. The information presented is the “delta” or additional requirements that the PM of an IAP must deal with as opposed to a U.S.-only program. However, as security requirements are frequently updated, the reader should always refer to the most current directives. The primary DoD security directives that apply to IAPs are DoD Directive (DoDD) 5230.11, DoDD 5230.20, and DoDD 5000.39. Technology transfers are governed by the International Traffic in Arms Regulations (ITAR) and DoDD 2040.2. Industrial security policy is set forth in the National Industrial Security Operating Manual (NISPOM).

The security aspects of an IAP are very important and can be quite involved. Failure to handle them in the planning phase can lead to program delays or disruptions. Compliance is, however, a PM responsibility. Therefore, PMs should manage IAP security aspects as they do other important parts of their program. Specialists will usually handle the day-to-day details; nevertheless, the PM must be aware of the basics to ensure that the appropriate emphasis is applied and that security does not become an impediment to program progress.

As discussed in Chapter 1, IAP PMs must also plan for and manage the role that the Department of State and Department of Commerce, OSD, and Service-level participants will have in program decisions and execution. Additionally, foreign governments and contractor officials will have a large role in the security aspects of IAPs.

This chapter was co-authored by Charles C. Wilson, a former Director of International Security Programs in the Office of the Secretary of Defense (Policy Support) (ODUSD[PS]). The information presented is condensed from the International Programs Security Requirements Course offered by the ODUSD(PS), the Defense System Management College (DSMC) International Security and Technology Transfer/Control Course, and the International Programs Security Handbook published by the DUSD(PS).

The definitions of terms that are typically associated with security aspects of IAPs are found at the end of this chapter, starting on page 2-13.

Security Basics

IAP security can be thought of as what (information and articles) can be released to whom and under what conditions. There are several basic concepts and common terminology that all persons involved in an IAP should know and remember. They are provided below in bulletized **1-2-2-3-3** summary form. Each is explained in greater detail later in this chapter.

- **1. False Impressions:** Don't create expectations with international partners that aren't/can't be fulfilled.
- **2.** The first **2** represents the *two fundamental security considerations*.
 - **Access:** Is providing access to information and defense articles in the best interests of the U.S.?
 - **Protection:** Can the information be adequately protected by the recipient within the definition of U.S. protective measures.
- **2.** The second **2** represents the *two activities* that govern release of U.S. *classified* information.
 - **Disclosure Decisions:** Who will have access to what U.S. *classified* information and is it authorized for release by the appropriate official in compliance with applicable disclosures policies?
- **Government-to-Government Transfer:** *Classified* information exchange must be conducted through *official channels or other channels that are agreed upon in writing by the sending and receiving governments*.
- **3.** The first **3** represents the *three security conditions* needed for disclosure/export.
 - **Transfer:** Recipient agrees not to transfer to a third country, government, person, or other third country entity without U.S. approval.
 - **Use:** Recipient agrees to use only for the purpose furnished unless approved otherwise by the U.S.
 - **Protection:** Recipient agrees to provide substantially the same degree of security as the U.S. would provide.
- **3.** The second **3** represents the *three basic documents* that provide legal and policy basis for international program security.
 - **Arms Export Control Act (AECA):** Governs the export of defense articles and defense services (i.e., technical data); forms the legal basis for security requirements in most DoD international programs.
 - **Executive Order (EO) 12958:** Establishes the Executive Branch's U.S. Classified National Security Information Program.
 - **National Security Decision Memorandum (NSDM) 119:** Establishes the National Disclosure Policy (NDP), which is the basis for making

decisions on the foreign disclosure of classified military information.

An additional security basic is *teamwork*. There are a lot of resources available to assist PMs in properly handling the security aspects of an IAP. Security aspects of an IAP should be handled using an integrated product team (IPT) approach, just as IPTs are used for other important aspects of the program. It's imperative that PMs ensure that the program Security IPT is staffed with the appropriate expertise and that it receives the management emphasis required to perform its vital role in the program. Alternatively, security and technology transfer specialists can be integrated in another program IPT.

U.S. Organizations/Roles

The implementation of security and export controls within IAPs involves many different U.S. Government organizations both within and outside of DoD. Their roles are outlined below.

- **The Department of State** administers the AECA. The Department of State controls the export of defense articles and services and related technical data through the Office of Defense Trade Controls (ODTC). The ODTC administers the International Traffic in Arms Regulations (ITAR), which implements the AECA. The Department of State, therefore, is a key player in all DoD IAPs.
- **The Defense Threat Reduction Agency (DTRA)** coordinates DoD positions on export license applications submitted under the ITAR. DTRA also coordinates the DoD position on the export of "dual use" items (see below).
- **The Department of Commerce** oversees U.S. industrial interests and promotes U.S. jobs. The Bureau of Export Administration (BXA) within Department of Commerce administers the Export Administration Act (EAA) concerning export of "dual use" and commercial items, through the Export Administration Regulations (EAR). The Department of Commerce evaluates all proposed IAPs for impacts on U.S. industry and makes export decisions on "dual use" items.
- **The ODUSD(PS)** is responsible for security policy of DoD international programs. This responsibility includes security policy and arrangements for international programs, international security agreements, the National Disclosure Policy, and NATO security policy.
- **The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (ASD(C3I))** is responsible for domestic security programs, including industrial security policy, and staff supervision of the Defense Security Service (DSS). The ASD (C3I) also provides technical security support for acquisition program protection planning.
- **The Director, DSS** is responsible for assuring industry's compliance with the NISPOM and thus for implementation and oversight of the international security policy within industry.
- **The Defense Contract Management Agency (DCMA)**, by agreement with the Office of the Under Secretary of Defense (Policy), carries out important international program security functions for DSS and the military departments in locations where DSS representatives are not available.

Export Control/Technology Transfer

In an IAP, the responsibility for obtaining U.S. export licenses normally resides with the contractors involved in the program. However, the PM has to take an active role in ensuring that the export control system is responsive to the program's MOU work share requirements or goals and objectives. Excessive delays with the U.S. export control system can be very frustrating to the foreign partner(s) and detrimental to the overall program, as well as to future programs. Key elements of export control/technology transfer are explained below.

- **The Arms Export Control Act (AECA)** governs the export of defense articles and defense services (i.e., technical data) to foreign countries and international organizations, and covers both commercial and government programs. It authorizes a list of controlled articles, the U.S. Munitions List (USML), which is contained in the ITAR published by the State Department. This act forms the legal basis for the security requirements of most DoD international programs. The Act states that foreign sales (i.e., *access*) should be consistent with U.S. foreign policy interests, should strengthen the security of the U.S., and should contribute to world peace. The Act also requires the President to give Congress assurances that the proposed recipient foreign government has agreed to certain security conditions regarding the protection of the articles or information. Listed below are the three security-related conditions that must be satisfied to provide export controlled defense articles and information to a foreign country or international organization.

1. The **recipient** country or organization **agrees not to transfer** title or possession of the articles or related

technical data to anyone who is not an officer, employee, or agent of the country or organization **without prior U.S. Government consent**.

2. The **recipient** country or organization **agrees not to use** the articles or related technical data or permit their use **for other than the purpose for which they were furnished** without prior U.S. Government consent.

3. The **recipient** country or organization **agrees to** maintain security and **provide substantially the same degree of protection as the U.S. Government**.

- **The EAA** governs items not on the USML that have a “dual use,” or both civil and military use. The EEA is implemented by the Export Administration Regulations (EAR) administered by the Bureau of Export Administration (BXA) in the Department of Commerce. The EAR contains significantly more detailed procedures than the ITAR—procedures such as the Commerce Control List (CCL), which identifies the controlled items, and the Country List, which is used in conjunction with the CCL and other guidance to determine export authorization requirements. IAPs (and other programs) must obtain export approval for “dual use” items.
- **ITAR Exemptions.** The ITAR contains several exemptions that may apply to an IAP, and which can greatly facilitate execution of an IAP. A long-standing ITAR exemption has been available for U.S.-Canadian defense trade. This exemption is currently being renegotiated. The Executive Branch has approved the expansion of the Canadian exemption to cover other

nations in order to facilitate defense exports. Although not targeted specifically to IAPs, these types of exemptions could make it significantly easier to execute an IAP.

Any IAP implemented by an IA may receive an exemption from licensing technical data (including classified) under Part 125.4(b)(11) of the ITAR. This type of ITAR exemption must be approved in writing by the ODTIC. If granted, the exemption may be limited to certain forms of technical data. This type of exemption can significantly reduce the management complexity (and cost and schedule) for an IAP. Other ITAR exemptions may be applicable and should be considered. Requests for ITAR exemptions should be submitted by the appropriate contractor(s) early in the program so that execution plans can be made based on whether the exemption is granted or not. Modifying the acquisition plans in IAP based on denial of an ITAR exemption request can create significant problems because of the expectations of the partner nations.

- **Executive Order (EO) 12958** establishes the Executive Branch's Classified National Security Information Program. It provides for levels of U.S. classified military information: Confidential, Secret, and Top Secret. It directs that access may be granted only when required to perform or assist in a lawful and authorized governmental function. Further, persons authorized to disseminate classified information outside the Executive Branch shall assure the protection of the information in a manner equivalent to that provided within the Executive Branch. The EO also states that classified information cannot be transferred to a third party without the consent of the

originator. It also requires the protection of foreign government information.

- **National Security Decision Memorandum (NSDM) 119** comprises the basic national policy governing decisions on the disclosure of classified military information (CMI) to foreign governments and international organizations. It governs disclosures of CMI under both government and commercial programs. NSDM 119 reiterates the basic requirements of the AECA and EO 12958. It emphasizes that classified military information is a national asset and the U.S. Government will not share it with a foreign government or international organization (i.e., permit access) unless its release will result in a clearly defined benefit to the United States and the recipient government or organization will provide substantially the same degree of protection.

Handling of Information

Proper handling of information must be emphasized in IAPs. IAPs are likely to encounter requirements to handle types of information normally not found in U.S.-only programs. Below are requirements and considerations for the handling of such information in IAPs.

- **For Official Use Only (FOUO).** Although not unique to IAPs, FOUO handling procedures in an IAP must be an area of management emphasis because of the involvement of foreign persons. FOUO information must be secured in a manner that precludes unauthorized access (e.g., locked in a desk drawer, file cabinet, or room to which access is controlled). It must be transmitted using secure voice, fax, or email, or encrypted (unless the originator waives this requirement). It may be mailed

using first class or parcel post. It should be destroyed by shredding or tearing into small pieces so that reconstruction is difficult. Unauthorized disclosure of certain FOUO information can result in criminal or administrative sanctions.

- **Controlled Unclassified Information (CUI).** CUI (see definition on page 2-13) when used in international programs will be marked to identify its “in confidence” nature. An example of CUI is unclassified technical data in an IAP. The data may not be lawfully exported without an export authorization/license.
- **Foreign Government Information (FGI).** FGI (see definition on page 2-14) must be classified under EO 12958 in order to receive protection equivalent to that provided by the originating government or organization. In the U.S., foreign RESTRICTED and CUI must be marked with the foreign government marking (in English) and is normally marked “CONFIDENTIAL-Modified Handling Authorized.” It is generally handled following the same procedures as FOUO. The basic three security conditions discussed earlier for U.S. information (transfer, use, and security) apply to U.S. handling of FGI.
- **NATO Programs/NATO Information.** For NATO programs (see definition on page 2-14), NATO security regulations apply to the protection of NATO information (see definition on page 2-14). U.S. acquisition personnel in an IAP that is an official NATO program must, therefore, know and follow the NATO security regulations as well as U.S. security regulations. One important aspect of NATO programs is that program information from them is normally available to all NATO members unless

the program documentation specifies otherwise. Information involved in NATO programs that originated from other than a NATO civil or military body remains the property of the originator, but the medium containing the information is to be protected under NATO policy. See Appendix B for a summary of the NATO security requirements and instructions for U.S. personnel. (Note that IAPs involving NATO member nations are often mistaken for NATO programs when they are not.)

- **Classified Information** is handled in the same manner as classified information in U.S.-only programs. The next section describes the procedures for sharing classified information.

Sharing Classified Information

The two fundamental security considerations that must be addressed prior to participation in a program involving the sharing of classified U.S. defense articles or information with another country or international organization are **access and protection**. The fundamental questions that must be asked when considering providing classified defense articles or information to a foreign government or international organization are: is access in the best interest of the U.S.?; and will adequate protection be provided?

To satisfy the above two considerations, the government-to-government principle is applied to the actual disclosure or export decision and to the transfer of classified articles and data. First, **disclosure decisions** (based on the AECA, EO 12958, and NSDM 119) are decisions on whether the **U.S. Government** will release classified information to **another Government or International Organization**. If the answer is yes, then the transfer must be

made through official “government-to-government” channels (e.g., military postal service or government courier service) or other channels approved by the responsible governments (i.e., government-to-government transfer). This is necessary so that government accountability and control can be maintained until custody is officially transferred and the recipient government assumes responsibility for the custody and protection of the articles or information pursuant to bilateral security agreements and the provisions of the applicable program agreement.

False Impressions

It is imperative that personnel involved in IAPs do not create false impressions of the U.S. Government’s willingness to release classified information. Therefore, in considering possible participation in an international program, the highest level of classified information required for participation must be determined before any commitment is made. Before any information can be released, a favorable disclosure decision by a designated disclosure authority is required regarding the highest level of information to be involved. An exception to the National Disclosure Policy may be required if disclosure authority has not been delegated, or disclosure does not meet other foreign disclosure criteria and conditions. This applies to contractors as well. PMs should monitor program contractors in this regard. There have been many occasions when false impressions have been created in the past involving personnel at all levels. These situations are embarrassing to all involved (the U.S. Government, DoD, parent organizations, and the direct participants). Creating false impressions hinder not only the current IAP involved, but also will be remembered by our international partners when considering future international programs of any type with the U.S. Government.

Disclosure

The National Disclosure Policy (NDP) governs the disclosure of CMI to foreign governments and international organizations. The NDP is based on NSDM 119 and is implemented by the NDP-1 document. The NDP-1 is updated annually by the NDP Committee (NDPC) (see Appendix C for NDPC membership). Delegation of authority charts are annexes to NDP-1 and provide the basis for making disclosure decisions on a country by country basis (see Appendix D for an example NDP-1 chart). A **Principle Disclosure Authority** or **Designated Disclosure Authority** within DoD commands, agencies, and major staff elements make disclosure decisions in accordance with the NDP. Appendix E provides a list of the DoD Principal Disclosure Authorities. In addition to the classified information being within the levels specified in the charts (i.e., delegated disclosure levels), a decision to disclose CMI must satisfy each of the following conditions:

1. disclosure is consistent with U.S. foreign policy;
2. disclosure is consistent with U.S. military and security objectives;
3. the recipient will protect the information in substantially the same manner as the U.S. would;
4. disclosure will result in benefits to the U.S. at least equivalent to the value of the information disclosed; and
5. the information disclosed must be limited to that which is necessary to fulfill the purpose of the disclosure.

If a disclosure is deemed to be in the best interest of the U.S. but is not consistent with the delegated disclosure levels and the five criteria above or the NDP-1 policy statements, or if another Department or Agency that owns or has an interest in the information does not support the disclosure, a request for an exception to the NDP can be submitted. NDP exceptions will normally be sponsored by the NDPC member from the Department or Agency that is to initiate a program involving the disclosure of classified military information. Contractors have no direct input into a request for an exception to the NDP. The information required for a request for exception to the NDP is covered in the OSD International Programs Security Handbook. Exception requests will be forwarded through channels to the NDPC and a decision will be made within ten days so long as unanimous agreement can be reached. When unanimity cannot be reached, there are procedures for obtaining a decision, including, ultimately, an appeal to the Secretary or Deputy Secretary of Defense.

All disclosure decisions (including denials) are required to be recorded in the Foreign Disclosure and Technical Information System (FORDTIS) database. The primary purpose of FORDTIS is to assist disclosure authorities in making future disclosure decisions. In urgent situations, the Secretary or Deputy Secretary of Defense may be asked to render a disclosure decision as an exception to policy. PMs should also be aware that the disclosure of certain categories of information are governed by separate laws, regulations, and policy (i.e., SCI, COMSEC, Nuclear, etc.). Therefore, PMs must be cautious not to create false impressions about the disclosure of this type of information until disclosure authorization has been obtained from the responsible agency.

Program Documents

The following security-related documents are normally required for an IAP. These documents must be written early and tailored for the specific program in order to be useful for program execution.

Program Protection Plan (PPP). The PPP requirement is not unique to an IAP; however, in an IAP the PPP will have added importance because of the inherent foreign involvement. The purpose of the PPP is to protect defense items and technical information from hostile collection efforts and unauthorized disclosure. DoD Regulation 5000.1R requires all acquisition programs to identify sensitive information and technologies or Critical Program Information (CPI) early in the acquisition cycle and then to prevent inadvertent or unauthorized disclosure on a continuing basis. The program Security Classification Guide identifies classified information within the program. The PM is responsible for obtaining approval of the Security Classification Guide and ultimately determining the classification of all program information. PPP policy and procedures are contained in DoDD 5000.39.

TA/CP. The TA/CP is a critical part of the PPP for an IAP. The purpose of the TA/CP is to:

1. assess the feasibility of foreign participation in the program from a foreign disclosure and technology security perspective;
2. assist in preparing negotiating guidance;
3. identify security arrangements for the program;
4. assist in drafting the delegation of disclosure letter (DDL);

5. support the acquisition decision process; and
6. assist in making decisions on foreign military sales (FMS), commercial sales, and co-production or licensed production of the system.

A TA/CP has four parts:

1. Program Concept;
2. Nature and Scope of the Effort and Objective;
3. Technology Assessment; and
4. Control Plan.

Parts 1 and 2 provide general program information to help provide a context for users of the TA/CP.

Part 3, the Technology Assessment, identifies and analyzes the critical military capability or technology that requires protection. Emphasis should be placed on the value of the technology and system in terms of military capability, susceptibility to compromise, foreign availability, and likely damage in the event of compromise. For any type of foreign involvement, the assessment must provide a risk-benefit analysis. It must consider phasing the release of classified and unclassified information. It must answer “how” the U.S. achieves operational and technological benefits from foreign involvement in the program.

Part 4, the Control Plan, must identify “how” to minimize the potential risks and damage to the U.S. The control plan for an IAP should consider phasing release of information to match program needs, release of information to foreign nationals working U.S. facilities and U.S. persons working at foreign facilities.

Delegation of Disclosure Authority Letter (DDL) explains classification levels, categories, scope, and limitations on information that may be disclosed to a foreign recipient. For an IAP, it is based on the TA/CP. The DDL is approved by the Milestone Decision Authority (MDA) in close coordination with the Principal or Designated Disclosure Authority, and must be kept current throughout the acquisition phases and with changes in the program. DDLs provide guidance for personnel who make disclosure or licensing decisions on the program. A DDL should be prepared as soon as foreign participation is anticipated. Failure to prepare a DDL early can result in program delays and political embarrassment, and possibly jeopardize future cooperation on the program. DDL’s are normally “U.S.-Only” and may be classified.

Multinational Industrial Security Working Group (MISWG) Documents. The MISWG is composed of the NATO countries, less Iceland. The MISWG documents contain common security procedure guidelines that the countries have collectively agreed to use, thus reducing the burden of developing program specific security procedures. See Appendix F for a summary of the MISWG documents. The MISWG documents should be used as the basis for developing the Program Security Instruction (PSI) for any bilateral or multinational IAP with U.S. involvement (including IAPs with non-MISWG countries). In order to use the MISWG documents effectively, they must be tailored for the specific IAP.

PSI. A PSI is usually required by the program MOU for an IAP to document special security procedures for handling and controlling access to program information (e.g., CMI and CUI). A PSI rationalizes the security requirements of the participating governments and establishes standard security procedures for the program.

Its preparation must involve all program participating countries and any contractors. The PM must provide guidance on its content. Guidance should take into consideration the possible use of each of the other MISWG documents (in general, not all will be used, so only those for which a use is anticipated should be in the PSI); any special security requirements identified in the Program Protection Plan or TA/CP; and requirements identified by other participating countries or by participating contractors. It is advisable to form a security working group, subordinate to the steering committee or head of the joint program office, to formulate the requirements for the PSI. Security specialists from all participating countries should comprise the working group, and advice should be sought from participating contractors.

Visits and Assignment of Foreign Nationals

International visits account for more transfers of CMI/CUI than all other transfer mechanisms combined. They are also a necessary aspect of IAPs and must be planned for properly. While they are necessary, they also present significant security risks. It is imperative, therefore, that personnel involved in IAPs know and understand the procedures for obtaining authorization for international visits, as well as the security requirements. The visit request process serves three important functions:

- It provides a means for consideration of disclosures of information related to the visit.
- It is the means for the requesting government to provide security assurances on the visitors and their firms and if needed, authorize the visitors to receive CMI on its behalf.

- It serves to facilitate administrative arrangements associated with the visit.

All foreign national visits (including foreign contractors) that involve U.S. or foreign government classified information must be requested through government channels and must follow the procedures set forth in DoDD 5230.20 and the DoD Foreign Clearance Guide (DoD 4500.54-G), and, for contractors, the NISPOM. Visit requests (to the U.S.) must normally be received 30 calendar days prior to the visit. Requests for documentary information must normally be submitted through the visitor's embassy; if a visitor is to take custody of classified information, the pertinent visit request must specify that the visitor is authorized by the requesting government to act as a courier, and the visitor must possess courier authorization documents. Each Service has unique (although similar) procedures for processing visit requests. There are three types of international visits.

- **One Time Visits.** Single, short-term visit (less than 30 days), for a specific purpose.
- **Extended Visits.** Single visit, for an extended period (up to one year), in support of a government approved program or contract.
- **Recurring Visits.** Intermittent, recurring visits covering a period up to one year in duration in support of a government approved program or contract. Recurring visit approvals for personnel involved in an IAP can provide flexibility for short notice visits and reduce associated visit administrative burdens. To be effective, recurring visit authorizations must be put in place as early as possible.

A Country Clearance is required for U.S. government visits to overseas government or cleared contractor facilities. Requests must normally be submitted at least 30 days in advance. The Country Clearance request must be approved by the host government. In addition, a Theater Clearance is required for visits to U.S. military facilities. The request for visit authorization is used to obtain Country and Theater clearances. Again, guidance is contained in DoDD 5230.20 and the DoD Foreign Clearance Guide.

The assignment of foreign nationals in support of an IAP is common. Foreign nationals will normally be assigned as either Liaison Officers (National Representative) or Cooperative Program Personnel. In either situation, the following access and control requirements must be followed.

- Unique passes to identify the person as a foreign national must be worn on the outer clothing.
- The DDL covering the assignment must specify information access limitations, identify a contact officer, and include any special instructions.
- A contact officer must be appointed who is responsible for supervising the activities of the foreign national. The contact officer must be experienced and familiar with DoD disclosure and visitor policies, and the DDL provisions.
- Non-escorted access to DoD facilities for foreign nationals is possible as long as the above provisions are followed; there is reciprocity by the other government; there is a frequent need for access for official purposes; access controls can be established at the facility; and a DoD sponsor provides justification.

Technology Control Plan (TCP)

The ITAR and NISPOM require a TCP when foreign nationals are assigned to a cleared contractor facility on an extended visit authorization and for foreign nationals who are employed by the contractors. Minimal requirements for a TCP are contained in Appendix G.

Other IAP Security Considerations

- **NISPOM.** The NISPOM (see definition on page 2-14) contains, in addition to industrial security procedures for an IAP, the security clauses that must be placed in international contracts that entail the transfer or production of classified information. Chapter 10 of the NISPOM contains procedures that are applicable to IAPs.
- **Foreign Ownership, Control, or Influence (FOCI).** The purpose of the FOCI process is to protect U.S. classified information that is held by U.S. companies under FOCI. There are five different FOCI arrangements that have been developed to accommodate various levels of foreign involvement. These arrangements are:
 - a voting trust agreement/proxy agreement;
 - a board resolution;
 - a special security agreement;
 - security control agreement; and
 - limited facility clearance.

These FOCI arrangements are explained in the OSD International Program Security Handbook. Although implementation of FOCI arrangements are the responsibility of the Defense

Security Service, IAPs that have industrial involvement from companies with FOCI arrangements and possible access limitations should be aware of these arrangements and ensure they are considered in program management.

- **Committee on Foreign Investment in the U.S. (CFIUS).** The 1988 Exon-Florio Amendment to the 1950 Defense Production Act gives the President of the United States the authority to intervene in certain foreign acquisitions and mergers involving U.S. companies when there are national security concerns. Responsibility for investigating the acquisitions and mergers and preparing recommendations for the President was assigned to the CFIUS.
- **General Security Agreements (GSA).** Also called General Security of Information Agreements (GSOIA) and General Security of Military Information Agreements (GSOMIA). These are bilateral agreements between the U.S. and a foreign government on the protection and security of information. When in place these GSAs provide the basis for implementing the three basic security conditions from the AECA (transfer, use, and protection).
- **Industrial Security Agreements.** Industrial security agreements have been negotiated with those governments with which DoD has entered into agreements involving defense-industrial cooperation. These agreements, which are annexes to the GSA, contain procedures for handling classified information in industrial operations that will apply to IAPs.

Significant Differences With Foreign Partners

PMs should be aware of IAP differences with foreign partners.

- **Foreign Person** – in the European Union (EU) persons from another EU country are not considered foreigners with regard to job availability. They may, however, be foreign persons in terms of U.S. export control policies. When negotiating IAP agreements, it should be determined if any of the foreign participant countries or their contractors will be employing nationals from a non-participating country. If this possibility exists, procedures for handling such situations must be worked out prior to conclusion of the program agreement.
- **Export control** – in some countries, including some of the NATO allies, oral or visual disclosure to a foreign individual is not considered an export. Moreover, an export does not occur unless material items that are controlled leave the country. These facts should be considered in connection with the above point, and if necessary, handled by provisions in the program agreement.
- **Security** – the security programs for many foreign governments are based on laws that give the government significant control over any person who has access to classified and, in some cases, unclassified official information. Such governments also have a hand in the appointment of company security officials. Many NATO countries have adopted NATO security policies by law. U.S. security programs are for the most part based on an Executive Order and depend on detailed procedures, albeit U.S. record and accounting requirements are

often less stringent than those of many allies. As a consequence, the U.S. operates parallel security programs for national and foreign government information.

Lessons Learned

PMs must be cognizant of the many security aspects within their IAPs. Some of the past mistakes that have been made are listed below.

- Visitors not wearing distinctive badges and poorly controlled, leading to embarrassment for all concerned;
- Emergency visit requests made and denied because they were routine in nature and should have been planned ahead of time;
- Faxing, e-mailing, or other transmission of FOUO and foreign government RESTRICTED information by non-secure means;
- Transmission to a foreign person of Controlled Unclassified Information by telefax, e-mail, or telephone without appropriate disclosure/export license or authorization;
- Agreeing to establish a program as a “NATO Program” without realizing the implications;
- Failure to establish government-to-government transfers and obtain receipts for international transfers;
- Failure to establish recurring visit authorizations early;
- Failure to prepare security documentation (TA/CP, DDL, etc.) early and in sufficient detail;

- Failure to properly identify type of program (NATO or multi-national non-NATO) and applicable governing laws and/or policies; and
- Failure to plan early enough for acquisition of appropriate equipment for secure communications among program partners and contractors.

Definition of Key Terms

Below are definitions of terms typically associated with IAPs:

Classified Military Information (CMI) is any information lawfully and properly classified IAW EO 12958 or successor orders and developed by or for the DoD or is under its control or jurisdiction. For an IAP, this information should be detailed in the program Security Classification Guide (which the PM establishes and publishes).

Controlled Unclassified Information (CUI) is unclassified information to which access or distribution limitations have been applied in accordance with applicable national laws or regulations. For the U.S., CUI is official government information that is unclassified, but that has been determined by designated officials to be exempt from public disclosure under FOIA including certain export controlled information as described in DoDD 5230.25.

“Deemed Export” is the oral or visual disclosure IAW the ITAR “Export” provisions below.

Disclosure Authorization refers to a decision by a designated authority that is required prior to the disclosure of classified information to foreign nationals.

For Official Use Only (FOUO) information is unclassified official U.S. government information that is exempt from public release when its withholding is approved by an appropriate DoD official.

Foreign Government Information (FGI) is information that has been provided by a foreign government or international organization, or jointly produced, with the expectation that the information will be treated “in confidence.” The information may be classified or unclassified. In addition to TOP SECRET, SECRET, and CONFIDENTIAL, many foreign governments have a fourth level of security classification, RESTRICTED, as well as CUI.

International Traffic in Arms Regulation (ITAR) is a regulation that implements the Arms Export Control Act (AECA) and governs the export of defense articles and services.

NATO Information is information provided to NATO by a member nation, a non-NATO nation or international organization, or which originates in NATO civil or military bodies.

NATO Programs are those programs that NATO officially designates as NATO programs and are managed by a NATO agency under NATO regulations. They normally are commonly funded.

NISPOM is the National Industrial Security Program Operating Manual, which contains U.S. industrial security procedures.

Public Domain Information is information that is published and generally available to the public through subscriptions, journals, etc.

Security Assurance, for the purpose of visits by foreign nationals representing or sponsored by their governments, is a written certification

provided by a foreign national’s government that the person is representing or is sponsored by the government and has the requisite level of security clearance, and that the government will be responsible for classified information that is provided to the foreign national. (A security assurance on a facility is a certification that they have the requisite security clearance and storage capability for classified information. A security assurance on a national seeking employment and access to classified information in another country is a certification that the individual could be cleared to a stated level.)

U.S. Munitions List (USML) is a part of the ITAR that contains the defense articles (including related technical data) that are controlled.

Key Definitions from the ITAR:

Defense Article means any item identified on the USML. The State Department designates the items on the USML with the concurrence of the DoD. An article or service may be designated a defense article or service if it is specifically designed, developed, adapted, or modified for military application and has significant military or intelligence applicability such that ITAR controls are necessary.

Defense Service means:

1. The furnishing of assistance (including training) to foreign persons whether in the U.S. or abroad in the design, engineering, development, production, manufacture, assembly, operation, testing, repair, maintenance, modification, demilitarization or use of defense articles.
2. The furnishing to foreign persons of any technical data controlled under Paragraph 120.10 of the ITAR (see below), whether in the U.S. or abroad.

Export generally means:

1. Sending or taking a defense article out of the U.S. in any manner;
2. Transferring registration, control, or ownership to a foreign person of any aircraft, vessel, or satellite covered by the USML, whether in the U.S. or abroad;
3. Disclosing (including oral or visual disclosure) or transferring in the U.S. any defense article to an embassy, any agency or subdivision of foreign government;
4. Disclosing (including oral or visual disclosure) or transferring technical data to a foreign person, whether in the U.S. or abroad; or
5. Performing a defense service on behalf of, or for the benefit of, a foreign person, whether in the U.S. or abroad.

Foreign Person generally means any natural person that is not a U.S. citizen or U.S. national, a lawful permanent resident alien, or otherwise protected individual. It also means any foreign corporation, business association, partnership, trust, society or any other entity or group that is not incorporated or organized to do business in the U.S., as well as international organizations, foreign governments, and any agency or

subdivision of foreign governments (e.g., diplomatic missions).

License means a document bearing the word license issued by the Director, Office of Defense Trade Controls or his/her authorized designee, which permits the export or temporary import of a specific defense article or defense service.

Technical Data means:

1. Information, other than software, that is required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance, or modification of defense articles. This includes, for example, information in the form of blueprints, drawings, photographs, plans, instructions, and documentation;
2. Classified information relating to defense articles and defense services;
3. Information covered by an inventory secrecy order; or
4. Software directly related to defense articles.

Note: The Department of Commerce's definition of technical data is slightly different.

PART II

**TRANSATLANTIC
AND
INTRA-EUROPEAN
COOPERATION**

3

EUROPE AND TRANSATLANTIC DEFENSE COOPERATION

TRANSATLANTIC ARMS COOPERATION SINCE WORLD WAR II

“A day will come in which you, France; you, Italy; you, Great Britain—all you nations of the continent—will be united in close embrace, without losing your identity or striking originality...A day will come in which markets open to commerce and minds open to ideas will be the sole battlefields.”

—Victor Hugo

Introduction

America's European allies in the immediate postwar era were armed almost exclusively with war surplus equipment, mainly of British or U.S. manufacture. Indeed, the French First Army that raced across Southern Germany in 1945 used Sherman tanks, M-1 Garands, G.I. steel pots, and U.S. half tracks and trucks. Because of the enormous quantity of materiel remaining after the war and the rising menace posed by the Soviet Union, military equipment was simply granted by the U.S. To some degree this continued through the 1950s. During the 1960s the U.S. moved away from grants and toward sales of arms to its European Allies.¹

The next step was coproduction of U.S. designed and developed equipment. The 1950s saw Italian and Canadian production of the F-86 Sabre Jet, followed by the addition of The Netherlands, West Germany, and Belgium in the production of the F-104 Starfighter.² There are many other examples of European production of U.S. designs and a degree of coproduction continues today.

Several factors contributed to a movement toward codevelopment on a transatlantic basis in the 1960s. Europe had developed a range of indigenous weapons systems by that time and their industries were naturally eager to maintain their local markets. NATO forces, expected to

fight together in a potential conflict, fielded a number of different models of the same equipment, including tanks, anti-tank weapons, trucks, and artillery. Warsaw Pact forces were largely standardized with Soviet equipment, giving them an inherent edge in interoperability and logistics. Early in the history of the alliance, this issue was recognized and addressed by the formulation of NATO Basic Military Requirements (NBMRs), which, though meant to be mandatory, were not complied with.³

An early example of a codevelopment initiative is the MBT-70 program between West Germany and the United States. Thanks largely to the support of then Defense Secretary Robert McNamara, agreement was reached in 1963 between the two nations to jointly develop a main battle tank. Unfortunately, rising costs and technical problems caused the partners to go their separate ways, resulting in the German Leopard II and the U.S. M-1 Abrams. In 1973, however, cooperation between these two projects led to the adoption of the German 120mm smoothbore gun by the U.S.⁴

To facilitate a broader NATO effort of codevelopment, the CNAD was established in 1966 and is still active today. The National Armaments Directors (NADs) or their representatives (NADREPs) are assisted and advised by a number of specialized groups including the NATO Industrial Advisory Group (NIAG) and one group for each Service component, as discussed in Chapter 1. These fora provide the opportunity for member states of NATO and their industries to explore potential areas for cooperation, by taking into consideration participants' requirements, economic and labor considerations, and technology concerns.⁵ An early success of the CNAD and the associated Naval Armaments Group (NAG) was the NATO Seasparrow, of which more is written in Chapter 4.

The first major piece of U.S. legislation designed to promote cooperation with the goals of interoperability and standardization was the Culver-Nunn amendment to the 1976 Defense Authorization Act. It established as U.S. policy that American forces should be equipped with standardized—or at least interoperable—equipment for enhanced effectiveness when fighting alongside allied forces. The legislation further allowed for the purchase of foreign-manufactured arms where the goals of standardization and interoperability are served.⁶ The Nunn-Warner amendment of 1986 was aimed at aiding cooperative development through the provision of seed money for such projects. These two pieces of legislation were followed by the Quayle amendment of 1986, which removed statutory impediments to cooperation, and the McCain amendment of 1997, which provided discretionary authority to waive protectionist provisions impeding cooperation.⁷ However, the sum of meaningful codevelopment and common procurement achieved by NATO remains modest, and interoperability in many battlefield areas has not been achieved.

European Economic and Political Development

Many Americans still see Europe as it was in the postwar era—politically troubled and economically prostrate. This contributes to the perception that European technology is broadly inferior to that of the U.S., and that European nations have no choice but to cooperate or buy American if they want top-shelf equipment. This mostly inaccurate view is not helpful to transatlantic defense cooperation. One European official summed up the U.S. attitude in the former transatlantic arms relationship as, “You buy from us and shut up.”⁸

It is not unusual for perceptions to lag reality, but in the case of European development, events

have moved particularly rapidly and America's view of Europe has been slow in adjusting. Immediately following World War II, the U.S. accounted for 55 percent of the planet's Gross Domestic Product (GDP). America dominated the world scene economically, militarily, and politically. That frame of reference was not difficult for Americans to become accustomed to and they did. The problem is that it was an artificial situation brought about by war and within a decade, balance was beginning to be restored. By the mid-fifties, the German economy was rapidly reawakening along with that of several other European nations. This was not the universal experience in Europe as the example of the U.K. shows, but the overall trend toward a modernized, competitive, industrial economy was unmistakable.

Today, Europe lags the U.S. in per capita GDP, but the gap has closed substantially since 1950 when the average "Old World" citizen's share of GDP was only half that of his U.S. counterpart. In 1998, U.S. per capita GDP was \$32,328 compared to \$26,217 for Germany, \$24,034 for France, and \$23,692 for the United Kingdom. The Eurozone average was \$22,428.⁹ Depending on the mix of countries that are included, Europe is a little behind or ahead in aggregate GDP. For the first time in its 30-year history, Airbus achieved more orders in 1999 than Boeing. Nokia is the darling of the global telecommunications industry, and Arianespace is a competitive launcher of commercial satellites. Most European cities have a remarkable aura of prosperity, superb public transport, and a communications infrastructure second to none.

Concomitant with this growing prosperity were political developments aimed at creating the environment to make possible further economic growth. Europe has always envied the large unified market enjoyed by the U.S. and their

steps to emulate it have a long history. The Organization for European Economic Cooperation (OEEC) was founded in 1948, closely followed by the formation of a customs union by Belgium, The Netherlands, and Luxembourg (BENELUX). The European Economic Community (EEC) came into being with the Treaty of Rome in March of 1957. The three and a half decades that followed were not a story of unmitigated growth for the European Community, but in 1992 a free trade zone was achieved within Europe. In that time, Britain's commitment was uneven and there were (and still are) significant disagreements over issues such as fishing rights and agriculture. These setbacks were misinterpreted as signs that the realization of a unified European market was a pipe dream. Events have proven otherwise.

Following the achievement of a unified market, the next big test facing the European Union (EU) was monetary union. The five criteria that each member nation had to attain prior to admittance were agreed upon at Maastricht in 1993. Briefly, these criteria derived from limits on national debt, budget deficits, and inflation rates that needed to be roughly aligned so that national currencies could be fixed to the new benchmark, the euro, for a period prior to being phased out.¹⁰ The advantages are obvious and equally obvious were the political difficulties attendant to reaching the Maastricht criteria. These difficulties gave rise to another wave of "Euroskepticism" in the mid-nineties, fueled by French strikes, a negative referendum in Denmark, and close votes elsewhere.

The dawn of the new millennium has seen most of that skepticism erased. Germany powered through the toughest years of financing reunification, France reined in its powerful public sector unions, and Italy summoned considerable national will in meeting the Maastricht criteria. These developments surprised all but

the most optimistic and proved the existence of a powerful pan-European will to realize a closer union.

What was missed by the doubters was the emotional and psychological attraction of union to an enthusiastic core of adherents. A sense of collective European identity, Euronationalism, is emerging particularly among the young, a notion that is unappreciated by American observers who are more accustomed to a strong traditional nationalism. The past century has dampened that traditional nationalism for many Europeans. Germans and Italians are self-conscious about waving their flags two generations after World War II. France witnessed the ignominious fall of the Third Republic in 1940 followed by the loss of its colonial empire in the next two decades. Throughout the continent, patriotism carries a different, less reverential meaning than that understood in the U.S. Britain alone retains a form of nationalism familiar to Americans and this may explain her reluctance to commit herself to the EU more fully.

The generational change in Europe is marked. Germany's new political class and the grass-roots sentiment that sustains it are well described by Frederick Kempe, in *Father/Land: A Personal Search for the New Germany*. The emerging cohort of Germans who found their voice in the election of Gerhard Schroeder and his ministers view themselves as citizens of the world and share deeply the collectivist tendencies of their EU partners. Where their parents may have admired the U.S. for what they saw and experienced in the Marshall Plan, the Berlin Airlift, and a benign occupation, younger Germans are open in their disagreements with America, as Greeks, French, and Italians have been for years. In this sense, theirs was an easy transformation into "citizens of Europe."

Germany is not the only example of Europeans seeking to redefine themselves. The phenomenon can be seen from Gibraltar to the Baltic. What is significant for relations with the U.S. is that Europeans are more certain of what they are not (Americans), than of what they are. This is understood at different levels and in different ways, such as a rejection of what is viewed as a "McDonalds culture" or predatory capitalism.

Euronationalism does not necessarily equate to anti-Americanism. Indeed, part of the motivation for the creation of the EU was to emulate the U.S. market, as previously noted. It would be a mistake however, not to recognize that a significant element of the European movement is the desire to emerge from a perceived U.S. cultural, economic, political, and military hegemony. This notion, in turn, is fueled by what was termed "an accumulated resentment" by Owen Harries, editor of the influential Washington-based journal, *National Interest*. Harries concluded that "...it is not unreasonable to suppose that such resentment will find its way into differences of policy."¹¹

Along with the impetus toward European economic and political unity was the same shift of public (and public policy) focus that the U.S. experienced with the end of the Cold War. Freed of immediate security concerns, Europeans turned to domestic issues such as joblessness, the environment, and social welfare. This shift in focus ushered in a Europe-wide wave of electoral victories for Social Democrats, the rough equivalent of the U.S. Democratic Party. The reticence of these Social Democratic parties—often coalitions of Greens (environmentalists), labor, and other left-of-center elements—to spend substantially on defense explains why Europe will have difficulty in rectifying the shortcomings in military capability revealed in Kosovo. Figures 3-1 and 3-2 contrast overall defense spending and

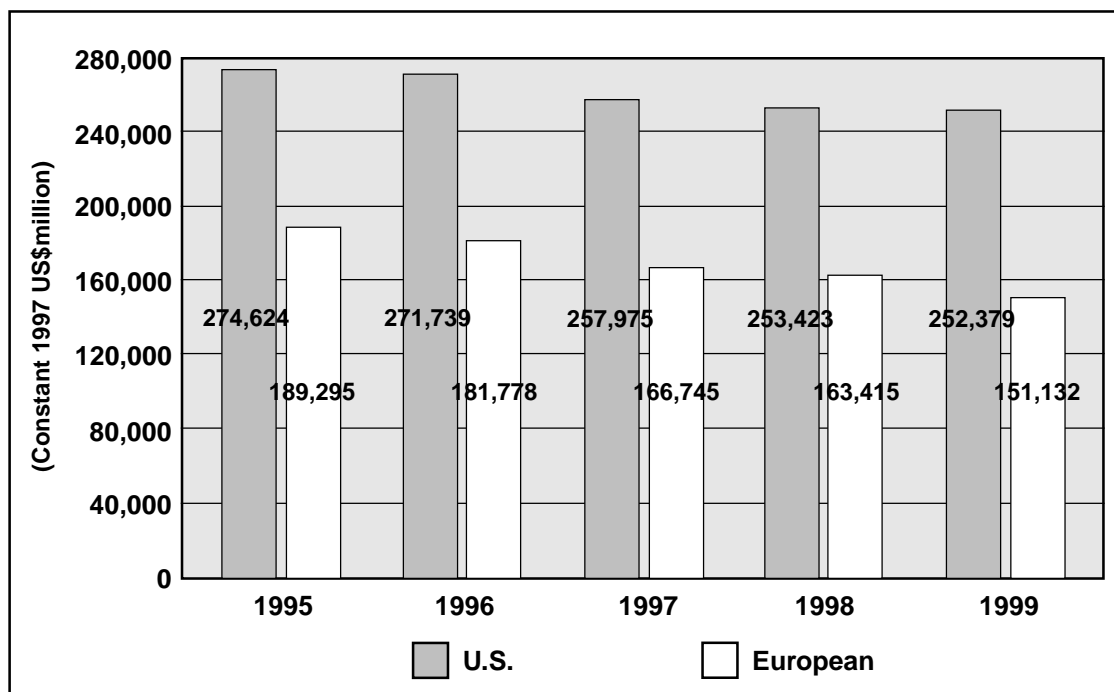


Figure 3-1. Defence Spending in NATO and non-NATO Western Europe, 1995–1999

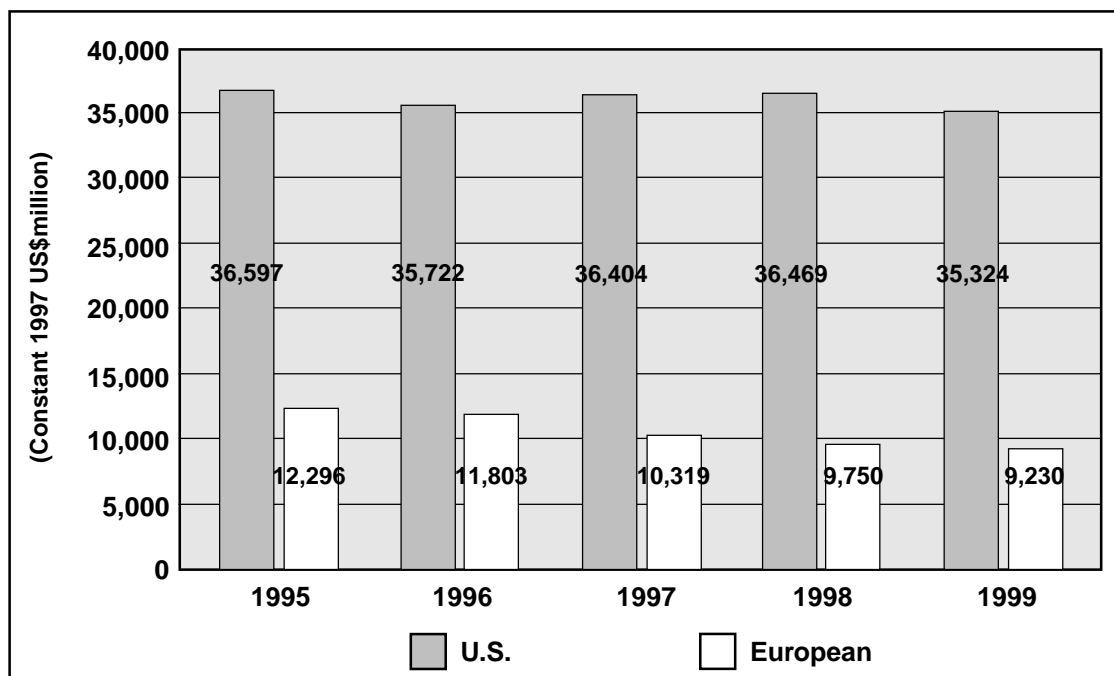


Figure 3-2. Research and Development (R&D) Spending in NATO and non-NATO Western Europe, 1995–1999

Source: The International Institute for Strategic Studies, *The Military Balance – 1999-2000*

spending on R&D between Europe and the U.S. between 1995 and 1999.

European Defense Cooperation

Parallel with the development of European economic integration in the form of the OEEC was a similar movement to address collective security. It should be recalled that at the close of World War II, the U.S. Army demobilized and left a skeleton force in Europe, while the Soviet Union maintained a wartime force, heavy in offensive mobility and firepower. In reaction to this menace, Belgium, France, Luxembourg, The Netherlands, and the U.K. signed the Brussels Treaty in 1948, the main feature of which was a commitment to mutual defense. (See Appendix H for a timeline of European defense initiatives.)

Perhaps the most significant effect of the Brussels Treaty was to convince the U.S. that Europe was serious about a collective defense effort. The creation of NATO followed in 1949. When General Eisenhower was named Supreme Allied Commander Europe (SACEUR), the Brussels Treaty signatories merged their military structure into NATO.¹²

By the early 1950s there was growing sentiment that the former Axis partners should be brought into the collective security arrangement of Europe. France led an attempt to create the European Defense Community (EDC), which would have included West Germany, but the French National Assembly refused to ratify the treaty. Support for the idea persisted and in 1954, the Paris Agreements were signed creating the Western European Union (WEU) and bringing both Italy and West Germany into Europe's security arrangement.¹³

The profile of the WEU has been uneven since its creation. The Union did ease the reintegration

of the Saar into Germany and acted as a liaison between the U.K. (a member of the WEU but not of the EC) and the EC until the former joined the latter in 1973, but was overshadowed by NATO.¹⁴

The first European organization outside NATO dedicated to armaments cooperation was created in 1976, with the name Independent European Program Group (IEPG). The word "independent" was inserted at French insistence to underline the group's independence from NATO. The IEPG comprised all European NATO members with the exception of Iceland, and championed the idea of a centralized procurement organization. However, France possessed a good measure of arms-producing autonomy and was loath to cede any procurement authority. Similarly, Britain feared a loss of sovereignty and had the additional concern of the IEPG becoming a forum for anti-U.S. sentiment.¹⁵

After several fits and starts, leading European defense ministers decided in 1992 to coordinate arms development within the framework of the WEU.¹⁶ What emerged was the Western European Armaments Group (WEAG), a forum for arms cooperation. WEAG's governing principles include increased efficiency through the harmonization of requirements, the opening of national defense markets to cross-border competition, cooperation in R&D, and the strengthening of Europe's defense technological and industrial base.¹⁷

The mid-90s were important years for Europe. From the Maastricht Treaty in 1993 to the creation of a joint armaments agency in 1996, that period saw European unity in the realm of defense make substantial progress. France and Germany, with the former usually taking the lead, were the principal players in this movement. The joint armaments agency's name was

Organisme Conjoint de Coopération en Matière d'Armement (OCCAR), participated in at the outset by France, Germany, the U.K., and Italy. Soon thereafter, the Western European Armaments Organization (WEAO) was formed with broad participation among European nations. The charter of that organization is to improve coordination of collaborative defense research through the creation of a single contracting entity.

OCCAR can be seen as emblematic of European efforts to reach collective solutions, to address both economic and security concerns,

and to gain a measure of independence from the U.S. It is emblematic because OCCAR was a French initiative formed around a Franco-German axis. From the early postwar years, France has been the intellectual and political engine for European unity, readily embraced by Germany (sometimes described as Europe's economic engine) for historical reasons.

OCCAR acts to consolidate program management for several programs contributed by member nations, including the Tiger helicopter and the Roland antitank missile. The organization eases the way for long-term planning in

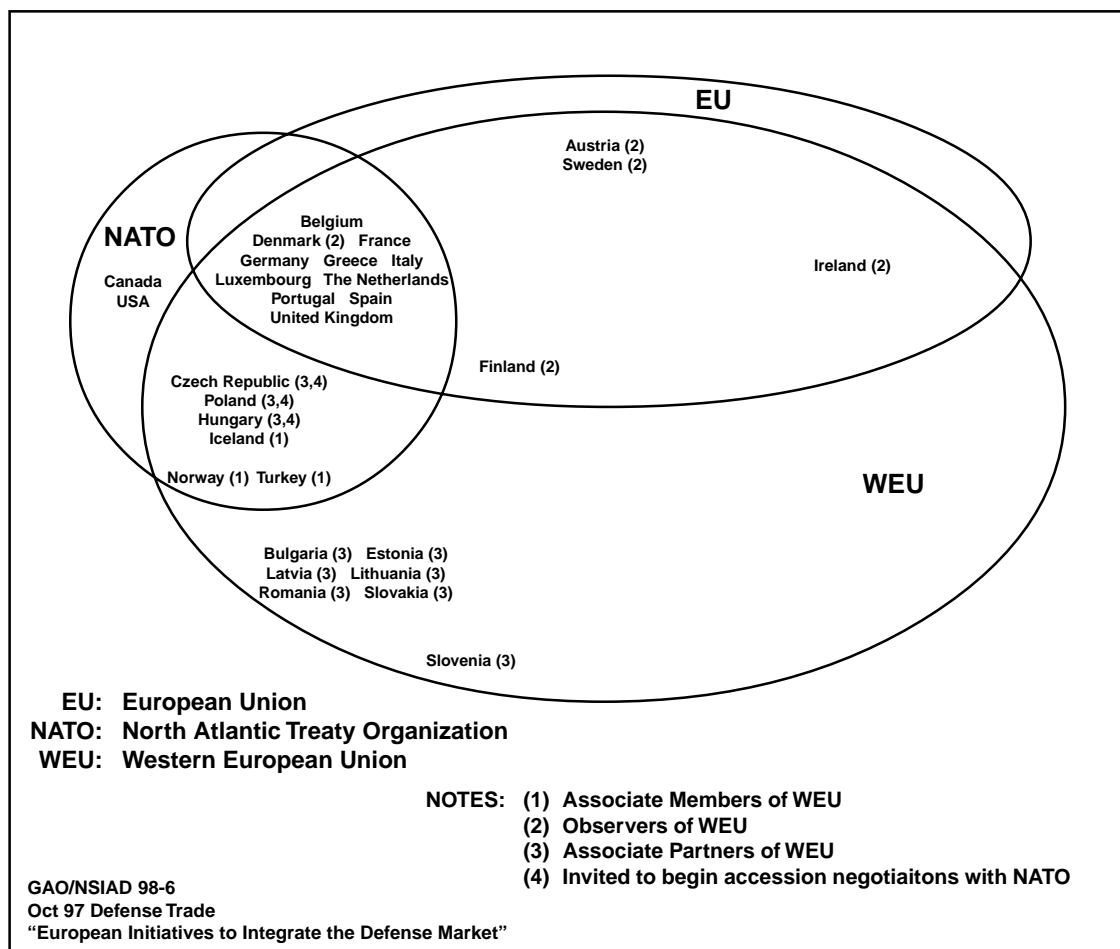


Figure 3-3. Organizations Addressing European Armament Policy Issues

that requirements can be addressed over a longer period and work share can be leveled among several programs over time.¹⁸ OCCAR's administrative offices are in Bonn and other nations can be expected to join in the near future. OCCAR has the potential to develop into a European armaments agency. Should such an agency evolve, it could serve as a single European entity for partnership with the U.S. in armaments development and procurement.¹⁹

Working against transatlantic and European movements to join more effectively for armaments cooperation are the fractured political and military organizations to which the U.S., Canada, and European nations belong (see Figure 3-3). The expansion of OCCAR and similar entities inevitably leads to a confrontation between competing allegiances, particularly between NATO and the EU.

Consolidation of the European Defense Industry

Europe's defense industry has undergone fundamental evolution in the postwar era, the most important changes occurring in the last several years.

For most of the past 50 years, national champions dominated the defense industry landscape in Europe. These corporations typically had a monopoly within their respective nations and were at least in part publicly owned. Into the 1970s this arrangement survived, augmented by a heavy dose of foreign military sales (FMS) from the U.S. Several currents eventually forced a change. Weapons systems became increasingly complex, demanding a broader base of capability and expertise. Additionally, these national champions lacked a sufficient market to be viable and were forced into foreign sales where they were often uncompetitive.

Finally, consolidations within the U.S. put European industry at a further disadvantage while political pressure mounted to become less dependent on American equipment.

In the later 1990s, a confluence of events made possible a consolidation of the European defense industry in response to U.S. dominance. The overarching context of this change was globalization. Growing European interdependence through economic and political integration set the stage for governments to loosen their grip on their national champions in defense. Against a backdrop of privatization, unchallenged, and in some cases encouraged, by the Social Democratic parties that came into power in the 90s, closer ties were allowed between European defense manufacturers.

Significant Consolidations In Europe, 1997-1999:

- British Aerospace acquisition of Marconi Electronic Systems to form BAe Systems
- Germany's DaimlerChrysler Aerospace's (DASA) merger with Aerospatiale Matra of France and CASA of Spain to form the European Aeronautic Defense Space Company (EADS)
- Formation of Astrium, a pan-European satellite company consisting of Matra Marconi, DASA, and Alenia (Italy)
- A pan-European missile company, Matra BAe Alenia²⁰

To put these developments in context, BAe Systems will control 90 to 95 percent of the U.K.'s defense market, and combined with EADS will account for roughly 75 percent of all European defense and aerospace sales.^{21, 22}

These companies are capable of head-to-head competition with the American aerospace and defense giants across the spectrum of products.

Figure 3-4 below illustrates how the European defense industry teamed to produce aircraft and missiles prior to the creation of EADS and BAe Systems.

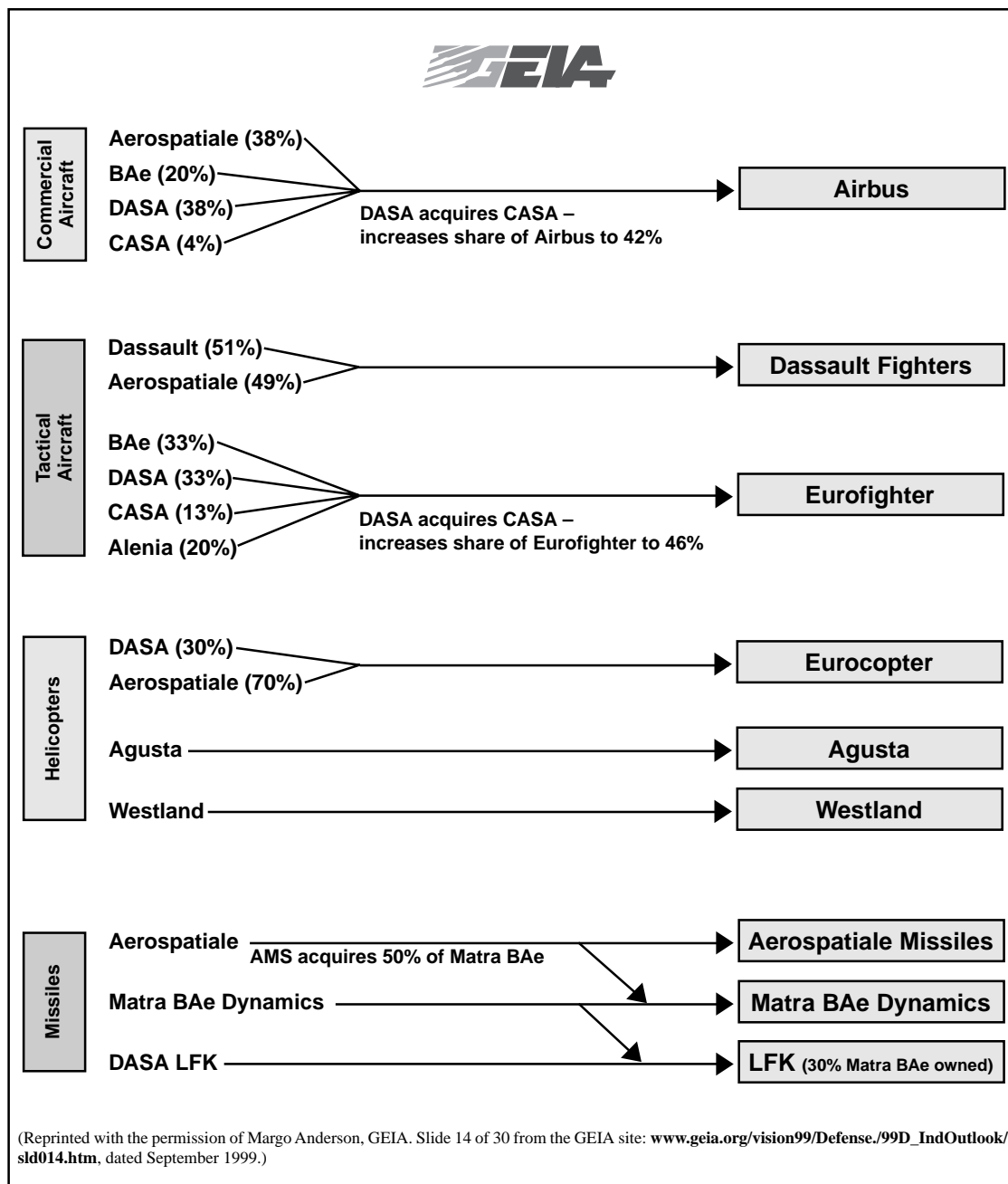


Figure 3-4. European Consolidation by Industry: Aircraft and Missiles

ENDNOTES

1. Farr, Charles Michael, *An Investigation of Issues Related to Success or Failure in the Management of International Cooperative Projects*. Diss. University of North Carolina 1985, p.19.
2. Ibid, pp.27-28.
3. *Management of Multinational Programs; A Handbook for Managers Entering the World of International Acquisition*, 2nd Ed. (Ft. Belvoir, VA: DSMC Press 1987), p.3-4.
4. *Collaborative Development of Main Battle Tanks: Lessons from the U.S.-German Experience, 1963-1978*, Defense Technical Information Center technical report (Alexandria, VA, February 1984).
5. *Conference of National Armaments Directors*, NATO Research and Technology Organization, <http://www.rta.nato.int/CNAD.htm>, p.1.
6. *The Management of Security Assistance*, 18th Ed. (Wright-Patterson AFB, OH: Defense Institute of Security Assistance Management, June 1998), p.439.
7. Frank Cevasco, Slide: *Armaments Cooperation – The Congress* (McLean, VA, Hicks & Associates).
8. Interview with a European national armaments representative at NATO headquarters (February 28-29, 2000).
9. *GDP per capita, 1998*, National Accounts of OECD countries, Main aggregates, Volume 1, <http://www.oecd.org/std/gdpperca.htm>, p.1.
10. Werner Antweiler, “The Euro,” <http://pacific.commerce.ubc.ca/xr/euro/euro.html>
11. Michael Elliott, “Goodbye to All That,” http://www.newsweek.com/nw-srv/printed/special/emu/emu5_4, pp. 3-4.
12. “About Western European Union, The Birth of the EU,” <http://www.weu.int/eng/info/1948.htm>.
13. Ibid.
14. “About Western European Union, WEU From 1955 to 1984,” <http://www.weu.int/eng/info/1955.htm>.
15. Guy Challands, *Sense About European Defence: Affordable Interoperable Arms Procurement Through Collaboration?*, Fellowship Paper, St Antony’s College, Oxford 1999, pp. 38-39.
16. *Defense Trade, European Initiatives to Integrate the Defense Market*, United States General Accounting Office, GAO/NSIAD-98-6 (October 1997), p.4.
17. “Western European Armaments Group,” <http://www.weu.int/weag/eng/info/weag>.
18. *Defense Trade*, p. 7.
19. Challands, p. 45.
20. Jeffrey P. Bialos, “The Transatlantic Defense Industry on the Eve of the 21st Century: Cooperation in the Face of Consolidation,” speech delivered at Toulouse, France (December 6, 1999).
21. Ibid.
22. Felix Rohatyn, speech on U.S.-European Defense Industry Issues, <http://www.usis.it/wireless/wf990415/99041511.htm> (April 15, 1999).

4

REVIEW OF SELECTED TRANSATLANTIC COOPERATIVE PROGRAMS

“Trying to make things work in government is sometimes like trying to sew a button on a custard pie.”

— ADM Hyman Rickover

Introduction

Transatlantic cooperative programs are normally much more complex than single service or even joint programs. A review of selected recent programs shows that despite the increased difficulties, these undertakings are indeed manageable and the extra effort can be rewarding to the participants. While policies and regulations on cooperative programs abound, as discussed in Chapters 1 and 2, the PM has strikingly little in the way of systematic analysis of recent programs available to assist in developing effective plans and strategies. A look at selected successful programs reveals common characteristics that should prove useful to the PM and policymaker alike in anticipating the challenges faced in international cooperation. Of course, every program has unique aspects that must be taken into consideration. A bilateral program for a system upgrade is likely to be significantly less complex than a program to develop a new

weapon system with multiple partners. Regardless of the cooperative program's size and complexity, the PM will still have to be concerned with all of the characteristics addressed in this chapter.

This review looks at seven different cooperative programs (nine including the updates to the multiple launch rocket system) involving all U.S. military services and their counterparts from multiple European partners. These programs are the Multiple Launch Rocket System (MLRS) including the basic MLRS, the Terminally Guided Warhead (TGW), and the Guided MLRs (GMLRS); the NATO Seasparrow Surface Missile System (NSSMS); the Rolling Airframe Missile (RAM); the Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT); the F-16 Mid-Life Update (MLU); the Future Tank Main Armament (FTMA); and the Joint Strike Fighter (JSF).

Each of these programs will be assessed against several common characteristics, some of which were discussed in Chapters 1 and 2. Key to accommodating the various players' needs is the concept of **harmonization**—working to establish common ground in terms of both military and programmatic requirements. **Industrial teaming** describes how industry participates and works together in these cooperative efforts. The program's **management structure** provides the mechanism to arrive at often difficult decisions. **Technology transfer** aspects are significant in most cooperative programs and

require close and careful attention. Cooperative programs are inherently more complex and call for **business management** efforts that are not needed in national programs. Finally, each program has a **human dimension**—the “glue” that builds trust, binds, and motivates the team and provides the means to work through problems as they arise.

Following a discussion on each program, a summary table of relevant features is included in Figure 4-1 on page 4-49.

MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) PROGRAM

Background

The MLRS program is one of the oldest successful transatlantic cooperative programs. For over two decades, the MLRS program has evolved and matured and continues as an excellent example of cooperation between the U.S. and its international partners. MLRS is the only system of its type within NATO, making it a rare exception to the norm of having multiple systems with similar capabilities within NATO. MLRS is used within nine NATO and four non-NATO nations.

MLRS began as a U.S.-only program in 1976. The system consisted of a self-propelled launcher and free flight rockets with a range of 32 kilometers. In 1979, the U.S. reached agreement and signed a memorandum of understanding

(MOU) with the Federal Republic of Germany, France, and the U.K. for the cooperative continuation of the ongoing U.S. MLRS development effort. This agreement specified that the U.S. would receive assistance from its new MOU partners in terms of financial and engineering support for the development effort, but that there would be no major changes in the design, contractors involved, and scheduled completion dates to the U.S.-only project that was ongoing.

The U.S. awarded Validation Phase contracts to two U.S. competitors, Vought and Boeing¹, in September 1977 while the MOU negotiations were ongoing. In May 1980, Vought was selected and entered the Maturation/Initial Production Phase.² Vought began initial production of MLRS launchers and rockets in 1980 followed by full rate production in 1983.³



A M270, Multiple Launch Rocket System (MLRS)

European production did not start until 1987, although it was planned to start soon after the start of U.S. production.⁴

The two MLRS follow-on cooperative efforts, the Terminally Guided Warhead (TGW) and the GMLRS rocket development programs, are covered later in this chapter. Although these efforts were completed as MOU supplements to the 1979 basic MOU, they are distinct in many aspects.

Harmonization

In 1977, Germany, France, and the U.K. entered discussions with the U.S. about possible cooperation on MLRS. These countries all had a military requirement for an MLRS-like system. The common requirement stemmed from the need to provide large volumes of rocket artillery fire to counter Soviet artillery.

There was strong Congressional emphasis at the time for rationalization, standardization and interoperability (RSI) within NATO. The Culver-Nunn Amendment to the Defense Appropriation Authorization Act for FY77 in 1976 directed the Services to minimize diversity of high consumption systems in the NATO alliance. MLRS was a high ammunition consumption system and was deemed a key system used to promote RSI goals. The objective was to deploy the MLRS as a standard or at least an interoperable weapon system. Following Congressional guidance, the OSD directed that MLRS become a cooperative development program. A memorandum dated July 25, 1977 from the Director, Defense Research & Engineering (DDR&E) directed that the MLRS PM assume single point management responsibility for international cooperative efforts.⁵

An essential step to initiating the MLRS cooperative effort was harmonizing the design

requirements. Very early in the U.S. MLRS program the diameter of the MLRS rocket design was increased to harmonize with the known German requirements. Germany had already started developing a scatterable anti-tank mine, the AT-II, which needed a larger diameter rocket than the U.S. had originally planned. This was the only significant modification that was made to the U.S. program.⁶

OSD directed the U.S. chief negotiator to use the guiding principle of “get it done and make it fair” for MLRS basic MOU negotiations.⁷ In July 1979, after two years of negotiations and national staffing, Germany, France, the U.K., and the U.S. signed the MOU. The MOU stated that the MLRS hardware, except for the communications equipment, would be standard for the four nations. The MOU also served as the basis for future MOU Supplements for cooperation on production and support, development of future munitions, system improvements, and the addition of partners.

Industrial Teaming

During the MLRS development effort there was not significant international industrial teaming. As agreed, the U.S. prime contractor Vought continued as the prime contractor for the development effort after the MOU was signed. Based on the MOU, there were no work share requirements that would mandate involvement of industry from the European partners. Likewise, Germany continued the AT-II mine MLRS submunition development using its national contractors.

During the production phase, two production lines were established, one in the U.S. and one in Europe. The U.S. prime contractor, Vought, operated the U.S. production line. The European line was operated by the European Production Group (EPG). The EPG consisted of

national contractors from each of the European participants. The Europeans expected to begin production at nearly the same time as the U.S. did in 1983. However, due to many difficulties in resolving the EPG work share arrangements and production start up problems, European production did not start until 1987.⁸

Since the U.S. production line started much sooner than the EPG line and produced far greater quantities, it was always significantly less expensive than the EPG line for third party sales. Later in the production program, the U.S. production line became even more attractive for third party sales because it incorporated a new deep attack capability into the MLRS launchers, unlike the EPG launchers. Consequently, third parties who wanted these features found it even more desirable to buy the less expensive U.S. system with these additional features. Hence, the EPG's original projected third party sales eventually were filled from the U.S. production line.⁹ This frustrated the European partners because they did not achieve the quantities and, therefore, the savings from economies of scale they had planned.¹⁰ However, since the European partners only established one production line (not four different lines) in Europe, it is likely some economies of scale savings were achieved by consolidating European production.

The MLRS MOU Production supplement established the MLRS International Corporation (MIC) to consist of the U.S. prime contractor and the EPG. It had several purposes, one being to balance third party production between the U.S. and European lines. However, this still proved ineffective. The MIC did prove to be effective in advertising MLRS in publications and at trade shows. Vought-based marketing representatives working with the MIC were responsible for the proliferation of MLRS worldwide. The MIC also served as an agency

for collecting and distributing development cost recoupments to the MLRS MOU partners.¹¹

Management Structure

The basic MOU defines the management structure for the program. A Joint Steering Committee (JSC) with a senior member (General Officer level) from each participant makes program decisions by unanimous consent and gives direction to the Executive Management Committee (EMC). The EMC consists of the National Project Manager (O-6 level) from each participant. The U.S. Project Manager is designated the Program Coordinator and chairs the EMC. A representative (O-6 level) of the operational user from each participant is also a member of the EMC.

Technology Transfer

Throughout the development, the U.S. maintained sole control of the design configuration and the preparation of the technical data package (TDP). The TDP was prepared primarily in the metric system—a first for a major U.S. weapon system—to facilitate future European production efforts. The European partners provided engineering support to the development program. The European engineering participation allowed them full knowledge of design and other program decisions. This European engineering support was essential for the European production preparation.¹²

The basic MOU provided the terms for the transfer of technical data from the development program to all the participants for use in production by their national contractors. The program utilized an exemption clause in International Traffic in Arms Regulation (ITAR) that is available for cooperative programs. This ITAR exemption facilitated the export of technical data to the EPG national contractors

involved in MLRS production. It greatly reduced the time and effort required for the export of controlled data.¹³

Business Management

The U.S. funded the majority of the MLRS development costs but there were also contributions from the other partners. The most significant development cost sharing were the following. Germany completed (primarily with its national contractors) the development effort required to integrate the AT-II mine into the MLRS rocket and make the results available to the other participants. The U.K. and France paid \$15 million each, although no specific work share was provided to national contractors from the U.K. or France as a result of their development cost sharing. Additionally, as noted above, each of the other partners provided engineering support to the U.S. for the development effort as part of their contribution.

The basic MOU made provisions for other NATO member governments to join the program. Italy joined the MLRS program as a full participant in 1982 and paid \$10 million for MLRS development costs. A computation method for the recoupment of the imbalances of the development costs (since the U.S. had borne the majority share) was specified in the MOU based on the expected production off-take of each country.

Human Dimension

Care exercised by all of the MLRS leaders relative to the human dimension led to a strong

bond of trust among the partners. This trust held the basic MLRS program together during difficult times such as the U.S. withdrawal from TGW development later in the program. The success of MLRS can be attributed in large part to the participant leaders understanding the national motives, politics and user requirements of all the participants.¹⁴ This has been particularly important for the U.S. leaders because of the overall leadership role the U.S. has had in the program.

Notes

The basic MLRS development program demonstrated that a cooperative program could achieve system acquisition performance, cost, and schedule goals.¹⁵ Even with the complications inherent in cooperation—(although clearly a U.S. led cooperative effort) MLRS was fielded to the U.S. Army six years after initiation of the development effort.¹⁶ This is a comparatively short period for development of a major weapons system. The MLRS program has proved that armaments cooperation can work over a very long period of time. Throughout the life of the program production support activities (engineering changes) and logistics support activities have been completed cooperatively, allowing the partners to achieve significant savings. The singular proliferation of MLRS throughout the NATO nations provides an example of the operational and logistical benefits of transatlantic cooperation.

TERMINALLY GUIDED WARHEAD (TGW) DEVELOPMENT PROGRAM

Background

TGW was a cooperative development program that involved advanced technology for smart weapons. It was a major development effort that was estimated to cost a total of \$557 million (1984 dollars) and was planned over a nine-year period. It was, and still is, one the largest and most complicated true codevelopment efforts undertaken by the U.S. The program faced significant challenges in the sharing of advanced technology, division of work shares among the national contractors involved, and the management of cooperative development over a long period of time.

At the end of the validation phase in 1993, TGW achieved its technical goals. However, because of reduced post-Cold War defense budgets, the U.S. withdrew from the program. In 1990, Congress directed that MLRS TGW and two other target-sensing submunitions be reviewed and that a single option be selected. In 1991, the U.S. Army selected the “BAT” submunition (versus TGW), which had been developed in a “black” program concurrent with TGW. To avoid breaking an international agreement by withdrawing before completion of the current MOU phase and incurring termination costs, the U.S. remained in the program until the end of the MOU phase in 1993.¹⁷ When the U.S. withdrew from the program, so did the U.K. and Germany. France continued for a short period on its own but then also terminated the program.¹⁸

Harmonization

The TGW development program for a smart MLRS submunition was envisioned from the

beginning of the basic MLRS program. In September 1979, shortly after signing the basic MLRS MOU, the original MLRS partners (U.S., U.K., Germany, and France) agreed on the military requirement for TGW. All the partners subsequently agreed, through MLRS MOU Supplement 1, on a cooperative TGW program definition phase. Following successful completion of the definition phase, the TGW Development Phase Supplement to the basic MLRS MOU was signed in December 1983. By then Italy was a full partner in the basic MLRS program but chose not to participate in the TGW effort.

Industrial Teaming

The work share arrangements for the program were managed by the MLRS TGW Joint Venture, MDTT, Inc. This joint venture consisted of a national contractor from each participant. The national contractors were Martin Marietta (U.S.), Diehl GmbH (Germany), THORN EMI (U.K.), and Thompson CSF (France). MDTT was a separate corporate entity wholly owned by the four national contractors. Each national contractor provided members to staff MDTT. Martin Marietta performed the system integration responsibilities as the prime contractor.¹⁹

Initially, MDTT was not successful in meeting cost and schedule requirements as a result of a lack of resource commitments from the parent companies. To address this problem, the development contract was restructured to provide additional incentives for the MDTT to meet program requirements and severe penalties for not meeting requirements. After the contract

restructure there were no more cost and schedule problems.²⁰

Management Structure

The government management structure was similar to the basic MLRS program with the EMC and JCS as the decision-making bodies. However, these were separate for the ongoing basic program because Italy was not a TGW participant. Although at the JCS level all decisions were unanimous, there were many difficult issues to resolve and TGW decision-making was often contentious and slow.²¹

Technology Transfer

The most significant issues that TGW faced concerning technology transfer were not centered on what to share but on what technology would be worked on by each partner. This quality of work issue complicated work share balancing. TGW also had some issues concerning the technology the partners would share. The U.S. General Accounting Office (GAO) raised concerns about the possible U.S. release of Microwave Millimeter Wave Monolithic Integrated Circuit (MIMIC) technology into the program. The primary concern was that MIMIC design and manufacturing processes would be provided to the TGW partners.²² Despite these concerns, TGW was successful at sharing advanced technology. Ultimately, the program's technological achievements represent a significant and successful effort in transatlantic technology sharing.

Business Management

The cost sharing arrangements were: U.S. 40 percent; and U.K., Germany, and France 20 percent each. The TGW MOU Supplement specified program work share objectives that

did not match the program cost share requirements. The work share objectives were not more than 34 percent of the work for the U.S.'s prime contractor, and not less than 22 percent each for the subcontractor(s) of each of the other nations. However, in addition to just managing the work share percentages, the program also had to accommodate national desires to work on the more complicated or higher quality technologies involved in the program. This resulted in work share arrangements that were not always based on which contractors were best qualified to perform the work. In some cases, contractors inexperienced in the work assigned them had to learn at the expense of the program in terms of both cost and schedule. Hence, work share balancing was a significant challenge and imposed inefficiencies on the program.²³

To reduce the exposure of the program to changing economic conditions of each of the participants, separate bank accounts were established in each country. Each participant deposited the majority of its TGW funding requirements (in its national currency) into these accounts and then paid for work done in its country from these accounts. In this way, work performed within particular countries was billed and paid for in their respective national currencies.

Additionally, to reduce funding uncertainties related to differences in currency exchange rates/economic conditions, the program's cost and work share arrangements were established using the currency exchange rates/economic conditions on January 31, 1984. The January 31, 1984 reference date turned out to be period of relative strength for the U.S. dollar. Throughout the eight-year program the dollar significantly declined in comparison to the European partners' currencies. As a result, the Europeans had to contribute more of their currency to meet

their annual funding requirements than if a more equitable currency exchange, such as an average over a ten-year period, had been used for the program. Additionally, as the dollar weakened against the European currencies (some more than others) the national work loading had to be adjusted to match the program's work share objectives.²⁴

Human Dimension

TGW had many contentious decisions related to work shares, quality of work, initial problems with the MDTT joint venture, exchange rates, etc. Throughout the program, it was the human dimension of seeking understanding of the partners' differences that led to achievement of the technical goals.²⁵ Without leaders that cared and were willing to work toward resolving differences over long periods of time (more than eight years) TGW could very easily have failed to reach its technical objectives. The ultimate demise of TGW was not because of the human dimension within the program, but rather U.S. funding choices made at a higher level.

Notes

TGW was a very large and difficult transatlantic cooperative development effort that achieved its technical requirements but fell victim to defense budget cuts at the end of the Cold War. The U.S. withdrawal cast doubt on the U.S.'s reliability as a partner and was particularly frustrating to the Europeans. TGW is cited as a classic example of one of the significant problems with transatlantic cooperation. DoD was simultaneously funding a "black" program, BAT, for a similar military capability. With the end of TGW, the Europeans felt frustrated that they were essentially left with nothing while the U.S. continued with its previously black U.S.-only BAT submunition program.²⁶ A contributing factor to TGW's demise was probably the relatively small U.S. industry involvement and resulting political support for the program as compared to the alternative BAT program. Would TGW have been killed if the U.S. had larger cost and work shares, and consequently, U.S. industry had a significantly greater interest in TGW?

GUIDED MLRS (GMLRS) ROCKET DEVELOPMENT

Background

The latest cooperative activity with MLRS is the GMLRS rocket development program, initiated in 1998 and still ongoing. GMLRS provides double the range (60 kilometers plus) and much greater accuracy as compared to the MLRS basic rockets.

This codevelopment effort includes all the basic MLRS partners (U.S., U.K., Germany, France, and Italy). A U.S. technology demonstration proved that a guidance system using off-the-shelf technology could be incorporated into an MLRS rocket to significantly increase its accuracy. The increased operational capabilities that GMLRS provided were so great and the technical risk relatively low that the U.S. rapidly made plans to start a GMLRS development program in 1998 and to initiate the program with or without the European partners.

Harmonization

This program evolved into a cooperative development program primarily from discussions and information exchange on future system improvements during the semi-annual EMC and JSC meetings as part of the ongoing basic MLRS program. A key element leading to harmonization of the GMLRS requirements with the European partners was the operational user participation in the EMC meetings.²⁷

To harmonize requirements with the European partners, the U.S. agreed to add-on requirements—a new rocket motor (versus U.S.-only plans to use the proven, but less capable, Extended Range MLRS rocket motor) and

incorporation of the Global Positioning System (GPS) to aid the guidance system. Both of these add-ons provided operational benefits to the U.S. for a relatively small increase in production costs.

The GMLRS MOU Supplement was negotiated and staffed for national approval concurrent with the harmonization of requirements and program organization efforts during the period 1996 through 1998. The U.S. wanted the earliest possible start of the development program. After a six-month delay caused by national staffing problems, the MOU was signed by all participants in September 1998. In total, the MOU negotiations and national staffing took over two years to complete.

Industrial Teaming

From an industrial work share standpoint, the GMLRS development effort is significantly different from the previous TGW development effort. TGW employed a joint venture company as the prime contractor, with industry participation from all the nations involved. In GMLRS, the prime contractor, Lockheed Martin Vought System (LMVS), has responsibility for selecting subcontractors on a best value basis. No requirements equating work share and cost share have been established. However, reaching work share and cost share equity is a secondary program aim. Despite agreement on the best value subcontracting approach, when European subcontractor candidates have not been selected in key component selections, the Europeans have expressed concerns about the best value selection process and whether the U.S. prime contractor was biased towards U.S. subcontractors.²⁸

Management Structure

The GMLRS management structure uses the existing MLRS EMC and JSC structure. GMLRS also has co-product managers (O-5 level); one is always U.S. and one rotates among the European participants. The co-product managers coordinate and manage the day-to-day activities of the program.

The GMLRS program has implemented a series of Integrated Product Teams (IPTs) to improve management efficiency consistent with U.S. acquisition reform initiatives. These IPTs include dedicated functional experts from each of the participants and enable program decision-making down to the lowest level possible. Additionally, the program uses a web site to post key program information and has all members connected through commercially available e-mail systems. These measures mitigate the time zone differences and distance separation aspects of running a transatlantic program.

Technology Transfer

The GMLRS European partners thus far have been frustrated by the U.S. export control system. European industry has not been able to participate in GMLRS development to the degree expected because of the significant amount of time it takes to process U.S. export licenses. Often, by the time the export licenses are approved, the bid cutoff date has passed. In order to meet program schedule requirements, these cut-off dates cannot be extended. Hence, many European subcontractor candidates are shut out of the subcontract competitions. Efforts by the program to obtain an ITAR exemption approval from the Department of State to facilitate the transfer of necessary technical data have so far been unsuccessful.²⁹

The GMLRS production plans are not yet finalized. However, the primary objective is to have single source component and subassembly production capability and simultaneous dual integration capability for the same items in the U.S. and in Europe. Dual subassembly production capability may be considered for work share reasons. The MOU Supplement contains provisions for a commercially prepared Product Definition Data Package (PDDP) by the prime contractor to facilitate the transfer of technical information to contractors not involved in the development program if a second source is used during production.

Business Management

The cost sharing arrangement is 50 percent for the U.S. and 12.5 percent each for the four European participants. This cost sharing is equitable because the U.S. is expected to have more than 50 percent of the production offtake. The cooperative development was estimated to cost approximately double the planned U.S.-only effort. The increase in development costs resulted from the required add-ons and the added costs of the cooperative development effort, as well as, perhaps, low initial estimates for the U.S.-only program.

Since the contracted development work is performed through the U.S. prime contractor, LMVS, the GMLRS Supplement specifies that all of the partners' payments will be made in U.S. dollars. Unlike TGW, currency exchange rates were not fixed in the MOU Supplement.

Human Dimension

Within the GMLRS program, long-standing human relationships have continued. There are several new people involved but the trust and willingness to work through differences that have developed over many years of MLRS

cooperation continues. The GMLRS program, through strong and determined leadership, resolved the difficult problems that developed with the approval process for the MOU Supplement. The human dimension holds the partners together despite continued frustration with the U.S. export control system.

Notes

The latest cooperative follow-on effort, GMLRS development, is an extension of, and builds on, the previous MLRS cooperative experiences. The ongoing MLRS JSC and EMC meetings continue to serve as an effective forum to address and foster future cooperative MLRS activities like GMLRS.

NATO SEASPARROW SURFACE MISSILE SYSTEM (NSSMS)

Background

The case of the NSSMS is distinctive in several ways. It is the oldest and largest cooperative project in NATO that is active today. Of the four significant cooperative development projects contemplated by the U.S. in the late 1960s, NSSMS was the only one standing by 1970. The program was conceived at a time when U.S. dominance of the alliance was more obvious and less questioned than in the recent past. Despite the economic and technological preeminence of the U.S., the European partners have made valuable contributions from the project's inception.¹

The evolution of the NSSMS project has proved the flexibility and durability of its cooperative

arrangement. Originally, there were only four participants: Denmark, Italy, Norway, and the U.S. Currently, there are 13 active participants as Belgium, Canada, Germany, Greece, The Netherlands, Portugal, Spain, Turkey, and Australia have joined in the intervening years. This runs counter to the conventional wisdom that in order for a cooperative program to be effective, only two or three partners can be engaged.

The concept dates to 1966 when the U.S. approached the CNAD with a proposal for a shipboard self defense system to counter the anti-ship missile threat. The NATO Naval Armaments Group (NNAG) established Project Group 2 (PG2) to evaluate the feasibility of a cooperative program in November of that year.



The NATO Seasparrow Surface Missile System (NSSMS)

In May of 1967, NNAG approved the PG2 recommendations to use the existing Sparrow Missile as the basis for development and to utilize a guided missile fire control system and a trainable launcher.² Almost propitiously, on 21 October 1967, the Israeli destroyer Elat was sunk near Port Said by two Egyptian Komar missile boats firing Styx missiles. These events led to the signing of an MOU in June 1968 by the original four participants in the NSSMS project.

The initial MOU was followed in 1977 by an MOU for cooperative support. The next agreement was an addendum for the cooperative engineering and manufacturing development of the Evolved Seasparrow Missile (ESSM) signed in 1995. The last MOU concerned the cooperative production of ESSM (1997). NSSMS project MOUs are clear and straightforward. The substantive articles, including cost share/work share, exchange of technical information, third party sales, the accession of new members, and termination, occupy only 30 pages in a large typeface. All four MOUs (including the addendum) followed the same format and streamlined approach. Changes to the elements that are shared (management, security, work share, etc.) between the four are few, endowing the project with a valuable consistency.

Harmonization

As the original missile was based on the AIM-7 Sparrow, harmonization of requirements did not become an issue for NSSMS until an upgrade was contemplated. By the mid-1980s, the U.S. Navy concluded that anti-ship missiles launched from Soviet submarines and those that remained passive until a late stage demanded that NSSMS be more responsive. Some of the NSSMS partners felt the same need because of their operations in coastal areas where an air threat can materialize rapidly. In addition,

the 1980s saw NSSMS employed from three different launchers, the Mk 29 trainable launcher, the Mk 48 vertical launcher, and the larger Mk 41 Standard Missile launcher, all of which could be modified for NSSMS. At the same time, requirements for the now-defunct NATO Anti-Air Warfare System (NAAWS) were formulated. Those requirements provided the baseline for what was to become the ESSM.

The close of the 1990s saw NSSMS challenged by having to integrate into six different combat systems and four different guidance methods. Coordination of requirements among so many participants is no small matter, and trust within the NATO Seasparrow Project Office (NSPO) was credited with the reaching of a consensus. The NATO Seasparrow Project Steering Committee (NSPSC) provides overall project guidance. The U.S. member and chair of the NSPSC was specifically credited with addressing the concerns of each participant and thereby creating the atmosphere for success.³

Industrial Teaming

The formal relationship between Raytheon and the European industrial partners was governed by a series of Technical Assistance Agreements (TAAs).⁴ The TAAs specify what kind of work was to be performed in the cooperative effort.

The U.S. Navy was empowered to name a prime contractor and remains the contracting agent for ESSM production. Raytheon acted as the prime contractor and established an effective working relationship with its industrial partners. This is particularly noteworthy since Raytheon was responsible for the observance of national work share distribution in NSSMS contracting, an arrangement that has been successful to date. The human element was critical. Raytheon assigned managers to the program who built trust with their partners

over time, preempting the friction and mistrust that often characterizes similar relationships.⁵

The issue of work share was addressed in the initial MOU on a cost share basis, a consistent theme through subsequent documents. Latitude in planning was provided by a cushion of plus or minus 20 percent of national contributions. Should the NSPO not be able to work within those boundaries, the NSPSC would intervene to satisfy national work share concerns.

Management Structure

The management arrangement, cited as a key to the success and durability of the NSSMS project, survived the past three decades basically unchanged. Overall guidance for the program was vested in the NSPSC and consisted of one member from each participating nation. Those decision areas requiring unanimous consent were put forth in each MOU. Examples include annual budgets for shared costs and major schedule changes. For all other decisions, the initial document specified that votes be weighted according to cost share, which implied a lopsided influence for the U.S. Subsequent MOUs specified simple majorities.

Subordinate to the NSPSC was the project manager appointed by the U.S. This position was typically filled by an active duty U.S. Navy captain.⁶ He was charged with direct management of the program and is assisted by a deputy and one officer from each of the participating nations (Belgium is represented by the Dutch officer). National representation among the officers was initially based on cost share, but this was changed at the same time as proportional voting rights were introduced in the 1977 support MOU. The project manager and team work in the NSPO in Arlington, Virginia.

Technology Transfer

The preeminent role of the U.S. does emerge in some NSSMS arrangements. That the U.S. disclosure and arms transfer process is different (to be generous) was recognized in the ESSM production MOU. Third party sales and transfers of the ESSM, as well as components and information developed cooperatively or individually, are addressed in Section 13. "U.S. Unique Items" is a term that has no equivalent for the other participants. They are defined as "those items for which U.S. national disclosure policy prohibits dissemination of design and manufacturing data to the (other) participants." For equipment and information related to U.S. unique items, the U.S. need only consult the other participants prior to third party sale. It is significant because it includes equipment that is cooperatively developed. An exception is made for X-band guidance capability, which requires the approval of those who contributed to its development prior to sale.

Though the technology transfer and third party sales provisions of the production MOU may seem too U.S.-specific and tedious, they serve an important purpose. These areas are potentially the source of friction and disappointment so the more clearly they are addressed at the outset, the better the chance of preempting misunderstandings. The NSSMS project has notably lacked these problems.

Apart from the aforementioned, guidelines governing third party sales and technology transfer are logical and consistent. Generally, that which is cooperatively developed requires the approval of the engaged participants prior to sale. Participants must be consistent in their positions in that if they would approve sale to a particular government on their own behalf, they must approve sale to that same government when requested by another participant. Recoupment

costs may be waived in part or in whole when a sale is negotiated, as desired by each participant. From the point of view of the non-U.S. partners, recoupment should always be required in full to prevent freeloading. The U.S. Foreign Military Sales (FMS) system involves a surcharge that could be considered an indirect method of recovering sunk costs.

Business Management

Financial administration has remained consistent throughout the life of the project. The 12 non-U.S. participants deposit their annual financial commitments into a Bank of America trust account in U.S. dollars. Withdrawal of funds from the trust account is managed by the NSPO as required to execute steering committee-approved activities within approved budgets. The NSPO is subject to an annual audit of trust account transactions by the U.S. government.⁷

Human Dimension

This factor, though important in any collective undertaking, may be a critical advantage for the NSSMS project.

The NSSMS management arrangement, combined with the large number of participants, creates pressure to reach a consensus on matters beneath the purview of the NSPSC. The collegial environment of the project office, primarily composed of O-4/O-5 level officers, fosters cooperation and no small amount of give and take. This is aided by an arms-length relationship with the NSPSC, which meets semi-annually and is concerned primarily with larger questions of national interest, sometimes preempted through cooperation at the NSPO.⁸

The value of these interpersonal relationships was a recurrent theme in interviews with NSPO

personnel. Trust was cited as the key element in overcoming many of the difficulties inherent in an international cooperative project.⁹ When the addendum to the support MOU for engineering and manufacturing development of ESSM was negotiated, teams of legal experts and bureaucrats from the participating nations argued for tighter control by national partners. There was a fear within NSPO that a new MOU would derail the project. Fortunately, the national representatives made the point that flexibility was critical to the project's success, and their judgement carried the day. This shared perspective within NSPO was a product of the trust developed by the project leadership and by daily interaction, often outside work, among the national representatives who normally serve for three years.¹⁰

An insight is gained by the thoughts of the current Deputy Project Manager, Captain Kees DeVries, Royal Dutch Navy. Captain DeVries cultivates a position of strict neutrality in national issues, referring to himself as "perfectly purple." The interests of The Netherlands are represented by a separate Dutch officer. Captain DeVries believes that it is critical to maneuver toward win-win situations and that the project's requirement for unanimous voting is important. He considers that the project has enjoyed success because national representatives have built trust through reliability. The NSPO leadership carefully builds a consensus prior to meetings of the Steering Committee. National representatives then offer a unified view to their respective steering committee members, preempting disagreements. According to Captain DeVries, the greatest threats to this harmony are careerism and a short-term perspective.

Another view is offered from within DoD. NSPO has succeeded where other cooperative programs have failed because the project was blessed with a succession of project managers

(U.S. Navy captains) who were content to maintain a low profile and eschewed careerism for the common good.¹¹ Both of these views acknowledge the success of the project and the importance of the interpersonal or human element in that success.

If there is a problem peculiar to Americans in the maintenance of an atmosphere of cooperation, it is the mindset of “we are the biggest.” The literal truth in that phrase is the reason why it is difficult to curb the underlying sentiment. As a larger organization, the U.S. Navy faces a bigger challenge in education.¹²

Notes

Few would dispute the success of the Seasparrow Consortium, though proof of cost

savings in any cooperative program is elusive. Undeniably, unity within the alliance has been well served and an effective weapons system with a uniformly high state of readiness has been produced. The NSSMS project has been praised on both sides of the Atlantic. NATO Secretary General Javier Solana noted the success enjoyed by the Seasparrow Consortium on the occasion of the 50th anniversary of NATO, and Vice President Al Gore presented the project the Hammer Award for “doing it faster, smarter, cheaper.” The Vice President recognized the missile’s re-architecture program where off-the-shelf components were employed.¹³

ROLLING AIRFRAME MISSILE (RAM)

Background

The case of the RAM is an interesting contrast to NSSMS. Both systems are missiles designed to defeat anti-ship cruise missiles, though NSSMS does so at a greater distance. RAM is a bilateral program while NSSMS is multi-lateral in the extreme. The most significant aspect of the RAM program, however, may be that it is much closer to an equal sharing (in absolute terms) of development costs and work than NSSMS or most other programs. Political and

economic developments in Europe favor cooperation on a more equitable basis, thereby drawing attention to RAM as a model.

The RAM program was initiated in the early 1970s when a mission need statement (MNS) was approved and designation as an acquisition category (ACAT) II was conferred. At the beginning of the advanced development phase in 1976, the cost share arrangement was agreed to with Denmark (initially party to the program) paying two percent and Germany and the U.S.



A MK 31 Rolling Airframe Missile (RAM)

each 49 percent. Denmark ended its financial contribution in May 1985 as the Danes felt that their ships were too small even for the RAM launchers envisioned at that time. Thereafter, Denmark's participation was reduced to observer status.¹

Harmonization

Harmonization of requirements, while not a major issue at the program's inception, became a concern for the upgraded RAM Block I (the most recent, improved version of RAM). The German Navy needed RAM to be capable of defeating all air threats to the missile patrol boats that employed the system. Therefore, a capability against slow aircraft and helicopters was sought. The U.S. Navy needed a weapon to defeat small boats, such as those operated by the Iranian Revolutionary Guards in the Arabian Gulf. By chance, the primary enhancement offered by the Block I was an image scanning capability in the seeker that allows the missile to defeat targets based solely on their infrared signatures. This same capability, combined with software changes, will satisfy the requirements of both the U.S. and German navies.²

Industrial Teaming

The principal U.S. contractor and the prime contractor for the missile was Raytheon (General Dynamics at the program's inception). On the German side, a consortium of four firms under the umbrella name of RAMSYS was created, consisting of Daimler-Benz Aerospace AG (DASA), Lenkflugkorpersysteme GMBH, Diehl GmbH, and Bodenseewerk Geratetechnik.³ RAMSYS was essentially an office where those responsible for RAM within each of those participants coordinated the German industrial contribution to the program. RAMSYS assumed duties as the prime contractor when the

missiles were assembled in Germany, as was the case for the first production missiles destined for the German Navy.⁴

The 21-cell launcher for the RAM was initially produced by a joint venture company named TRANSLANT, composed of the same participants that produced the missile. The reason for this change of relationship was an analysis that showed a 25 percent cost saving when a joint venture is formed, versus a prime contractor/subcontractor arrangement, primarily due to pass-through costs, the administrative handling of money.⁵

The RAM program had to conform to the realities of the defense contraction in the wake of the fall of the Berlin Wall. Perhaps with some irony, the greatest effect in this program was felt by the U.S., whose missile requirement was reduced from roughly 7,000 to 2,000, compared to a reduction by Germany from 1,700 to 1,150. The initial production MOU, signed in the halcyon year of 1987, envisioned two separate production lines, one German, one U.S., with open competition for combined German/U.S. orders. With the new reality of reduced production runs, a single integrated production line was agreed upon with each contractor building specific subassemblies. With Germany receiving the first production missiles, RAMSYS was initially responsible for final assembly. The single production line was a significant change made possible by the mutual realization by Raytheon and RAMSYS that a solution needed to be negotiated between them. This came about through what was termed a "Cooperative Production Agreement" (CPA) signed by RAMSYS and General Dynamics in June of 1992. The Steering Committee acknowledged the CPA (which is not the same as approval) thus circumventing the lengthy process required to modify the production MOU.⁶

The CPA provided a specific answer to the dilemma that emerged from the move to a single production line—the issue of industrial work share. Perhaps surprisingly, work share was not directly addressed in previous agreements. The cooperative production MOU signed in 1987 simply states in its Principles for Cooperation section that both German and U.S. industry would have a fair chance to compete on a dual-source basis. The CPA specified a 50/50 arrangement which was successfully implemented. The significant lesson from the CPA is that a departure from the bureaucratic structure can be necessary to move ahead, something that was indeed done successfully in the case of RAM. In fact, the CPA has been the governing arrangement for production of RAM from its drafting to the present.⁷

Germany has remained a steadfast and valuable partner through the quarter century of the program's history. At one point in the early 1990s, the U.S. portion went unfunded for 18 months, and the program subsisted solely from the German contribution until U.S. funding was restored. Those missiles went directly to satisfy German requirements. The CPA and the previously mentioned relationship between the industrial partners laid the foundation for the successful passage through this difficult period.⁸

RAM has recently come into favor in the U.S. Navy and orders have increased dramatically. At the same time, the German defense budget has come under pressure, reducing the German share of the development costs for the Block 1 missile to about 35 percent.⁹ These developments changed the context of the work share arrangement arrived at in 1992, at least in the U.S. view. The American side is pushing to revisit the issue in light of the disproportionate share of missiles going to the U.S. Navy. Germany, naturally, wants to continue the 50/

50 arrangement agreed to in the CPA.¹⁰ There is no resolution at this time.

Management Structure

The management of the RAM program shares some features with that of NSSMS. A U.S. Navy Captain is the PM and the deputy is a German civil servant. Unlike NSSMS, and reflecting the relative parity between the participants, the latter has authority nearly equal to the former. The PM must consult with his German deputy on issues that affect both participants and the latter has veto power over some program issues.¹¹ The RAM Steering Committee is composed of one flag-level officer or civilian equivalent from each country. The German representative is a senior civil servant and the U.S. representative is the Program Executive Officer for Expeditionary Warfare (PEO EXW), appointed by a Navy International Programs Office (IPO) memorandum.¹² That memorandum sets forth the limits of the U.S. representative's authority, specifically proscribing the disclosure of RAM information to Germany not previously agreed to, commitments to third parties, and changing work share arrangements. Anything beyond the authority granted in the memorandum must be referred to IPO for adjudication and coordination with the appropriate agencies.¹³ As in the NSSMS program, RAM is administered from a Washington-based program office (RAMPO).

Technology Transfer

Though eminently successful, the German-U.S. partnership that produced RAM was, and continues to be, plagued by some familiar problems. Third party sales are a serious issue. Germany desires that they be conducted on a direct commercial basis while the U.S. Navy position is that as ordnance, RAM missiles must be sold

through FMS. For the time being, a compromise is in effect allowing customer choice of direct commercial sales or FMS to the original 13-nation NATO and treaty allies. Related is the issue of recoupment of non-recurring and development costs, which Germany would like to include in the sale price. The U.S. seeks to derive its benefit from the FMS surcharge (currently 2.5 percent) and economies of scale inherent in larger production runs.¹⁴ Precisely because the program has been such a balanced partnership, these disagreements have sometimes been sharp. Germany does not feel like a supplicant and resents any treatment as such.

The rules governing data transfer are clearly stated in the 1987 production MOU. One participant cannot transfer or disclose to a third party, equipment, data, or software that was provided by the other participant or that was jointly developed without the written consent of the other participant. National security concerns are the only basis for refusal. Within the program all information and equipment is shared and can be used by either participating government for defense purposes.

Business Management

Differences in business practices are significant. German firms work on a strictly firm fixed-price basis for R&D work, whereas the U.S. side allows for some cost-plus contracts.¹⁵ These practices have been successfully accommodated to date through fixed price contracts where necessary. U.S. contracting procedures are employed as Naval Sea Systems Command (NAVSEA) is the contracting agent for the program and Raytheon, as previously noted, is the prime contractor. Obligations between the prime contractor and sub-contractors are delineated in the CPA.

The method by which payments are made within the RAM program differs from the NSSMS model, perhaps due to the relatively balanced bilateral relationship. German funds never pass through a U.S. accounting system, such as the Treasury.¹⁶ Instead, they are held in an interest-bearing account in a bank chartered in both the U.S. and Germany.¹⁷ Obligations are satisfied directly from this account, avoiding the delays (and frustrations) attendant on an arrangement whereby the funds pass through an official U.S. Government account.

As is the case with any international program, the RAMPO is buffeted by currency fluctuations, since obligations are incurred to the German and U.S. industrial partners in deutchmarks and dollars respectively. Due to currency fluctuations in FYs 1994 and 95, the currency risk was passed to the industrial partners in the contracts let in FY 98.¹⁸ Unlike NSSMS, the introduction of the euro will not have the effect of simplifying financial management, since only two currencies are involved, though currency risk management within the program may change again. The first year of the euro's existence showed clearly that currency stability is by no means guaranteed.

Human Dimension

The human element in the creation of the CPA was critical. The RAMSYS leadership and the RAM director at General Dynamics developed a solid working relationship in the years previous to the CPA, which paid dividends in the reaching of an agreement.¹⁹

Cultural differences are present within the program but do not seem to impede cooperation. Germans are reluctant to coordinate through e-mail, a method of communication that has become second nature to Americans.

Europeans are also accustomed to a different work schedule with regard to vacations, holidays, and the workweek.²⁰ Though English is the official language of the program, the German participants enjoy an advantage in the sense that they are typically fluent in English, and their sidebar conversations in German during negotiations cannot be understood by their American opposites.²¹

Notes

Germans involved in the RAM program take pride in it because it is a true partnership that produced an excellent product.²² The last point should not be overlooked. Field tests of the RAM system have been impressive and the

missile offers the best hope in either fleet today of an effective defense against certain cruise missiles. The principal source of pride for the German participants, however, is the equal stature that they enjoy, not only through balanced burden sharing, but also through significant technical contributions. The craftsmanship of the molded fiberglass end-piece of the launcher made by Diehl was lauded by the U.S. side as a critical component that would have been extremely difficult, if not impossible, to produce anywhere else in the world. The image-scanning seeker and the associated complex image processing that endows the Blk 1 RAM with capability against non-radio frequency radiating threats was developed by Germany.²³

MULTIFUNCTIONAL INFORMATION DISTRIBUTION SYSTEM LOW VOLUME TERMINAL (MIDS-LVT)

Background

MIDS-LVT is a multinational cooperative development program with participation by France, Germany, Italy, Spain, and the U.S. The MIDS-LVT program was initiated to satisfy a requirement for small-volume, lightweight tactical information system terminals and associated equipment.

MIDS-LVT is being developed for employment in a wide variety of U.S. and Allied tactical aircraft, maritime, and ground applications using the "Link-16" networked communications system. Platforms planned for MIDS-LVT installation include the F/A-18, F-16, EA-6B, Airborne Laser, Rafale, Eurofighter Typhoon, aircraft carriers and cruisers.¹



The Multifunctional Information Distribution System Low Volume Terminal (MIDS-LVT)

Link-16 enables secure, jam-resistant, digital communication of data and voice for command and control, relative positioning, identification, and navigation. Link-16 is a significant force multiplier. The system enables onboard and off-board sensor data to be exchanged with all network participants and greatly enhances cooperative tactics. The system also helps minimize duplicate mission assignments or missed targets.²

A key MIDS-LVT program requirement is interoperability with earlier Link-16, Joint Tactical Information Distribution System (JTIDS) Class 1 and 2 equipment. Additionally, MIDS-LVT is intended to overcome a key JTIDS shortfall—compatibility in size and weight with highly space-constrained tactical aircraft at total ownership cost more affordable than JTIDS.³

The MIDS-LVT program has evolved from earlier Link-16 and JTIDS efforts. The Link-16 communication standard originated from fusion of two NATO STANAGS involving sophisticated frequency hopping waveform and digital message formats. Earlier generation JTIDS terminals have been fielded on U.S. and Allied systems, including E-3 Airborne Warning and Control System (AWACS), Patriot missile system, F-14 fighter aircraft, carriers, cruisers, submarines, and the NATO Air Defense Ground Environment (NADGE).⁴

Harmonization

Harmonization of requirements quickly emerged as a recurring issue in this program. For example, numerous different platforms demanded markedly different interface requirements, such as power, volume, cooling, and electromagnetic interference. The French wanted to operate MIDS-LVT at multiple and very low power levels to accommodate their

unique operational purposes. Further, the U.S. decided to integrate Tactical Air Navigation (TACAN) within MIDS (to eliminate the need for a separate TACAN black box). Additionally, the Federal Aviation Administration (FAA) imposed maximum transmission power limitations, complicating the design of an effective system.⁵

The MIDS-LVT was originally conceived as a pre-planned product improvement (P3I) to the older JTIDS Class 2 terminal. MIDS-LVT was proposed to NATO as a cooperative development program in 1986. Senior DoD officials outlined a number of objectives they believed could be best accomplished through a MIDS cooperative development program. First, the U.S. hoped for expanded NATO implementation of Link-16, paving the way for more effective command and control (C2) interoperability crucial to successful coalition warfare. Second, program cost sharing would reduce overall cost for development of a new compact Link-16 terminal for U.S. tactical aircraft with limited equipment space. A third objective was bolstering U.S./European political and economic ties, demonstrating U.S. willingness to cooperatively develop and manufacture a major Allied defense system.⁶

Interested European allies expressed similar cooperative development objectives. They also desired to share costs to achieve a state-of-the-art, affordable C2 system to improve interoperability with U.S. forces. The Europeans sought technology transfer, including the sharing of the technology, design, and manufacturing experience that the U.S. gained through development of JTIDS and other similar systems. An additional European goal was an equitable distribution of quantity and quality of work sharing. The European allies sought development and manufacturing activities divided based upon the participating

nation's cost share and proportional technical challenge.⁷

In the Spring of 1986 the U.S. Under Secretary of Defense for Research and Engineering proposed a NATO cooperative development of JTIDS low volume Class 2 terminal. Under this proposed arrangement, participating nations and their industries would cooperatively define their terminal requirements and interfaces. In 1987, the U.S. and seven other nations—France, Germany, Italy, Spain, plus Canada, Norway, and the U.K. (which later dropped out)—initiated the MIDS-LVT project definition phase.⁸

The project definition phase spurred effort to achieve greatly increased U.S./NATO interoperability. This phase lasted seven years, with delays driven by efforts to harmonize requirements, adjustments from loss of three of the partners, and difficulties with U.S. and European program approval and funding.⁹ During this period the program MOU and the Steering Committee structure were established. Focus items during this phase included the difficult task of refining harmonized requirements, risk reduction/prototyping, development of financial management procedures for Engineering and Manufacturing Development (EMD), development of a Request for Proposal (RFP), proposal evaluation and negotiation of the EMD contract, and preparation for the U.S. Defense Acquisition Board (DAB).¹⁰

In 1994 the U.S., France, Germany, Italy, and Spain entered into the cooperative funding and management of the EMD phase of MIDS. The program was an early acquisition streamlining candidate. During the first six months of its existence, the EMD program was significantly restructured to be consistent with emerging acquisition reform initiatives such as cost and schedule reduction, open/modular architecture,

use of industrial parts, and commercial practices. The MIDS program also transitioned to joint status with the addition of a U.S. Army MIDS variant and the USD(AT&L) direction to develop a reduced function MIDS for the United States Air Force (USAF) F-15 fighter aircraft.¹¹ The program is now in limited rate production with anticipated eventual procurement of over 5,000 U.S. and allied terminals.¹²

Industrial Teaming

The EMD program developed unique industrial arrangements with the percentage of work share defined by each partner. Supposedly to avoid the tax and legal implications inherent in a U.S. partnership and limit capital assets to one million U.S. dollars, the partners agreed to form "MIDSCO," a unique single-program, joint venture corporation chartered in the U.S. to manage industry efforts.¹³ MIDSCO's five member companies were ENOSA, GEC-Marconi Hazeltine, MID SpA (formerly Italtel), Siemens, and Thomson-CSF.¹⁴

One of the key problem areas was accommodating the unique MIDSCO international consortium structure to the Federal Acquisition Regulation (FAR) requirement for a contractor's level of responsibility. During project definition studies in 1987/88, the national companies developed principles upon which they would organize.¹⁵ The principles included establishment of a separate entity to avoid national prime contractors having to subcontract to each other, maximization of work share, and limitation of liability. MIDSCO start-up costs would be provided through member company loans, and staff would be composed of non-dedicated members contractually assigned from member firms.¹⁶

When the Navy assumed program leadership in 1990, Space and Naval Warfare Systems

Command (SPAWAR) contracting personnel questioned this approach. After much wrangling, the parties agreed to use an irrevocable letter of credit issued by a U.S. commercial bank (essentially a type of performance guarantee from the governments). This compromise arrangement is inferior to the more traditional joint and several liability for contract performance used on other international industrial partnerships such as the MLRS-TGW program.¹⁷

Cost allowability issues also arose. None of the costs MIDSCO incurred prior to contract award were allowable and as an alternative, the government developed special earned value incentives that MIDSCO could earn early in the contract.¹⁸

Management Structure

Between 1987 and 1989 MIDS-LVT technical implementation and concepts were managed by an eight-nation industrial team. Later, from 1990 through 1993, the nations separately funded their industries to perform risk reduction activities in support of the design goals outlined in the project definition phase. A separate IPO was established in Washington D.C. (later relocated to San Diego, California) in September 1993 to oversee the EMD phase. The IPO is staffed by members of the five participating nations and performs routine program management functions. The U.S. has provided about half the IPO manpower in EMD, consistent with the international agreement.¹⁹

The PM, a U.S. Navy Captain, reports to an international steering committee chartered by the MIDS international agreement. The U.S. representative and chair is the Program Executive Officer, Space, Communications and Sensors (PEO-SCS), and is chartered with all host nation responsibilities, including program

contract management and oversight. Members of the Steering Committee have an equal vote and all decisions must be unanimous. The PM also receives considerable functional support from a number of agencies such as the PEO-SCS, SPAWAR, Defense Contract Management Command, MITRE Corporation, Draper Laboratory and other government engineering, logistics, and test centers.²⁰

As a major ACAT ID U.S. acquisition program, the MIDS PM also reports to the USD(AT&L) through the PEO-SCS and the Assistant Secretary of the Navy (Research, Development, and Acquisition). Oversight of the U.S. joint program is provided by U.S. Army, U.S. Navy, U.S. Air Force, and Joint Chiefs of Staff through a Program Executive Council chaired by PEO-SCS.²¹

The MIDS program team makes extensive use of multi-disciplinary IPTs. These IPTs manage the technical, cost, and schedule aspects based on the principles of earned value management.

With a large, diverse IPO, the PM, early in EMD, pressed to push decision-making authority to the lowest level consistent with effective management. These procedures were captured in a Program Management Plan and approved by the Steering Committee.²²

MIDSCO, the U.S. chartered, international joint venture company and prime contractor, has employed a similar multinational management structure to manage activities of the various national industries. The U.S. President of MIDSCO sits on the Board of Directors (BoD), which is made up of vice presidents from the five member companies from each nation. The MIDSCO PM, also charged with chief operating officer duties, works day-to-day industrial responsibilities on the program and reports to the BoD.²³

Technology Transfer

Prior to EMD, industry efforts focused on harmonization of requirements for software and hardware interface, study of specific technology areas, and risk reduction efforts to support release of the solicitation. In EMD, an “Integration Process” followed conventional engineering processes where components were furnished from each contractor. Examples of industrial participation include the integration of radio frequency modules by Thomson-CSF in Paris and integration of digital units by GEC-Marconi Hazeltine in New Jersey. GEC (USA) will build and test the power amplifier developed by Siemens (Germany). MIDSCO and GEC will train MID SpA (Italy) to integrate and test MIDS terminals. A two-way flow of limited technology transfer occurred with some technology advancement seen in both the U.S. and Europe.²⁴

The push to abandon military standards in favor of commercial parts and practices has probably benefited all.²⁵ The MOU and contract provide for a TDP to be delivered to all participating nations. This TDP allows nations to either procure and/or manufacture MIDS-LVT terminals, but offers no unique advantages to the Europeans.²⁶

Future technology transfer efforts will focus on software changes driven by threat and mission requirements, and associated software maintenance. Software development and associated testing proved to be a challenging area on this program.²⁷ Aside from European unease over tight U.S. control of a government-furnished encryption device, handling and protection of technologies has generally not emerged as a program issue.²⁸

Business Management

To manage the unique and complex financial management requirements, the program uses a financial management board composed of senior national representatives (SNRs) from the IPO. The IPO works with the PEO and SPAWAR to manage a network of various international financial and banking transactions and assure even payment of program expenditures. This network allows accurate and secure reporting of the European nations’ deposits and electronic disbursements and enables participants to deposit funds in their own currencies. Currency exchanges are not routinely used, except where required to pay program bills. The board generally targets payments to each participant’s national currency. U.S. bills are paid in U.S. dollars from the U.S. Treasury. These financial arrangements have served the MIDS program exceptionally well.²⁹

The program also effectively employed other innovative business management practices. The program has accommodated a host of requirement changes and successfully implemented acquisition reform initiatives such as open architecture, use of industrial parts, CAIV, IPTs, and the Single Process Initiative. The program team developed and employed innovative logistic support concepts. For example, a contractor logistic support approach was developed where the contractor payment was based not on system repairs but system availability on the F-15. This approach was designed to provide a strong incentive to design and build in reliability and availability.³⁰

The IPO employed innovative contracting techniques using oral presentations as well, and thereby improved past performance evaluation practices. Notably, despite significant program change and reform, the highly focused program

team was still able to compress the original EMD schedule presented at the Milestone II DAB by six months.³¹

Human Dimension

The program benefited from a continuous stream of highly skilled and dedicated program personnel. For the MIDS program, issue resolution and harmonization have been effectively accomplished with smaller, focused, working-level organizations. Small international working groups were also used to resolve differences over the Interface Control Document. An International Test and Interoperability working group was recently created to oversee complex multinational testing issues.³²

Over its life the program has also enjoyed a high level of interest, support, and commitment from the participants at all levels. This is due to the program's significant potential value and the perception that common objectives are being generally satisfied. The difficulty of the MIDS undertaking and its relative high success have been warmly regarded. U.S. Secretary of Defense William S. Cohen recognized the program as a 1997 David Packard Excellence in Acquisition Award. The program was also a recipient of a 1997 U.S. Department of Defense Value Engineering Award. First production

samples were accepted at an elaborate Pentagon rollout ceremony in March 1998 attended by high level dignitaries from each nation.³³

Notes

Several lessons have been learned from the MIDS program to date. First, a core of common objectives and perception of exceptional gain are vital ingredients to overcome the heavy resistance of multinational, multi-service, and multi-agency coordination and management. Significant time and effort are required to work joint and international programs and time should be allotted for the increased complexities. Additionally, as in the case of MIDS-LVT, partners may not be aware of or convinced of the rationale for acquisition reform initiatives, and extra time and effort will most likely be required to win over all partners. Proposed industrial organizations may not meet contracting and legal requirements and should be reviewed early in the acquisition and contracting strategy development. Dedicated, high quality staff and effective, tailored management and business practices are crucial, with decision-making pushed to lowest practical level. Finally, a compelling need and commitment at all levels must be present to sustain the program through international negotiations, program initiation, and execution.

F-16 MID-LIFE UPDATE (MLU) PROGRAM

Background

When the F-16 multi-role fighter was first deployed among the original F-16 partners (the European Participating Governments (EPG) of Belgium, Denmark, The Netherlands and Norway, and the U.S.) in 1979, a replacement aircraft was envisioned around 2000. The partners considered various replacement alternatives in the mid 1980s. The EPG evaluated near-term alternative fighter aircraft such as the French Rafale and new F-16 variants. The high replacement cost of these aircraft compared to the marginal effectiveness improvement led to serious consideration of an upgrade option until

a more capable F-16 replacement aircraft was available (2010 timeframe). Thus, in 1989, the EPG and U.S. decided to initiate development of the MLU avionics upgrade.¹ This successful transatlantic cooperative effort is noteworthy as a result of the combination of a versatile MOU and flexible, committed partners.

The F-16 MLU program is an avionics and cockpit upgrade that brings the earlier model F-16A (single seat) and F-16B (two seat) fighter aircraft up to the current F-16C (single seat) and F-16D (two seat) “Block 50” standard and greatly improves interoperability with newer generation F-16s.²



A MLU-equipped F-16/B Multi-Role Fighter

Program objectives are outlined in the multi-national MLU agreement appended to the original 1975 F-16 Multi-national Fighter Program (MNFP) MOU: "The objective of the F-16 MLU Program (also referred to within this document as the "Program") is to increase the defense capability and to maintain the capabilities of the Parties' air forces well into the 21st century. The Program will be a multi-phased activity to design, develop and procure the F-16 MLU kit. Throughout the Program, the Parties will seek an optimum mix of defensive effectiveness, technical, cost, schedule, and commonality in avionics factors."³

Harmonization

Early MLU development was initiated in March 1989 with approval of Steering Committee Arrangement (SCA) #44 to the Basic F-16 MOU entitled "Agreement for Predevelopment Phase of F-16 Derivative Program." This "Predevelopment Phase" was a two-year study to explore the "feasibility of upgrades to the F-16 aircraft (production and retrofit) which will consider avionics, propulsion and aerodynamic improvements."⁴ This phase covered preliminary design effort, evaluation of industrial teaming arrangements for the various countries, evaluation of potential sales, and release and exchange of technical data. The total cost of this phase was limited to \$12.5 million (U.S.), with costs split proportionally based on the anticipated number of modified F-16A/Bs (less forecast loss of aircraft). Based on this formula the U.S. share amounted to over 60 percent. Cost sharing for subsequent program phases was determined on a similar pro-rata basis.

Full Scale Development (FSD) began in May 1991 with SCA #45 to the MOU entitled "Multi-national Agreement for the F-16 MNFP Mid-Life Update Program." Activities covered

under FSD included design, development, manufacture of prototypes, and test and evaluation to establish the detailed final design of the MLU kit. The phase also included "post design service" and integrated logistic support planning.⁵ An FSD contract was awarded in June 1991 to General Dynamics, now Lockheed Martin Aeronautical Company (LMAC), Fort Worth, Texas, the F-16 prime contractor. Development of the MLU kit continued until 1997.⁶

During initial production planning, the U.S. requirement was 130 full MLU kits for its fleet of F-16A/Bs. This number was reduced because of the end of the Cold War and the "Bottom-Up Review" (BUR) force structure report, where the USAF decided to retire its F-16A/B fleet early. The U.S. maintained its full role in the MLU development phase and redefined its production participation as 223 newer F-16C/D Block 50 aircraft which the MLU-common components, including the new Modular Mission Computer, were based on. The events and difficulties leading up to this redefinition are significant and underscore the value of creativity and commitment.⁷

One must remember that the Cold War ended in 1990 and all U.S. Services were reeling from new force structure decisions and the realities of a new domestic budget strategy created by this change. In 1992, based on the first BUR Report, a recommendation was made to move all F-16A/Bs to the Air National Guard (ANG) and populate the Active Duty and Air Reserve Components (ARC) with as many F-16 C/D aircraft as possible. Not knowing what the final numbers and costs were going to be, and considering the new policy restricting aircraft modification within five years of retirement, the USAF was forced to reassess its participation. The U.S. announced to the EPG in June 1992 plans to participate in the MLU development phase but not production.⁸

This decision was politically unpalatable to each of the European partners who wished to remain common with the U.S. F-16 fleet. In September 1992, U.S. MLU representatives briefed then Secretary of Defense, Richard Cheney, on the USAF's plan to divest from the MLU production program. Secretary Cheney requested the team search for alternative solutions. Four weeks later the System Program Director (SPD)-led team briefed the Secretary again, presenting the solution that coupled the MLU kits to the 223 Block 50D avionics upgrades. This briefing was followed with briefings to congressional staffers, EPG Chiefs of Staff, two NATO Ministers of Defense, and the U.S. Ambassador to NATO. Each of these briefings was met with acceptance that enabled the partnership to continue.⁹

The MLU retrofit kit included advanced cockpit features such as up-front controls, color multifunction displays, a wide-angle head-up display with forward-looking infrared video capability, night vision goggle compatibility, and a countermeasures management system.



The F-16 MLU Cockpit

Additionally, the kit enhanced the F-16A/B's avionics suite. New MLU components included a next-generation Modular Mission Computer, the APG-66(V)2 multi-mode radar upgrade, an advanced Identification-Friend-or-Foe interrogator/transponder, a GPS, a ring laser gyro inertial navigation system, a digital terrain system, and a data link. The MLU kit also added new weapon capabilities, including provisions for the Advanced Medium Range Air-to-Air Missile, laser-guided bombs, and high off-boresight short-range air-to-air missiles. There were provisions that allowed for a later addition of a helmet-mounted cueing system and a reconnaissance pod system.¹⁰ Kit features created a substantially more effective and interoperable F-16 fleet. MLU standardization and common training was clearly valuable. For example, a Belgian F-16 pilot could quickly and easily operate a Dutch F-16 if necessary.¹¹

SCA #45 also defined the production phase of program, including a 1993 amendment to accommodate the U.S.-requested production redefinition. A production contract was awarded to LMAC in August 1993. Approximately 363 MLU kits have been firm-ordered to date (110 for Belgium, 136 for The Netherlands, 61 for Denmark, and 56 for Norway).¹² Recently, Portugal initiated discussions to become the sixth full MNFP partner in accordance with flexible provisions in the original MOU allowing expanded NATO member participation. Portugal recently signed a Letter of Offer and Acceptance for 20 MLU kits along with 25 used USAF F-16A/B aircraft. Additionally, several other F-16A/B users are also considering the MLU modification.¹³ As a side note, Taiwan is buying 150 F-16A/B Block 20 aircraft (a new F-16 with an MLU-based production kit installed at the factory).¹⁴ MLU kit deliveries began in October 1996 and based on current orders are expected to continue through at least 2003.¹⁵

Initial operational capability was declared with the modified aircraft in 1998. The first MLU F-16s began flying peacekeeping missions over Bosnia in January 1999, and the MLU kit capabilities enabled the EPG F-16s to achieve vastly greater interoperability with newer USAF F-16s.¹⁶ The kit production program continues essentially on track, meeting targets for product performance, cost, schedule, and quality. 296 MLU kits have been delivered and aircraft are being modified on schedule with approximately 140 completed to date.¹⁷

Industrial Teaming

The MLU program has involved extensive coproduction among aerospace and electronics industries in the four EPG countries and the U.S. LMAC, as the MLU prime contractor, coordinates activities of the participating European industries. The MLU agreement stipulated that “Industries of the Parties shall have the opportunity to compete for development and production work under this program.”¹⁸ The agreement also provided that any commitment for European industrial participation associated with MLU will result from separate agreements between U.S. industry and the EPG. U.S. Government policy would not allow the government to be a partner to these industrial agreements, a major departure from the complex and management-intensive offset arrangements of the earlier F-16 coproduction program. LMAC was therefore charged with the difficult task of working out an agreeable competitive industrial participation program, without the involvement of the U.S. government, which they eventually did. Completed individual components for the MLU kits are shipped from the various industrial partners to the Société Anonyme Belge de Constructions Aéronautiques (SABCA) F-16 production facility in Belgium. At SABCA the components are merged into full MLU kits and shipped for

installation at aircraft modification depots in each country.¹⁹

Management Structure

The MLU participants are also parties to the original Secretary of Defense-level 1975 F-16 MNFP MOU under which the MLU program is governed. The MNFP Steering Committee, a multi-national body created to assist the U.S. F-16 SPD in managing the EPG/U.S. F-16 programs, also oversees the MLU program. The Steering Committee chair is the U.S. Principal Deputy Assistant Secretary of the Air Force for Acquisition, a Lieutenant General. Major General-level national prime members and designated alternates represent each of the five countries. The Steering Committee chair, while a U.S. officer, in practice must act as an international neutral, letting national prime members work out differences, and arbitrating issues in a fair and impartial matter.²⁰

To maintain continuity and provide administrative support, the Steering Committee maintains a Permanent Secretariat office in Brussels, Belgium. Assigned there are the Secretary General (normally a Belgian Air Force Colonel), the Permanent Secretariat (normally a Royal Netherlands Air Force Major), and a clerical staff.²¹

Three functional subcommittees support the Steering Committee. These are the Operational & Logistics (OSC/LSC) Subcommittee, the Contractual & Financial (C&F) Subcommittee, and the Subcommittee on Industrial Matters (SCIM). Subcommittees are chaired by Colonel-level officers or civilian equivalents and assisted by Colonel-level national primes. Leadership of subcommittees and the Secretary General functions are equitably divided among participating governments.²²

Steering Committee and supporting subcommittee meetings are held at least semi-annually, rotating locations between the U.S. and an EPG country, but can be held more frequently to cover special topics. These meetings cover F-16 sustainment, software updates, and MLU concerns, but since the start of the MLU program, MLU concerns have dominated the agenda. The sometimes unglamorous “roll-up-the-sleeves”-level effort performed by the subcommittees has been highly valuable in resolving issues on the program. Discussions are frank and open, and often contractor participation is invited. There is a strong drive toward harmonization, consensus, and resolution at the subcommittee level. Individual subcommittees report on progress and issues at each Steering Committee meeting. Those relatively few issues unable to be resolved in the subcommittees are referred to the Steering Committee with options and recommendations.²³

Throughout its 25 years of existence, the subcommittee structure has been able to resist the inevitable bureaucratic inertia and has proved fairly flexible. As the F-16 program has matured, the focus today has shifted from design and production to sustainment and selected upgrades. Accordingly, the SCIM, an extremely active body during the program’s early and middle years, is now dormant.²⁴

With the emphasis on sustainment and Integrated Weapon System Management (IWSM), the separate OSC/LSC were successfully merged into a single entity, reflecting the close link between operational requirements and supportability. This merged subcommittee has had the difficult job of maximizing harmonization of disparate requirements and schedules to lower overall cost. In the case of MLU, perfect consensus was not always required. The program was structured to accommodate some kit differences for each customer, such as

options for electronic warfare and weapons provisions. The MOU allows for flexible cost sharing arrangements between participants and also has provisions for those participants with unique requirements. The U.S. prime operational representative to this key Subcommittee has been for many years the Chief of Fighter Requirements at the USAF Air Combat Command. This has been a major plus in providing needed support through the dynamic U.S. requirements and budget process and aiding other national primes with operational background on that committee. The existence of color cockpit displays in the MLU kit can be credited largely to the persistence of an influential Dutch pilot representative on this subcommittee, who questioned the display’s prohibitively high development cost and worked with LMAC to research affordable alternatives. The USAF is now retrofitting its newest F-16s with this MLU-developed display, enhancing pilot situational awareness and improving avionics utility.²⁵

The C&F Subcommittee also benefited from well placed and dedicated staffing. This subcommittee faced numerous difficulties with national budget processes working at differing cycles, and an acute, ongoing interest from the various national audit bodies. Committee members devoted substantial time to answering inquiries from and briefing multiple international audit and inspection agencies. Part of the effort was spent in educating auditors on national laws and policies, vital in maintaining collective governmental confidence in this multi-billion dollar program. Despite this level of attention, problems arose on occasion. For example, European auditors had different interpretations of U.S. legal requirements for protection of certain financial information LMAC considered proprietary. Often there were practical workarounds to audit issues. The U.S. GAO performed an unusual role in providing

oversight for European audit bodies on those areas involving U.S. proprietary information. The C&F subcommittee was also instrumental in developing MOU provisions such as a flexible currency management program, which eased financial management burdens and simplified accounting on the program. In addition, this subcommittee performs national staffing of significant changes to MOU agreements.²⁶

Overall F-16 and MLU program management responsibility is assigned to the U.S. Colonel-level SPD at the F-16 System Program Office (SPO) located at Wright-Patterson Air Force Base, Ohio. An MLU PM, a U.S. Lieutenant Colonel, assists the SPD. SNRs and small national staffs are assigned to the F-16 SPO to participate in regular IPT meetings, facilitate day-to-day management, and foster open communication.²⁷

Even before IPTs and IWSM were management standards within the USAF, the tight schedule and heavy pressure for success drove the MLU program team to quickly harmonize differing positions. SOWs were jointly drafted in multiple working meetings with LMAC and EPG customers at the table. SPO project managers pushed to resolve differences and keep constant open communication with numerous formal and informal meetings with EPG SPO representatives and joint teleconferences with LMAC. Full program reviews were held three to four times a year with all participants.²⁸

Technology Transfer

While there is significant U.S. industrial participation, LMAC relies on avionics components furnished or coproduced by a host of suppliers in each of the EPG nations to supply the estimated 60,000 parts in each MLU kit. The knowledge exchange from involvement in design, manufacture, installation, test, and support of

this complex avionics upgrade is significant, both at industrial and government level.²⁹

LMAC conducted an exhaustive competitive evaluation, selection, and qualification of numerous suppliers from each country. These MLU kit parts are shipped to and accumulated at SABCA in Belgium, where they are reassembled into 4x4x8 foot crates for further shipment to Air Force depots in each country for installation.³⁰ For the initial MLU “Trial Verification Installation” (TVI), each Air Force sent one F-16 to LMAC’s Fort Worth, Texas facility. Depot technicians from each country participated in initial training, installation and test of the five TVI kits. Aircraft panels and avionics were removed, miles of wiring and hundreds of harnesses installed, and new avionics and radar components installed.³¹

Following TVI emphasis then shifted to further training and preparation for the first “Lead the Fleet” (LTF) in-country installations at the overseas Air Force depots. Beyond kit installation, each country actively participated in developmental testing at Edwards AFB, California, and operational test and evaluation, at Leeuwarden Air Base, The Netherlands.³² Country participants also aided in the generation and test of various aircraft software upgrades required for MLU.

Business Management

The MLU program developed a number of unique business management practices. For example, the C&F subcommittee developed a relatively simple but concise “Groundrules for Financial Procedures” agreement. This steering committee arrangement outlined specific responsibilities and procedures for currency management, including establishment of fixed exchange rates, mitigation of currency exchange risk, and provisions for sharing associated

management costs. The C&F subcommittee also helped educate and encourage adoption of various aspects of acquisition streamlining and reform. Briefings and discussions were conducted to inform and win support for use of award fee incentives, a contractual tool not normally seen in European contracting.³³

Contractual processes were cleverly combined and synchronized. In October 1989, the MLU EMD contract was known to be on the horizon. However, FMS contracting actions could not proceed until a Letter of Acceptance (LOA) was signed by all EPGs. This presented a unique problem in that each country had its own budget cycle and none of them matched. However, members of the C&F subcommittee developed a schedule that attempted to meet the intent of the parties. The juggling act centered on ensuring that kit availability would match known kit installation schedules at the various aircraft depots. This created a tight fit for some of the countries due to aircraft airframe hours and other competing depot needs. To meet the schedule required a new contracting philosophy to ensure EMD schedules would produce appropriate training, supply and kit components for development kit installations.³⁴

A plan was worked out with LMAC, MLU program management, and the contract pricing and review communities to initiate as much upfront work where possible to get ahead of the game. Additionally, the development effort for the kits, support equipment, training, technical orders, and developmental supplies were all contracted for by one contracting entity in a single negotiation, versus three entities and separate contracting actions.³⁵

Human Dimension

The MLU program is indeed one of only a handful of transatlantic armaments cooperation

efforts widely regarded as a success. We asked current and former program officials about major contributors to the program's success. Maximum interoperability among NATO participants was cited as the primary driver behind the MLU program. A second significant driver was affordability. Each nation could not afford to take on the program on its own. National costs on the program could therefore be effectively limited through a set cost sharing principle, even though total program costs were higher. Each nation was in practice regarded as an equal partner, even though national cost shares were based on differing numbers of MLU kits. A third factor for cooperation was a solid, well thought out MOU.³⁶

The basic 1975 F-16 MOU structure had served the MLU program well and remained largely intact except for a few relatively minor changes. Logical hierarchies of amendments to the F-16 MOU were developed facilitating flexibility and easing MOU staffing burdens, and this flexibility was exploited on the MLU program. Significant modifications to the MOU were captured in a numbered series of documents known as Technical Agreements. Less significant revisions were captured in numbered Steering Committee Arrangements, and minor procedural and administrative revisions were included in a series of Steering Committee Decisions. The MLU agreements allowed use of the existing F-16 System Program Office management and facilities, avoiding duplication.³⁷

Also highlighted as significant to program success were the strong personal relationships and deep trust developed over the many years of the F-16 and MLU programs. The MOU was a high level agreement between governments and not just Air Forces. This level of agreement added stability and commitment to working issues on the program. The MOU envisioned flexibility toward future expansion

and specifically allowed the accession of additional NATO members, with Portugal to be added under the terms of this original provision.³⁸

The subcommittees have been largely instrumental in program success, often helping define the way forward. As replacement of the F-16 is not being considered until the 2010-2015 timeframe, the OSC/LSC subcommittee has developed a roadmap of operational requirements five to eight years out, specifically looking to harmonize future upgrades and supportability requirements. This forward look helps greatly in the national budgeting process. Many of the experienced F-16 operators sitting on the OSC/LSC subcommittee help develop and influence their national budgets, and this underscores the immense value of having the right people who are empowered to make decisions working on the team.³⁹

Maintaining cost targets was important in maintaining program commitment. Overall, the F-16 and MLU programs did very well in this area, again building trust. Like many cooperative programs, quantitative savings resulting from the MLU program have proven difficult to capture, but several subjective factors indicate MLU has been a substantially cost-effective venture. In the case of the Belgian Air Force, earlier F-104 and Mirage aircraft lasted approximately 15 to 18 years, with their operational quality steadily declining versus the threat. The F-16 MLU kit brings operational capability of older F-16s up to the latest F-16 standards at a fraction of the \$20-30 million

cost of a comparable replacement aircraft, enabling a forecast aircraft life of 35-40 years. In essence, MLU has enabled European partners the option to skip a much more expensive aircraft replacement cycle and the associated support cost “tail.”⁴⁰

Overall, the program has been relatively issue-free. The program did encounter a few disclosure-related issues in the areas of weapons integration and software but these were successfully resolved over the course of several meeting cycles. There was some early frustration with LMAC’s European work share proposals and the U.S. government nonparticipation in offset arrangements, but these concerns were eventually mitigated and resolved and did not disrupt the program.⁴¹

Notes

The F-16 MLU program has made a strong contribution to increasing the capability of all the participants’ Air Forces and thereby bolstering NATO power, a prime program goal. The forward-looking, flexible MOU provisions and adaptive management structure set the stage for the program. A huge benefit to the MLU program was the transfer of many years of an existing culture of trust, equity, and partnership developed on the F-16 program. Capable, committed team members at all levels have enabled the program to work through difficulties and maintain challenging cost and schedule goals. These factors make the MLU program a valuable example of successful transatlantic cooperation.

FUTURE TANK MAIN ARMAMENT (FTMA) PROGRAM

Background

The FTMA effort was started in 1988 before the end of the Cold War. It was an effort to harmonize the tank main armament systems (tank main guns, breeches, recoil systems, and related components) among the largest NATO defense nations, the U.S., U.K., France, and Germany. The ultimate objectives of the program were the codevelopment and production of a common FTMA system that was capable of overmatching the projected threat for the year 2000 and beyond.

Phase I, the demonstration phase, entailed work completed individually by each participant to demonstrate a tank armaments system that complied with the parameters (140mm, etc.) of a 1988 Harmonization Agreement. By the time the initial Phase I study was successfully completed by each nation, the end of the Cold War had eliminated the urgency of developing a 140mm tank weapon system. Instead, in 1995, the partners agreed to extend the Phase I effort within the scope of the existing MOU—essentially, continuing as a cooperative R&D project. The future effort would focus on caliber neutral activities and would be mutually beneficial to future tank armament developments of all the partners.¹

Harmonization

An FTMA Harmonization Agreement was signed by the Senior National Representatives, Army, (SNR(A)s) of the U.S., U.K., France, and Germany in 1988. This agreement included a list of harmonized parameters for the FTMA such as caliber (140mm), gun design pressure,

maximum component length, etc.² In 1990 the U.S., U.K., France, and Germany all signed an MOU to officially begin the FTMA cooperative program. A common threat picture, which each national system must be able to defeat, was jointly defined by the SNR(A) group.³

The EMC meets at least semi-annually to determine future national work efforts based on military priorities, technological capabilities, national desires, funding availability, value of work packages, and cost equitability. Each nation then contracts and executes its assigned work packages individually, with the work to be conducted cooperatively, and the technical data and results shared equally.⁴

Industrial Teaming

At the request of the FTMA governments, an industrial consortium was formed to support the FTMA program in 1993. Each nation designated a national contractor that was primarily responsible for executing its assigned work. The companies in the consortium are General Dynamics (U.S.), Royal Ordnance (U.K.), Rheinmetal (Germany), and GIAT (France). These companies have developed an industrial Cooperation Agreement to effectively coordinate the execution of the national work efforts determined by the EMC. The agreement facilitates the sharing of technical information within the consortium consistent with the agreement in the government MOU. In addition to the direct work they are contracted to perform, the industrial partners benefit by exposure to the technological developments of the partners and potential access to each other's markets.⁵

Management Structure

The FTMA management structure consists of a JSC which is formed by the SNR(A) from each of the participants and the EMC, which is composed of the national project managers (O-6 level) from each participant, as discussed in Chapter 2. The JSC provides direction on program execution to the EMC and resolves all issues referred to it from the EMC. A Military Working Group with O-6 level representatives from each nation provides the military priorities for work efforts to the EMC. In addition, the EMC has created a Legal Working Group to advise them on legal issues, and a Technical Working Group to execute their technical programs.⁶

Technology Transfer

The Phase I national level system demonstrations used several different technical solutions and generated significant technological data exchange. Demonstration of several different technical solutions reduced the overall program risk for Phase II, the development phase.⁷ At the end of Phase I, even absent continuation to Phase II, at a minimum there would be a basis for each nation to produce 140mm interoperable and interchangeable tank cannon and ammunition in the future.

The MOU required sharing of technical performance data among the participants throughout Phase I. The data sharing requirements included the “capability in terms of lethality, rate of fire, probability of hit, reliability, and safety information”⁸ as well as other basic design information. However, the partners were not required to share detail designs and manufacturing know-how, except through licensing agreements. Each participant agreed to provide the other participants, under fair and reasonable licensing terms, with any technical information

that was generated as a result of the Phase I work. However, the participants were not required to provide this data until Phase II.

Business Management

Each nation’s initial work packages for Phase I were determined by its technological capabilities and funding availability. U.S. Phase I efforts were funded by cooperative R&D Nunn funds. Although the Phase I work packages for each nation were substantially different, they were deemed to be equitable. The MOU required equitable financial contributions from all the partners. These types of arrangements have continued throughout the program with each nation contracting for and funding its own efforts. Therefore, work share equal to cost share concerns are automatically handled by the arrangement on national work packages. Currency exchange rates and economic conditions are also factors that are automatically handled by the national work packages.⁹

Human Dimension

For over a decade, the FTMA leadership from all participants has demonstrated flexibility and a willingness to continue to work together despite many changes in the program. The participants reach agreement every year on new work packages and openly share the data to the extent called for in the MOU.

Notes

Although the FTMA program has not produced a common tank main armament as originally planned, by continuing the program as a cooperative R&D effort there has been significant technology sharing among the participants. The governments and industries have all gained technological information in gun tube wear reduction coatings, high pressure recoil seal

design, and lightweight composite gun barrels. The partners have agreed to continue their cooperative research in advanced tube wear reduction coatings, new sabot design and materials, and advanced propellant charge systems.

The FTMA program has essentially four structural pillars for planning, managing, executing, and coordinating the cooperative R&D activities: 1) JSC (SNR(A)s) to provide top level direction/ dispute resolution; 2) Military Working Group (O-6 level) to set military priorities; 3) EMC (National PMs) to determine technical work packages; and 4) Industrial consortium to execute R&D work, and provide technical data. It also provides a forum for exploration of future cooperation, such as development of electro-thermal and/or electro-magnetic based armament systems among NATO's largest members.

The FTMA program with its four structural pillars perhaps provides a model that could effectively be used to manage and execute other multinational R&D efforts. Although when judged against its original lofty objectives, this program has languished because of both a lack of urgent need based on the current armored threat and defense budget constraints, it nonetheless provides a good example of how to conduct cooperative R&D activities. With the likelihood that defense budgets will remain severely constrained, the U.S. and its partners must find ways to get the most return on their R&D investments. Effective cooperative R&D programs, like the FTMA program, are one of the bedrocks of armaments cooperation. Sharing technical data and developing common technologies are likely to lead to formulation of common military requirements, which are the foundation of all codevelopment/coproduction programs.

JOINT STRIKE FIGHTER (JSF) PROGRAM

Background

The JSF program, although relatively new in its program life cycle, is an unusual and interesting example and may be indicative of the direction future transatlantic cooperative programs are headed. The program will develop and field a highly common family of next generation, multi-role strike fighter aircraft for the Navy, Air Force, Marine Corps, the U.K.'s Royal Navy and Royal Air Force, and a growing number of allies. Foreign interest in the program is high and this participation is expected to increase.

The JSF is currently the world's largest tactical fighter program, with over 2,800 aircraft to

be delivered from around 2008 through the 2020s.¹ The JSF Concept Exploration program emerged in 1994 from the merger of the earlier Joint Advanced Strike Technology (JAST) and Advanced Short Take-Off Vertical Landing (ASTOVL) technology demonstration programs.² The JSF program is currently in the Program Definition and Risk Reduction (PDRR) phase. Concept Demonstration contracts were competitively awarded in November 1996 to two teams, Boeing, and Lockheed Martin Aeronautics Company (LMAC), with Pratt and Whitney providing propulsion hardware and engineering support for both teams. These teams are developing competing aircraft designs and first flights are expected in 2000. Selection of the winning team and



Artist's Rendition of Boeing's Navy Version of the Joint Strike Fighter

initiation of the EMD phase is expected in 2001.³

The original program partners have refined their requirements for their JSF family variants. The U.S. Navy requires a multi-role stealthy strike fighter to complement the F/A-18E/F. The U.S. Air Force will use JSF as a multi-role (primary-air-to-ground) fighter to replace the F-16 and A-10 and complement the F-22 fighter. The U.S. Marine Corps will employ JSF to fulfil the need for a multi-role, short take-off vertical landing (STOVL) strike fighter to replace the AV-8B and F/A-18A/C/D. The Royal Navy and Royal Air Force require supersonic STOVL aircraft to replace the Sea Harrier and GR-7 respectively. The growing list of allies is in the process of defining similar requirements.⁴

The current PDRR phase focuses on three distinct objectives as a sound basis for transition to EMD in 2001. The first objective is facilitation of the development of fully validated, affordable operational requirements. A second objective is lowering risk by investing in and demonstrating key leveraging technologies that lower the cost of development, production and ownership. Finally, PDRR will demonstrate operational concepts.⁵

A significant and visible part of the current phase is the Concept Demonstration Program. This multi-year \$2.2 billion JSF effort commenced in November 1996 with competitive contract awards to Boeing and LMAC. These competing contractors are building concept demonstrator aircraft for flight demonstrations in 2000, conducting relevant ground demonstrations unique to their designs, and developing and refining appropriate weapon system concepts for proposal in the next phase. The aircraft demonstrated in this phase will not be production representative aircraft and will have

minimal avionics and other mission systems. The program office will use limited but fundamental demonstration requirements to assess the contractors' proposed concepts. The demonstration aircraft will be evaluated on their commonality and modularity, STOVL hover and transition capabilities, and low speed handling qualities.⁶

These flight demonstration results, along with the proposed weapon system designs and related technology maturation work will be considered in selecting the winning contractor for EMD and production. The JSF Alternate Engine Program, working with General Electric Aircraft Engines, is continuing the development of an alternate engine for production.⁷

Harmonization

The JSF Program has attracted substantial foreign interest. Several agreements have been signed for the current phase of the program with more expected. The JSF program has developed a unique structure for international participation in the Concept Development Phase, with requirements influence tailored to the level of participation. This structure includes four levels of participant involvement, governed through a negotiated Memorandum of Agreement (MOA)/MOU.⁸

The highest level of participation is known as "Collaborative Development Partnership." This level of participation affords a significant ability to influence requirements. The U.K. is a full collaborative development partner for the current Concept Demonstration Phase.

The second level of participation is the "Associate/Limited Partnership." This level provides for participation in specific technologies or the core program but with a more limited ability to influence requirements. Further, associate/

limited partners are provided access to JSF project information needed to better understand and evaluate how they might best use their JSF aircraft. Denmark, Norway, and The Netherlands have entered the program as associate partners.

The next level, the “Informed Partner,” is also allowed access to JSF project information to assess the utility of the JSF for their application. However, these participants are unable to influence requirements. Canada and Italy have entered the program as informed partners.

The final level, the “Major Participant,” participates as a FMS customer and is provided program insight through JSF studies, technical assistance and access to predetermined data. There is no ability to influence requirements at this level. Singapore, Turkey, and Israel have signed on as major participants. Further participation is expected in the EMD phase.

The Services, with selective input from higher level partners, are using an iterative process to define requirements, seeking to balance system capability with life cycle cost (LCC). Industry teams receive each iteration of requirements, evolve their designs, and in turn provide updated cost data to the warfighters. Costs and appropriate trades are then decided for the next iteration. This process produced the Joint Interim Requirements Document (JIRD) in 1995, 1997, and 1998. Continued refinements using this process led to approval in March 2000 of the Joint Operational Requirements Document (JORD) to support the decision to enter EMD. In parallel, the industry teams continue to evolve and update the configuration of their respective weapon system concepts for submittal with their EMD proposals.⁹

The JSF Program is significant in its approach to accommodating “jointness,” international

requirements, and maximizing commonality. The program has developed a novel “family of aircraft” concept toward affordably meeting the warfighters’ tactical aviation mission needs.¹⁰

Three different designs are in work, each with high cost commonality. The three designs will use common high-cost components such as avionics, engines and significant structural components.¹¹ Notably, past attempts at similar joint aircraft programs such as the 1960s-era F-111 development effort, were largely unsuccessful in adapting a single design to meet differing user requirements.¹² The Services, with selective input from the partners, continue to work together to develop joint and common requirements.¹³

The contractor teams are using trade studies extensively to determine an appropriate level of commonality. Where logical, some commonality is sacrificed to meet unique Service needs such as vertical take-off. The three highly common JSF variants will be assembled using flexible manufacturing technology on the same production line. This flexible manufacturing approach combined with common components will allow significant economies of scale and associated cost benefits.¹⁴

Estimated cost commonality for the three designs is in the range of 70-90 percent with an emphasis on commonality in the higher-priced components. Besides manufacturing cost reductions, other savings accrue through increased commonality. Common depot maintenance, common logistic support, as well as increased Service and coalition interoperability all lower operating cost. The JSF program office estimates development savings from the family of aircraft approach at nearly 40 percent compared to three stand-alone programs. Further, this approach is expected to generate significant total LCC savings compared to historical programs.¹⁵

Industrial Teaming

Two contractor teams led by Boeing and LMAC are competing in the current Concept Demonstration Phase, down-selected in 1996 from three teams in the earlier Concept Development Phase.¹⁶ For production, Boeing's JSF, the X-32, would be assembled at facilities in St Louis, MO. LMAC's JSF, the X-35, would be fabricated at the Fort Worth, TX plant.¹⁷ Primary propulsion for all three variants will be provided by a derivative of the F-22's F-119 engine developed by Pratt and Whitney. General Electric Aircraft Engines, under the JSF Alternate Engine Program, is continuing the development of an alternate engine for production, based on the F-120 engine design.¹⁸

Opportunities exist for significant foreign industry participation at the subcontractor and vendor level. In a departure from traditional combat aircraft development programs, the JSF program does not require a second, U.S.-based source for foreign supplied components. Use of open systems architecture will make integration of foreign supplied avionics far easier. While there is markedly increased opportunity for foreign participation, ground rules for selection will be significantly different from past programs. Foreign suppliers will have to compete based on price and quality factors; selection will not be based on the past practice of specified work share targets. Further, industries will have to become more tightly integrated with the U.S. primes' team than previous programs.¹⁹

Foreign industry is already actively involved. For example, several U.K. contractors are major players. On both teams, Rolls-Royce is contributing its significant expertise with vertical lift propulsion technologies. BAE SYSTEMS is a major partner on the Lockheed Martin team.²⁰ Dutch industry is pressing hard for a

share of the EMD phase. A group of companies under the Dutch Stork Aerospace Group (SAG) are involved with current technology demonstrator contracts for both Boeing and LMAC. For example, A SAG company, Fokker Elmo, supplied all wiring for Boeing's X-32 demonstrator aircraft.²¹

Management Structure

The JSF Program is an ACAT ID joint program,²² staffed by Air Force, Navy, Marine Corps, and international personnel. A dedicated IPO is co-located within the JSF program office and reports to the JSF program director. National deputies from each partner country reside within the IPO. There is no designated lead service on the JSF program. The program director position, currently a Marine Corps Major General, alternates between the Departments of Navy and Air Force, and reports to the Service Acquisition Executive (SAE) of the other Service. The deputy program director position is currently an Air Force Brigadier General.²³

The program office relies heavily on IPTs and is organized by teams to handle the numerous facets of the program. The program director, deputy program director, and their staffs reside in the JSF Program Directorate and oversee a number of subordinate directorates. These include the two Concept Demonstration Teams as well as functional areas such as Systems Engineering, Business and Financial Management, Requirements, Contracts, Plans and Programs, Security, Propulsion Systems, Autonomic Logistics, JAST, and EMD Planning.²⁴

Technology Transfer

The opportunity for meaningful technology has been a driver for significant international interest. Technology transfer occurs at a number

of levels and is tailored to the needs of the participant. All international participants are provided access to JSF program information to assist in assessing their national requirements for a strike fighter. This can include use of modeling and simulation (M&S) tools to facilitate their requirement validation. Participation provides a channel for foreign industry to engage U.S. industry on possible future partnerships in future phases of JSF (e.g., EMD and Production).²⁵

Participants at the higher levels of involvement are afforded the opportunity to participate in and influence the final design.²⁶ This has included both governmental and industrial involvement as in the case of the U.K. The Royal Navy, Royal Air Force, and British industries such as Rolls-Royce and BAE SYSTEMS have provided substantial design expertise in the development of JSF vertical lift systems and other aeronautical systems. Other European vendors are also participating in the current phase, performing such tasks as developing aerostructure demonstration articles using alternate manufacturing processes and materials.²⁷

It appears widely recognized that the window of opportunity for maximum technological participation will rapidly diminish as the JSF program progresses and the design stabilizes. Accordingly, further interest is rapidly growing for those participants wishing to gain a foothold in this relatively early phase of the program.²⁸

Business Management

A key JSF Program tenet is affordability—reducing the development, production, and ownership cost. The program incorporated acquisition streamlining principles from the beginning, and has emphasized jointness and tailored international partnerships. Early on, attention

was focused on technology maturation, concept demonstrations, and early use of cost-performance trades in evolving weapon system requirements.²⁹

This evolutionary JSF requirements definition process, using CAIV guidelines, is markedly different from earlier acquisition programs. Technology maturation is an area of major focus. The JSF program concentrated on lowering cost and risk by maturing and demonstrating key technologies early—before the EMD phase. This atypical JSF strategy resulted from recommendations of a variety of panels on acquisition reform.³⁰

Human Dimension

Individuals we spoke with in the U.K. were quite supportive of the program overall, particularly at the vendor level.³¹ The feeling is that getting even ten percent of a U.S. program is big business and worthwhile for the U.K.³² U.K. Ministry of Defence officials were quite positive about the program, and felt JSF was not an “American airplane” and that the U.K. was able to significantly influence requirements.³³ Further, there was a good atmosphere of trust and good flow of work, which should carry forward to work future EMD challenges.³⁴

Also cited as beneficial is the inclusion of a nine-man U.K. team in the JSF Program Office. These individuals have been there for some time and provide the U.S. good access to U.K. perspectives.³⁵ However, there remain lingering concerns over timely processing of TAAs, U.K. industrial content, and costs of U.K. production and support.³⁶ Access to stealthy technologies is viewed as “tricky, but workable,”³⁷ while frustrations remain with U.S. export of technology laws in the area of engine development.³⁸

Notes

Joint and international interests are high and the government and industry teams are highly committed to making this unusual program succeed. The JSF program uses a number of new approaches in developing an affordable, mission-effective tactical aircraft.

The JSF family of aircraft variants will be highly common designs built on the same production line with flexible manufacturing technology. The acquisition strategy is also new, with early and close involvement between

warfighter and developer and major emphasis on risk reduction. Requirements are refined through an iterative process, working a balance of capability and affordability. International partners, when they desire, are given significant voice in defining their unique requirements and have an attractive opportunity for technology transfer and substantial industrial participation.

The program is maturing key technologies up front to reduce both costs and risks. Demonstration flights in 2000 will provide valuable data on basic aircraft performance, lowering risk as the program transitions to EMD.



Artist's Rendition of Lockheed Martin's Air Force Version of the Joint Strike Fighter

SUMMARY

These transatlantic cooperative programs represent some of the most complex program management challenges anywhere. They are representative of the wide variety of transatlantic programs in general. While there is certainly no one-size-fits-all cookbook approach to transatlantic cooperative program management, this review reveals that while difficult, proper attention to a set of common characteristics makes these programs manageable. Each has incorporated tailored structures and processes to accommodate the partner's needs and expectations.

Lessons Learned

The review of selected transatlantic programs reveals several lessons of interest to the PM. These lessons learned are grouped below by common characteristics.

- **Harmonization**

- In programs we reviewed, the original harmonization of requirements did not result from a single pattern, and did not follow an orderly, systematic process. For example, harmonization on the NSSMS and MIDS-LVT programs was fostered by NATO CNAD working group discussions, whereas the MLRS development was the result of OSD direction to find cooperative partners. Further, FTMA resulted from a strong desire of the partners to collectively overmatch the future Soviet armored threat with a common tank armament. However, within cooperative programs, there is good likelihood of future cooperative upgrades, such as F-16 MLU,

GMLRS, TGW, RAM Block I, and ESSM. The management structure of the existing program was instrumental in harmonizing the system upgrades.

- Cooperation can be successfully achieved with many partners as in the case of NSSMS, MLRS and MIDS-LVT but due to the number of factors involved in harmonization, it is easier to achieve with fewer.

- **Industrial Teaming**

- Industry has great capacity to solve problems and well thought out industrial arrangements can greatly enhance government-to-government agreements. For example, in the RAM program, it was independent action on the part of Raytheon and RAMSYS that produced the CPA, thus overcoming the impasse over a single production line. In MIDS-LVT, the cooperative efforts of industrial participants helped define the early principles for management and sharing of work that would be proposed for subsequent program phases. In the F-16 MLU program, the difficult issue of program offset arrangements was left completely to the industrial partners to solve, a marked difference from the tough government-to-government brokering that occurred on the basic F-16 program.
- As exemplified by industrial issues that arose from the MIDS-LVT and TGW joint ventures, the PM should carefully

consider proposed industrial structures and contractual arrangements to ensure compliance with legal and regulatory requirements and responsiveness to the program's needs.

- **Management Structure**

- All programs employed an adaptive, responsive management structure. Most used a senior level steering committee, supported by functional subcommittees or working groups, to support the program office. Day-to-day program execution and resolution of most issues were overseen by mid-level (0-6 level or equivalent) managers.
- Equitability must be perceived within the management structure by all the participants. For each program, what is perceived as equitable by the participants will be different, but it is the perception of equitability that is essential. We found this in all cases reviewed.
- Programs successfully tailored their organizations as the program matured. For example, the MIDS-LVT program restructured several times due to changes in partner composition, physical location, and U.S. Service leadership. F-16 MLU contained provisions for future addition of NATO members. Portugal was easily added to the program using this feature.
- Appendix I contains a “lessons learned” perspective on early considerations in developing an international program office. Retired USAF Colonel Alan E. Habermusch, in his article, “Standing Up or Joining an International Program Office? Some Nitty Gritty Details You

Might Need to Know,” (reprinted from DSMC’s January-February 2000 *Program Manager* magazine), outlines a number of personal experiences as the Modular Stand-Off Weapon Program Director standing up a new international organization.

- **Technology Transfer**

- Program MOUs addressed key technology transfer provisions in programs we reviewed. In several cases, the cooperative efforts did not involve full sharing of U.S. technology, but these cases were made clear in the development of the program and the harmonization of expectations of the partners. False impressions were not created.
- Both quantity and quality of high technology work were always important considerations for the participants.

- **Business Management**

- While the introduction of the euro has simplified matters somewhat, procedures will nonetheless be needed to handle the complexities of multiple currencies and economic conditions.
- Currency fluctuation can be a significant issue. For instance, in the TGW program, the currency exchange rate was fixed at the beginning of the program when the dollar was strong. When the dollar weakened significantly over the eight-year effort, the other partners’ cost share contributions were still based on the rate that favored the U.S., causing distress among the other partners.

- **Human Dimension**

- Selection of leadership is vital. Leaders that were willing to consider the ideas of others, work through differences, and effectively deal with program ambiguities led programs to success. Conversely, an autocratic, dictatorial style is unlikely to succeed in an international cooperative program environment.
- Great care should be exercised in building consensus for use of new acquisition initiatives. For example, a rather sudden implementation of U.S. acquisition reform on the MIDS-LVT program

caused significant high level rancor among some of the partners, and required additional effort to rebuild shaken confidence. Further, use of unfamiliar contracting approaches on the F-16 MLU program took considerable explanation to win the partners' acceptance.

- Cultural and communications differences are significant even among Europeans, as exemplified by the widely diverse NSSMS program. NSSMS leadership cultivates a culture of cooperation and frequent social interaction. This approach helps mitigate differences and build team cohesion.

	HARMONIZATION	INDUSTRIAL TEAMING	MANAGEMENT STRUCTURE	TECHNOLOGY TRANSFER	BUSINESS MANAGEMENT	HUMAN DIMENSION
MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) SYSTEM						
MLRS	<ul style="list-style-type: none"> Common requirement US increased rocket diameter to match German requirements MOU standardized hardware, except communication equipment 	<ul style="list-style-type: none"> US and European production lines US prime for development; US & Euro prime for production Joint US/European marketing organization 	<ul style="list-style-type: none"> Joint Steering Committee Balanced representation 0–6 level EMC chaired by US Project Manager Operational Users' Representatives on EMC 	<ul style="list-style-type: none"> US controlled TDP European engineering support for development ITAR exemption to facilitate export of technical data to European partners for production 	<ul style="list-style-type: none"> US funded bulk of development MOU corrected this imbalance through recoupment in production MOU allowed for future NATO growth, with recoupment 	<ul style="list-style-type: none"> Caring leadership built trust Principal of equity Unanimity in decisions
GUIDED MLRS (GMLRS)	<ul style="list-style-type: none"> US agreed to "add-on" requirements to accommodate partners Existing MLRS management structure facilitated harmonization 	<ul style="list-style-type: none"> US prime International subcontracting on "best value" basis No firm MOU work share = cost share requirements, but program goal 	<ul style="list-style-type: none"> Similar to MLRS US & European government co-production managers (0–5 level) 	<ul style="list-style-type: none"> US export provisions frustrating to partners, no ITAR exemption as in MLRS Production Data Package for technology transfer to Europeans 	<ul style="list-style-type: none"> Based on US currency; no fixed exchange rate US funds 50%; others 12.5% each 	<ul style="list-style-type: none"> Caring leadership Strong commitment to work tough issues
MLRS TERMINALLY GUIDED WARHEAD (TGW)	<ul style="list-style-type: none"> Smart submunition planned from beginning of MLRS End of Cold War and reduced funding led to US pullout; others followed 	<ul style="list-style-type: none"> JV Company w/ national representation for development Difficulties in balancing work shares based on quality of work 	<ul style="list-style-type: none"> Similar to MLRS 	<ul style="list-style-type: none"> Advanced technologies shared Up front decisions on technology transfer minimize problems 	<ul style="list-style-type: none"> US funded 40%; others 20% each Fixed currency exchange rate at beginning of program Actual currency fluctuations required workload adjustments 	<ul style="list-style-type: none"> Caring leadership Many difficult and contentious decisions made over 8-year period
NATO SEASPARROW SURFACE MISSILE SYSTEM (NSSMS)	<ul style="list-style-type: none"> Initially, common requirement based on AIM-7 Sparrow Later, some partners wanted upgraded capabilities Complex integration, multiple launchers, platforms, guidance 	<ul style="list-style-type: none"> US prime International subcontracting, prime responsible for work share targets Work share based on cost share, +/-20% 	<ul style="list-style-type: none"> Program Steering Committee Initially membership and voting proportional to cost share, later changed to equal balance 	<ul style="list-style-type: none"> Guidelines on transfer/export of items clearly specified in MOU Specific provisions for US "Unique Items" and X-band technology 	<ul style="list-style-type: none"> Consistent currency management Annual financial commitments deposited in US \$s to trust account 	<ul style="list-style-type: none"> Strict neutrality of Steering Committee leadership Consensus style management Competent leadership, highly cooperative, trusting membership

Figure 4-1. Comparison of Selected Transatlantic Programs

	HARMONIZATION	INDUSTRIAL TEAMING	MANAGEMENT STRUCTURE	TECHNOLOGY TRANSFER	BUSINESS MANAGEMENT	HUMAN DIMENSION
ROLLING AIRFRAME MISSILE (RAM)	<ul style="list-style-type: none"> Initially, common requirement Upgrade requirement diverged; however new technology able to satisfy needs of both participants 	<ul style="list-style-type: none"> US prime developer Single integrated missile line German consortium acts as prime for German missile items JV for Launcher w/ same participants 	<ul style="list-style-type: none"> Program Steering Committee Equal representation and voting US-based project office 	<ul style="list-style-type: none"> Clear MOU guidelines for technology sharing and usage Some issues over third party sales; US prefers FMS, Germany prefers DCS. Compromise resolution; certain customers have choice 	<ul style="list-style-type: none"> German firms use Firm Fixed Price contracts exclusively; US allows some cost-plus contracts German funds don't pass through US accounting system; deposited in bank chartered in both countries; arrangement is faster 	<ul style="list-style-type: none"> Strong, trusting relationships developed while working tough production issues Cultural and communications differences well tolerated
MULTIFUNCTION INFORMATION DISTRIBUTION SYSTEM-LOW VOLUME TERMINAL (MIDS-LVT)	<ul style="list-style-type: none"> Proposed as NATO cooperative follow-on to earlier JTIDS program Significant effort to accommodate numerous platform variances and operational concepts 	<ul style="list-style-type: none"> JV Company w/ national representation for development Unusual nature of JV required letter of credit provision to comply with FAR "responsible contractor" guidelines; workarounds for early cost allowability 	<ul style="list-style-type: none"> International Steering Committee Equal representation and voting, unanimous decisions US-based International Program Office 	<ul style="list-style-type: none"> Two-way flow of limited technology transfer Advancement seen in both US and Europe TDP delivered to all participants 	<ul style="list-style-type: none"> Complex financial arrangements overseen by Financial Management Board Tailored network handles financial transactions Acquisition Reform techniques used extensively 	<ul style="list-style-type: none"> High level of support and commitment; strong trust Emphasis on small, focused working groups to resolve issues Continuous stream of talented, highly motivated members
F-16 MID-LIFE UPDATE (MLU)	<ul style="list-style-type: none"> Common requirement among original F-16 partners US redefined production participation based on end of Cold War and reduced aircraft requirement Provisions for additional NATO members (Portugal added) 	<ul style="list-style-type: none"> US prime contractor Competitive subcontracts to European industry European JV to manage European industry effort Installation at F-16 Depots in four European countries 	<ul style="list-style-type: none"> Steering Committee with functionally-oriented subcommittees Equal representation and voting US based System Program Office with integrated International Programs Directorate 	<ul style="list-style-type: none"> Two-way flow of limited technology transfer; component co-production and kit installation by all Advancement seen in both US and Europe 	<ul style="list-style-type: none"> Complex financial procedures covered in multilateral agreement Highly streamlined, flexible contracting procedures Acquisition strategy accommodated some customer kit variances No work share targets; subcontracts awarded on best value 	<ul style="list-style-type: none"> Strict neutrality of Steering Committee leadership Consensus style management, small working groups to resolve issues Competent leadership, highly cooperative, trusting membership

Figure 4-1. Comparison of Selected Transatlantic Programs (continued)

	HARMONIZATION	INDUSTRIAL TEAMING	MANAGEMENT STRUCTURE	TECHNOLOGY TRANSFER	BUSINESS MANAGEMENT	HUMAN DIMENSION
FUTURE TANK MAIN ARMAMENT (FTMA)	<ul style="list-style-type: none"> • Early Harmonization Agreement on standardized requirements • Harmonized requirements included in program MOU 	<ul style="list-style-type: none"> • Industrial consortium w/ designated national contractor participation • Industrial Cooperation Agreement to manage MOU provisions 	<ul style="list-style-type: none"> • Joint Steering Committee • Balanced representation • EMC supported by Military, Legal, and Technical Working Groups • 0–6 PMs form EMC, rotating chairmanship 	<ul style="list-style-type: none"> • Significant exchange of technical and basic design data for tank armaments • US and partners gained significant amount of technology 	<ul style="list-style-type: none"> • Work packages determined by technical capabilities and funding; different, but equitable • Each nation funds and contracts for workshare – no currency issue 	<ul style="list-style-type: none"> • Sustained commitment to working together • Flexible leadership enabled the program to collectively modify its objectives at the end of the Cold War
JOINT STRIKE FIGHTER (JSF)	<ul style="list-style-type: none"> • US Joint Program with tailored foreign participation • Some foreign partners can influence requirements, if desired 	<ul style="list-style-type: none"> • Two competing US prime-led teams for Concept Demonstration Phase • International participation based on best value 	<ul style="list-style-type: none"> • US-based Joint Program Office with International representation • International participation in EMC 	<ul style="list-style-type: none"> • Significant exchange of technical and basic design data, modeling and simulation tools • Europeans contributing expertise in vertical lift and aerostructure technology 	<ul style="list-style-type: none"> • Evolutionary requirements development • Emphasis on affordability using CAIV techniques • Early technology maturation 	<ul style="list-style-type: none"> • Flexible, highly experienced leadership • Good access by partners • Strong trust, committed partners • Draw of leading-edge technology, opportunity for portion of huge program
<p>CAIV = Cost As an Independent Variable EMC = Executive Management Committee FAR = Federal Acquisition Regulation JTIDS = Joint Tactical Information Distribution System JV = Joint Venture MOU = Memorandum of Understanding TDP = Technical Data Package</p>						

Figure 4-1. Comparison of Selected Transatlantic Programs (continued)

ENDNOTES

MLRS

1. *Multiple Launch Rocket System Lessons Learned*, Defense Systems Management College (DSMC) Report (Fort Belvoir, VA, July 1980), p. B-5.
2. Ibid, p. B-8.
3. *Multiple Launch Rocket System (MLRS), Fiscal Year 1993 Historical Summary* published by the MLRS Program Office, p. 1.
4. Interview with MLRS prime contractor, Lockheed Martin Vought Systems (LMVS) representative (March 2000) by authors.
5. MLRS DSMC Report, pp. D-1 – D-2.
6. Multiple interviews with MLRS program officials (December-March 2000) by authors.
7. Ibid.
8. LMVS interview.
9. MLRS program official interviews.
10. Interviews with European armaments officials (March 2000) by authors.
11. LMVS interview.
12. MLRS program official interviews.
13. LMVS interview.
14. MLRS program official interviews.
15. MLRS DSMC Report, p. viii.
16. MLRS Historical Summary, p. 2.
17. U.S. General Accounting Office, National Security and International Affairs Division Report GAO/NSIAD 92-7 (Washington D.C., 31 October 1991), p. 2.
18. Europeans interviews.
19. MLRS program official interviews.

20. Ibid.
21. Ibid.
22. GAO/NSIAD 92-55 (21 April 1992), pp. 21-22.
23. MLRS program official interviews.
24. Ibid.
25. Ibid.
26. Europeans interviews.
27. MLRS program official interviews.
28. Europeans interviews.
29. MLRS program official interviews.

NSSMS

1. Robert T. Williams, Technology Service Corporation (February 3, 2000). Interview by authors.
2. Raymond Blackburn, III, Slide presentation: *NATO Seasparrow Surface Missile Project*, (January 6, 1999), slide 6.
3. Interview with European armaments official.
4. Interview with official associated with the NATO Seasparrow Project Office (NSPO)(January-February, 2000).
5. Williams interview.
6. Raymond Blackburn, III, “The NATO Seasparrow Project,” printed in *50 Years of NATO*, (1999), p. 46.
7. Williams interview.
8. NSPO interview.
9. Ibid.
10. Williams interview.
11. Interview with DoD official.

12. Williams interview.

13. NSPO interview.

22. Interviews with German armaments officials (March 7-8, 2000).

23. Ibid.

RAM

1. *The Rolling Airframe Missile (RAM) International Cooperative Acquisition Program*, case study (DSMC, Fort Belvoir, VA, August 1998), p. 3.

2. Interview with associates of the RAM Program Office (RAMPO)(January 2000).

3. RAM case study, p. 3.

4. RAM case study, pp. 5 and 8.

5. RAM case study, p. 5.

6. RAM case study, p. 12.

7. RAMPO interview.

8. RAM case study, p. 12.

9. RAMPO interview.

10. RAM case study, p. 13.

11. RAMPO interview.

12. RAMPO interview.

13. RAM case study, Exhibit B.

14. RAM case study, p. 15.

15. RAMPO interview.

16. Ibid.

17. Case study, p. 14.

18. Ibid.

19. RAMPO interview.

20. Ibid.

21. Case study, p. 11.

MIDS-LVT

1. *FY98 Annual Report, Multifunction Information Distribution System Low Volume Terminal (MIDS-LVT)*, U.S. Department of Defense, Office of the Secretary of Defense, Director of Operational Test & Evaluation, <http://www.dote.osd.mil/reports/FY98/navy/98navymids.html>, p. 2.

2. "Data Link Solutions Completes MIDS-LVT Production Readiness," *Aviation Week's Show News Online*, <http://www.awgnet.com/shownews/paris1/pressr26.htm> (June 15, 1999).

3. Norman S. Bull, *Multifunctional Information Distribution System Low Volume Terminal (MIDS-LVT), A Case Study Providing a History of the MIDS-LVT Program* (DSMC, Fort Belvoir, VA, November 1998), p. 1.

4. Ibid.

5. Ibid, pp. 11-12.

6. Ibid, pp. 1-2.

7. Ibid, p. 2.

8. Ibid.

9. Interview with a former associate of the MIDS International Program Office, (April 2000).

10. Bull, pp. 6-7.

11. Ibid, pp. 22-26.

12. Collie J. Johnson, "Gansler, International Partners Accept Initial Delivery of MIDS-LVT at Pentagon Ceremony," *Program Manager Magazine* (Fort Belvoir, VA, DSMC Press, May – June 1998), p. 10,

13. Bull, p. 14.

14. Johnson, p. 6.

15. Bull, pp. 13-15.

16. Ibid, pp 13-14
 17. Ibid, p. 15.
 18. Ibid, pp. 14-15.
 19. Johnson, pp. 4-7.
 20. Ibid, pp. 5-6.
 21. Ibid, pp. 4-5.
 22. Ibid, pp. 5 and 8.
 23. Ibid, pp. 6.
 24. Bull, pp. 28-29.
 25. Johnson, pp. 9-10.
 26. Bull, p. 29.
 27. Ibid, p. 29.
 28. Interview with a former associate of the MIDS International Program Office, (April 2000).
 29. Johnson, p. 7.
 30. Ibid, pp. 7-8.
 31. Ibid, pp. 8-10.
 32. Ibid, pp. 4, 6-7.
 33. Ibid, pp. 2-3.
3. *Steering Committee Arrangement No. 45, Multi-national Agreement for the F-16 MNFP Mid-Life Update Program* (January 21, 1991), Amendment to *Memorandum of Understanding between The Government of the United States and the Governments of Belgium, Denmark, The Netherlands, and Norway Relating to the Procurement and Production of the F-16 Aircraft*, (June 10, 1975).
 4. *Steering Committee Arrangement No. 44, Agreement for Predevelopment Phase of F-16 Derivative Program*, (March 31, 1989), Amendment to *Memorandum of Understanding between The Government of the United States and the Governments of Belgium, Denmark, The Netherlands, and Norway Relating to the Procurement and Production of the F-16 Aircraft*, (June 10, 1975).
 5. *Steering Committee Arrangement No. 45.*
 6. *F-16 Mid-Life Update Background*, http://home.wanadoo.nl/tcc/rnlaf/mlu_back.html, p.1.
 7. Multiple interviews with Colonel(s) Steven A. MacLaird, SAF/AQQX, Pentagon, Washington, D.C. (April 2000). Colonel MacLaird was the F-16 International Contracting Branch Chief and MLU Development Procurement Contracting Officer (PCO) October 1989 through July 1992 and was transferred to the Pentagon, SAF/AQPF, and assigned as the F-16 Program Element Monitor (PEM) August 1992 through October 1994. In those positions, he prepared contracting strategy, executed strategy, and acted for and on behalf of the U.S. Principal to the C&F Committee.
 8. Ibid.
 9. Ibid.

F-16 MLU

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1. *F-16 Mid-Life Update Background*, http://home.wanadoo.nl/tcc/rnlaf/mlu_back.html, p.1.
 2. Lockheed Martin Aeronautics Company, Press Release, *Lockheed Martin Receives Order for Additional F-16 Upgrade Kits* (February 15, 1999), <http://www.lmtas.com/News/Press/F16/f16990215.html>.
 10. Lockheed Martin Aeronautics Company, Press Release, *Portugal To Expand Its F-16 Fleet* (December 4, 1998), http://www.lmtas.com/News/Press/F16/f16pr_62.html.
 11. Multiple interviews with Multinational Fighter Program officials (February – March 2000).
 12. Multiple interviews with F-16 System Program Office officials (April, 2000).

13. Lockheed Martin Aeronautics Company, Press Release (February 15, 1999).
 14. *F-16 Mid-Life Update Background*, p. 3.
 15. Lockheed Martin Aeronautics Company, Press Release,(February 15, 1999)
 16. Ibid.
 17. Multiple interviews with F-16 System Program Office officials (April 2000).
 18. *Steering Committee Arrangement No. 45*.
 19. Lockheed Martin Aeronautics Company, Press Release (February 15, 1999).
 20. Multiple interviews with F-16 System Program Office officials (April 2000).
 21. Ibid.
 22. Ibid.
 23. Ibid.
 24. Ibid.
 25. Ibid.
 26. Ibid.
 27. Ibid.
 28. Ibid.
 29. Lockheed Martin Aeronautics Company, Press Release, *First F-16 Production Upgrade Kits Delivered Ahead of Schedule* (November 12, 1996), http://www.lmtas.com/News/Press/F16/f16pr_4.html.
 30. Ibid.
 31. *F-16 Mid-Life Update Background*, p. 4.
 32. Ibid, pp. 4-5.
 33. Multiple interviews with F-16 System Program Office officials (April 2000).
 34. MacLaird interview.
 35. Ibid.
 36. Multiple interviews with F-16 System Program Office and Multinational Fighter Program officials (March-April 2000).
 37. Ibid.
 38. Ibid.
 39. Ibid.
 40. Ibid.
 41. Ibid.
-
- FTMA**
-
1. Interviews with Future Tank Main Armament (FTMA) program officials by authors (January-March 2000).
 2. Memorandum of Understanding between France, the Federal Republic of Germany , the United Kingdom, and the United States for a Cooperative Program for Harmonized Future Tank Main Armament (16 May 1990), Annex A.
 3. FTMA program official interviews.
 4. Ibid.
 5. Interviews with a program official from U.S. industry member of the FTMA industrial consortium, General Dynamics, by authors (January-March 2000).
 6. FTMA program official interviews.
 7. Ibid.
 8. FTMA MOU, p. 8.
 9. FTMA program official interviews.

1. David Mulholland, "Debate Widens Over JSF Contest." *Defense News* (March 13, 2000), p. 1.
2. *Joint Strike Fighter Master Plan*, Joint Strike Fighter Program Office, (Arlington VA, Update as of December 15, 1998), Section 1., http://www.jast.mil/html/body_mpsection1.htm.
3. *Joint Strike Fighter White Paper*, Joint Strike Fighter Program Office, (Arlington VA, Update as of December 2, 1999) http://www.jast.mil/html/body_jsfwhitepaper.htm.
4. Michael Hough, Major General, U.S. Marine Corps, *The Affordable Solution – JSF*, Joint Strike Fighter Program Office (Arlington VA, Undated), Briefing posted on the Joint Strike Fighter website. <http://www.jast.mil/html/progbriefs.htm>.
5. *Joint Strike Fighter White Paper*
6. Ibid.
7. Ibid
8. *Joint Strike Fighter Program Office Organization, International Directorate*, Joint Strike Fighter Program Office, (Arlington VA, Undated), Posted on the Joint Strike Fighter website. <http://www.jast.mil/html/ipo.htm>.
9. *Joint Strike Fighter White Paper*
10. Ibid.
11. Ibid
12. John Pike, *F-111*, Federation of American Scientists Military Analysis Network, (Update as of December 24, 1998), <http://www.fas.org/man/dod-101/sys/ac/f-111.htm>.
13. *Joint Strike Fighter White Paper*.
14. Ibid.
15. Ibid.
16. *Joint Strike Fighter Master Plan*
17. Joris Janssen Lok, and Bill Sweetman, "Making More Room For Partners, JSF Collaboration Is Good Business, But Not Without Its Problems," *Jane's International Defense Review* (Coulsdon, Surrey, UK, March 2000), pp. 52-53.
18. *Joint Strike Fighter White Paper*.
19. Lok and Sweetman, pp. 53-55.
20. Hough, *The Affordable Solution – JSF*; Douglas Barrie, and David Mulholland, "JSF Negotiations Pivot On Technology Access." *Defense News* (December 20, 1999), p. 1.
21. Lok and Sweetman, p. 55.
22. FY1998 RDT&E Budget Item Justification Sheet (R-2 Exhibit), Program Element 0603800F, Defense Technical Information Center (Fort Belvoir, VA, February 1997) p.5. http://www.dtic.mil/cgi-bin/fulcrum_main.pl.
23. *Joint Strike Fighter Program Office Organization, Program Directorate*, Joint Strike Fighter Program Office, (Arlington VA, Undated), Posted on the Joint Strike Fighter website <http://www.jast.mil/html/progdirect.htm>.
24. *Joint Strike Fighter Program Office Organization*, Joint Strike Fighter Program Office, (Arlington VA, Undated), Posted on the Joint Strike Fighter website <http://www.jast.mil/html/organization.htm>.
25. *Joint Strike Fighter Program Office Organization, International Directorate*
26. Ibid.
27. Lok and Sweetman, pp. 53-55.
28. Ibid, p. 55
29. *Joint Strike Fighter White Paper*
30. Ibid.
31. Interview with British defense industry representative in London, U.K. (March 9, 2000).
32. Ibid.

33. Interview with British MoD representative in London, U.K. (March 10, 2000).
34. Ibid.
35. Ibid.
36. Interview with British defense industry representative in London, U.K. (March 9, 2000).
37. Interview with British MoD representative in London, U.K. (March 10, 2000).
38. Interview with British defense industry representative in London, U.K. (March 9, 2000).

5

INTRA-EUROPEAN COOPERATIVE PROGRAMS

*“Good judgement comes from experience.
Experience comes from bad judgement.”*

— Mark Twain

Introduction

Transatlantic armaments cooperation is greatly affected by the experience of Europeans in pursuing cooperation among themselves, both within and independent of NATO. Examining their motivations, procurement systems, and history of cooperation will aid the U.S. in gaining an understanding of current or prospective European partners. Most of the following focus is on France, the U.K., and Germany, as collectively they account for about 85 percent of European procurement.

European Motivations

Much of the impetus for arms cooperation among European partners is rooted in factors discussed in Chapter 3. Europe desires to strengthen the framework of its developing political and security institutions and emerge from the shadow of the U.S. Beyond historical and political considerations, there are compelling practical reasons in European eyes for

limiting partnership in a program to their side of the Atlantic. An obvious example is the introduction of the euro, which, while not yet universal (there are currently 11 nations in the euro zone), is now an advantage for intra-European cooperation. In many combinations on the continent currency fluctuation is no longer a consideration.

It is a widely held view among European defense officials that the U.S. is a problematic partner in cooperative armaments programs. The particulars of this view are treated in some detail in Chapter 3, while examples are shown in the various transatlantic programs discussed in Chapter 4. The current environment in Europe makes it possible to avoid these issues altogether through forming an exclusively European team. With the recent experience in the Balkans, there is also a sense that European military teamwork will be put to the test in future conflicts, or potentially so. Consequently, interoperability with other Europeans holds more urgency than with the U.S.^{1,2}

It has been observed that U.S. arms are inextricably linked to U.S. doctrine. A prospective European partner may find that its military doctrine is incompatible to that of the U.S., diminishing the potential for cooperation. Through a common environment, policies that are more closely aligned, and a common historical experience, Europeans are more apt to use their equipment in a similar manner and thus agree more readily on requirements. European warships are generally smaller than those of the U.S. Navy, leading to wide use in Europe of the U.K.'s Lynx helicopter, smaller and lighter than the U.S. SH-60. The German perspective in the abortive MBT-70 program illustrates the historical point. German experience in World War II taught the value of a low silhouette, high mobility, and effective engagement at close-range. Further, the weight of the proposed new tank needed to conform to the limitations of Germany's secondary road network, whose bridges were designed for loads no greater than 50 tons.³

Political systems and movements as well as budget processes and realities are generally better aligned on the continent than across the Atlantic. Most of Europe is governed by parliamentary democracies and the prevailing mood precludes substantial increases in military spending. There are some significant differences, however. France enjoys a national consensus in security affairs while in Germany there are substantial conflicts between left and right regarding the military and its role.

While it cannot be said that Europe has achieved anything like a common export policy for armaments (for example, the Greens of Germany's ruling coalition are much more restrictive than the French government) European partners share assumptions on the subject and the related issue of third party transfer.⁴ There is generally much less political interest

in what a partner does with equipment that was cooperatively produced. It is treated as a national decision as long as all the partners' commercial interests are protected.⁵ Germany and Italy did not veto the U.K.'s sale of Tornados to Saudi Arabia, for example. In European eyes, cooperation with the U.S. carries the risk of being tied to the caprices of American foreign policy and the associated ponderous decision-making process when sales are considered.

Expectations regarding technology transfer are better aligned among European partners. According to European officials, intra-European programs are much less restrictive regarding technology than transatlantic programs. Europeans tend to cede technology transfer decisions to industrial teams, thus protecting industrial interests.⁶ European partners believe that technology transfer is one of the rationales for cooperation, and indeed, the issue does not seem to be a significant obstacle in European programs.

In both export controls and technology transfer, six European nations (U.K., France, Germany, Italy, Spain, and Sweden) are currently working to completely harmonize their policies. If this be accomplished, it should significantly ease armaments cooperation in Europe.⁷

In most of Europe, once the ruling party or coalition commits to a program, the program funds are virtually guaranteed, even in the out-years. While it is true that the lower houses in the principal European nations review the budget, it is unlikely and would be highly unusual for substantial changes to be made, particularly in international cooperative programs.⁸ Most of these legislatures have their seats apportioned proportionally by party vote, which reduces the tendency toward "pork barrel" legislation. Moreover, continental timelines for procurement are

consistently stretched due to budget pressures. These similarities contribute to a mutual level of comfort and predictability that foster European partnerships.

Related to the above is the disparate practice of contracting on either side of the Atlantic. For development programs, Europeans generally use firm, fixed price contracting and the U.S. typically contracts on a cost plus basis. In the view of one European armaments official, cost plus contracting “amounts to industry solving their problems with our money.”⁹ The European practice is better suited to advancing existing technology, which carries less risk, as opposed to the large-scale application of new technology typically pursued by the U.S. This difference has been worked around in successful transatlantic programs, but remains a persistent hindrance.

Europeans place a great deal of public emphasis on equality among partners as a contributing factor toward the success of a cooperative program. In most transatlantic cases, the U.S. stake is disproportionate, reflecting the needs of a much larger force. This leads to the assumption that the U.S. will dominate the program and ignore the smaller partners’ concerns. It is much easier to find continental collaborators prepared to cooperate on a more or less equal basis. A by-product of the rough equivalency in European cooperation is that the loss of one or two partners does not necessarily doom the project. When France ceased participation in Eurofighter or the U.K. exited from Horizon Frigate, both programs continued. The loss of the U.S. in a cooperative program is normally fatal. Similarly, the exchange of proprietary information, an important goal in European cooperation, is served when partners are of the same stature in terms of technology and capabilities.

Industrial teaming within Europe has matured based on past cooperative efforts. These experiences provide Europeans with a big advantage in future efforts because industrial partners have already built trusting relationships and know who to team with for what. Commercial rules that apply equally to the defense industry in the European Union (EU) require that contracts be open to all EU members, yielding efficiencies gained through competition.¹⁰

An obvious but perhaps overlooked advantage of intra-European programs is time and distance. Despite all the opportunities to communicate afforded by technology, face-to-face meetings are still a major factor in doing business. Many meetings within Europe require no more than a few hours on a fast train as opposed to the eight to eleven hours needed to fly to the U.S.¹¹ The workdays are also nearly eclipsed by the time difference making real-time telephone conversations difficult to achieve.

To the extent that Europeans share a common culture distinct from that of the U.S., there may be a greater level of comfort among Europeans in working together. An active effort to develop social contacts on the part of the NSPO helped neutralize culture as an issue in the Seasparrow program, but the Medium Extended Air Defense System (MEADS) was plagued by an “us versus them” mentality between European partners and the U.S.¹² Language, paradoxically, may also favor intra-European programs as it is easier to communicate in a third language (English) than between native speakers and non-native speakers.

Finally, the U.S. often conducts more elaborate testing of new systems than is generally the case among European nations.^{13, 14} This and the other contrasting policies and habits across the Atlantic cited above do not imply automatic

success for exclusively European cooperative programs, nor do they doom those that span the Atlantic. Even in Europe, national programs are easier than cooperation. They do, however, imply an advantage for intra-European over transatlantic partnerships independent of technical or economic merits, an advantage that may grow with time.

European Procurement Systems

A full and useful description of the primary European procurement systems can be found in *A Comparison of the Defense Acquisition Systems of France, Great Britain, Germany and the United States*, edited by Tony Kausal of the Defense Systems Management College.¹⁵ No attempt is made to replicate that work here, but rather to provide an outline of the salient features and perhaps some insight into European acquisition management.

The acquisition processes employed are not greatly changed to accommodate a cooperative program, mostly because a large proportion of European development is done on that basis. France and Germany, in particular, approach acquisition from a cooperative perspective, and cooperation is part of their organizational culture.

France

The Délégation Générale pour l'Armement (DGA) is the branch of the French Ministry of Defense responsible for armaments development and acquisition. The other two branches are the Joint Armed Forces Staff and the Secretariat for Administration. The DGA was reorganized in 1997, partly to anticipate the emerging realities in Europe, and expressly promotes European cooperation. DGA is now organized along functional lines (program management, industrial activities, testing, etc.)

rather than operational environment (land, air, sea, and space).

DGA is directed by a senior civil servant and its personnel have a hierarchy that is closely akin to military rank. The incumbent is Jean-Yves Helmer, who was an automotive executive and launched the 1997 reorganization of DGA. He emphasizes competitive bidding for prime contracts and competitive selection of suppliers of subsystems and components by the prime, perhaps a result of his background.¹⁶

French defense equipment is categorized under eight "Systems of Forces" such as Long-Range Strike Capacity, Deterrence, and Communication. Each system has a senior member of the DGA assigned who bears the designation of Systems Architect (ASF). Each development program within the system is assigned a DGA program director who is assisted by functional specialists. These specialists remain within their functional areas though they are formally evaluated by the program director.

The program director occupies a critical position, equivalent to the PM in U.S. acquisitions. They are products of a formal and specialized education, expressly intended to produce armaments engineers with a broad base of technical and management expertise. Each has graduated from a school that is in the upper echelon of French higher education (Grandes Ecoles) and that reflects French excellence in, and emphasis of, science and mathematics. Typically, they have experience in several programs, including international cooperative ones.

The stages in France's new acquisition process are illustrated in Figure 5-1. The Preparation Stage is driven by meeting the requirements of a long-term (30 year) plan. The means of doing so are weighed, including purchase, updating legacy systems, and cooperation. The last

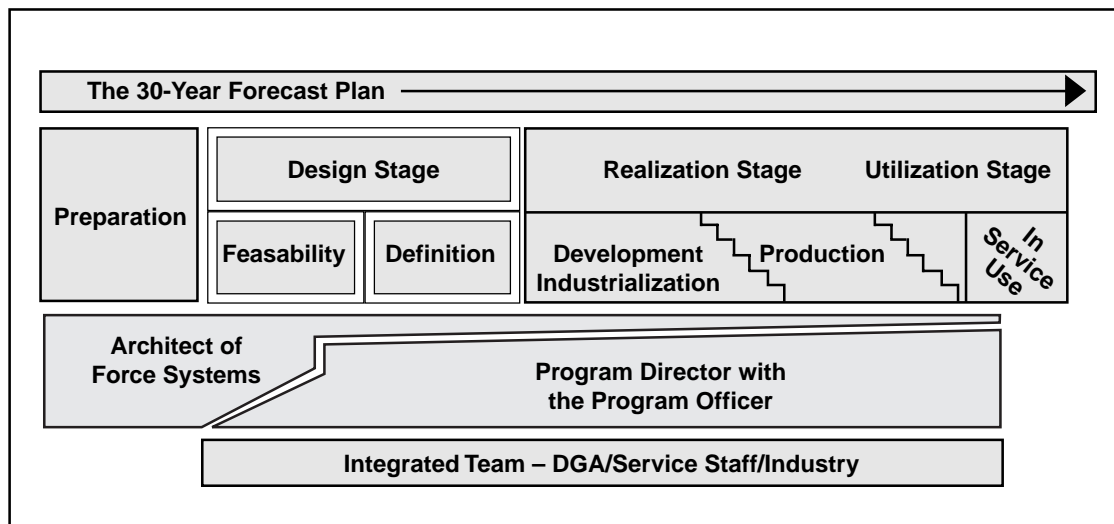


Figure 5-1. The French Acquisition Process

alternative is always emphasized. Reasons not to seek a cooperative solution must be thoroughly explained before a solely national program is approved. The Design Stage sees the birth of the program in that the Minister of Defense makes the decision to commence, the program team takes shape, and industrial partners are selected. At this point, the crucial work of cost determination occurs. At the beginning of the Development Stage the decision to continue with the program is taken and a plan to test and validate the equipment at various points is executed. The final step is the Utilization Stage, when the uniformed service takes possession of the equipment, normally after adequate support and maintenance systems are in place.

The uniformed services share responsibility for armaments development and procurement with DGA. This can be seen in the symmetry between the two in program management. The military counterparts for DGA's ASF (responsible for a Systems of Forces) are an Operational Coherence Officer (OCO) and a Corresponding

Coherence Services Officer (OCEM). The OCO is appointed by the Joint Staff and the OCEM represents one of the Service components. The working level counterpart for DGA's program director is a uniformed program officer. The term coherence refers to avoiding duplication of effort and the maximizing of synergy between the Service components. This is reflective of French emphasis on joint warfighting in an era of limited resources devoted to the military.

Thus the French employ an IPT approach to program management, involving DGA technical and management specialists and uniformed officers in consultation with industry. The roles of each change through the life cycle of a program. Long-range forecasting and the preparation stage are the province of the ASF, OCO, and OCEM. They retain oversight through the design, realization, and utilization stages, though it is the lower level integrated team of DGA, the Service staff and industry, that move the program forward through those later stages.

Germany

The German acquisition system's top level is the Directorate General of Armaments, an organization divided into eight functional areas. One of these, the Armaments Planning and Control Office, has administrative control of the Federal Office of Military Technology and Procurement (BWB), responsible for research and technology, development and procurement of defense material. Three of the remaining offices of NAD perform oversight of the land, sea, and air programs managed by BWB.

The BWB itself has three support divisions and seven technical divisions, each devoted to a category of equipment. These are more straightforward than those evident in the French System of Forces concept. Included are information technology, aircraft, weapons and missile systems, communications, ships and naval equipment, motor vehicles, and general equipment. It is within these divisions that the PMs are assigned, supported by technical and administrative personnel from the support divisions.

PMs typically have technical degrees from civilian universities before beginning their careers at the BWB. While Germany does not have a series of specialized institutions for

armaments design and development, there is formal training for the acquisition workforce. A one-to-two year course, depending on the seniority of the student, intended to provide basic acquisition education is conducted at the Federal Academy for Defense Administration and Military Technology.

Germany categorizes its acquisition programs in a manner analogous to that of the U.S. For programs with development costs over \$10 million (at 2000 exchange rates of approximately two deutschmarks to one dollar) and production costs over \$25 million, a category 1 is assigned and Bundestag (the lower house of the Federal German legislature) approval is needed. Category 2 begins at \$1 million and \$2.5 million respectively and can be approved by the Armed Forces Command. Category 3 programs are beneath those thresholds. Major programs are either category 1, or involve international cooperation.

The life cycle of a German armaments program begins with a series of strategic documents that culminates in the Bundeswehr Plan, which puts forward equipment requirements. This is then integrated into the budget and if approved, the program continues in a phased development process illustrated in Figure 5-2.

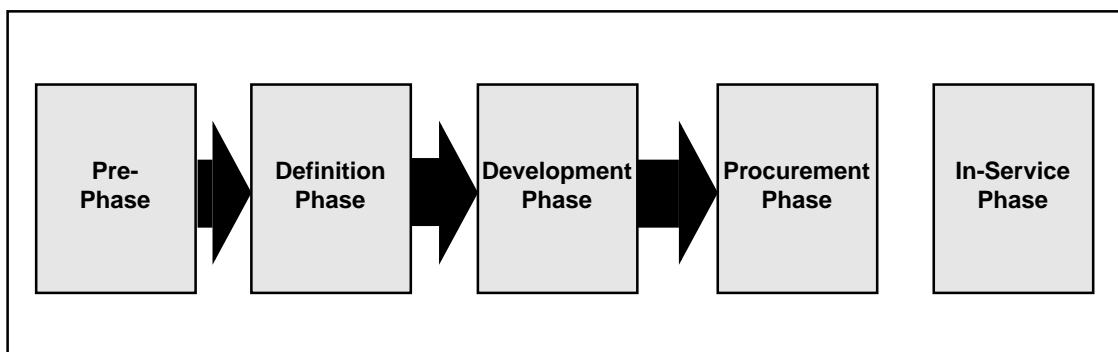


Figure 5-2. German Systems Development Phases

Briefly, the phases begin with the pre-phase, initiated by the military identifying a requirement. Then, along with industry and BWB, alternative methods of satisfying the requirement are explored. Should Germany favor new production, cooperative development is heavily emphasized, a reason why 70 percent of Germany's acquisition is done in concert with other nations.

The definition phase follows incorporation into the Bundeswehr Plan and is the point where project management responsibility passes to the BWB. Specifications are detailed and the management team is established to include the assignments of BWB's PM and a project officer from the uniformed Services. PMs are supported by the division that hosts the appropriate subject matter experts. As in the French approach, there is close collaboration between the BWB and the appropriate Service component in system development. The Germans do not subscribe to IPTs, however, but rather seek consensus within a hierarchical structure.¹⁷

The development phase sees the selection of a prime contractor and concludes with the Service component certifying the system's logistics support and conducting operational testing. Once these are satisfactorily concluded, an "Approval for Production" document sets the stage for the procurement phase. In this phase, the contractor for production is selected and the equipment delivered. The in-service phase is primarily the responsibility of the uniformed Service, though BWB will continue to provide engineering and logistical support. Training and maintenance schemes are developed to sustain effective system operation in the field.

U.K.

The acquisition procurement function of the British armed forces is fulfilled by the Defence

Procurement Agency (DPA), whose chief executive is the Chief of Defence Procurement. The DPA is part of the Ministry of Defence (MoD) and is overseen by the Minister of State for Defence Procurement. There are some 90 Integrated Project Teams in the DPA. Just as under the French DGA, there are 11 groupings of systems, according to type and without regard to Service, that are managed by Executive Directors or Support Directors. These are referred to as peer groups and within them work the project managers for individual programs.

The Labour government of Prime Minister Tony Blair initiated a comprehensive review of defense policies in 1998 termed the Strategic Defence Review. Part of this review was focused on procurement and resulted in the Smart Procurement Initiative. This initiative brought three substantial changes to the manner in which defense procurement is conducted:

- Identification of an empowered "customer" within the MoD;
- Adoption of the IPT approach;
- A streamlined approval process.

Up to this point, international cooperation has not been built into the organizational culture of the DPA or the MoD. The decision to enter a cooperative effort has been based solely on the individual merit of each case in the absence of top-level emphasis on cooperation as in France and Germany. It remains to be seen whether the recent changes will stimulate more cooperation.

The Equipment Capability Customer within the MoD both develops requirements and provides funds for the program. This is a departure from past practices and is designed to encourage trade-offs between cost and capability. It also

increases the incentive to find partners with which to share costs.¹⁸

The program life cycle has also been simplified and is illustrated in Figure 5-3. It begins with the Concept Phase in which different options to fulfil a given mission identified by the MoD are considered. The best of these options are then assigned estimated costs (on a through-life basis) by an embryonic IPT and submitted along with a User Requirement Document for “Initial Gate” approval. This step approves the funds necessary for the Assessment Phase.

In the course of the Assessment Phase the best technical option is chosen, with consideration given to the trade-offs between cost, performance and time. Only designated key performance parameters are non-negotiable. More detailed estimates for life cycle costs are prepared along with a plan to manage the remaining technical risk.

At the completion of the Assessment Phase the “Main Gate” is reached, the second of the two decision points in the U.K. development process. The MoD Equipment Capability

Customer and the IPT leader jointly submit recommendations along with firm development costs, life-cycle costs, in-service target dates, and performance requirements. These are significant as the failure to meet them in the course of development could cause the decision to continue with the project to be revisited. The decision to pass the Main Gate is made based on the merits presented.

The Demonstration Phase includes the selection of the prime contractor for remaining development and production. Design to cost and performance trade-offs are the features of this process. An early form of trials is carried out with models, computer simulations, or prototypes. Equipment trials against acceptance criteria are conducted during the Manufacture Phase. Once successfully accomplished, production commences.

There are two turnovers that remain to be performed at this stage. Throughout development, the MoD Capability Manager acted as customer; once the equipment becomes available to the appropriate force and support is in place, the relevant frontline commander

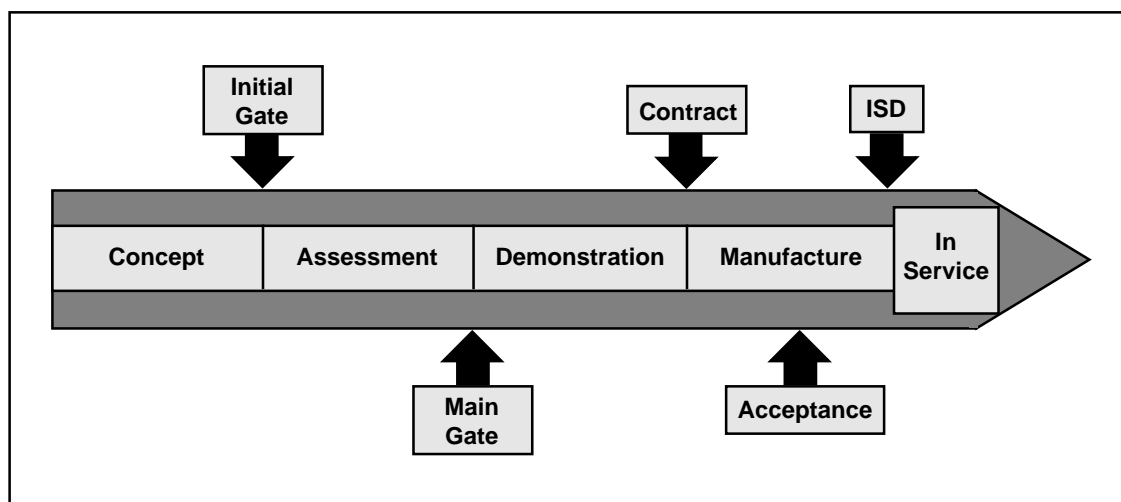


Figure 5-3. British Procurement Phases

assumes that responsibility. The base of the IPT passes from the DPA to the Defence Logistics Organisation with the completion of development, technical risk reduction, and acceptance into service. The point at which this takes place varies considerably with the type of equipment in question. It should be noted that the IPT itself is substantially transformed to conform to the needs of in-service equipment. However, the clear intention is that IPTs should have one continuous existence until the Disposal Phase is completed.

Intra-European Cooperation Efforts

There have been significant intra-European cooperative programs over the past four decades and the experience is instructive. Despite the inherent advantages in limiting the team to Europe, there are some familiar themes in the difficulties encountered along the way. See Appendix J for examples of European cooperative programs and the associated industrial teaming.

Harmonization of requirements has been far from easy in a variety of areas. Geography, history, national aspirations, and equipment replacement cycles all have contributed to diverse requirements among European nations. When France and Germany collaborated on the Transall military transport in the early 1960s, nobody dreamt of the possibility of German troops going as far afield as Somalia. France had the requirement for military transport to West and Central Africa, so Germany ended up with transport capabilities that they did not need.¹⁹ The Jaguar was developed between the U.K. and France as a light fighter-bomber/trainer in the late 1960s. For the U.K., the Jaguar was to be an attack aircraft first and a trainer second. The French held the opposite view.²⁰ The U.K. prevailed and France had an expensive aircraft with more capability than it desired. In fact, the cost overruns for France

were enormous—over 300 percent.²¹ Throughout, efforts to collaborate on tactical aircraft have been complicated by the fact that some European nations have aircraft carriers (some Short Take-Off Vertical Landing, France conventional) and the rest do not.

Most recently, the U.K. withdrew from the Horizon Frigate program in part because the Royal Navy did not need the ship until 2008 rather than 2005, the date projected for France and Italy. This disparity in replacement schedule among the partners led to a lack of common ground for the technical approach to ship design.²²

In the vein of common requirements, it should be borne in mind that European nations have in their present inventories a wide variety of aircraft purchased in the 1960s and 1970s. The dates at which these need to be replaced vary, another complication to aircraft collaboration. An advantage held by the U.S.-led Joint Strike Fighter (JSF) in seeking collaborative partners, by contrast, is that it is a timely replacement for all the nations that coproduced F-16s, a very successful program. (See Chapter 4 for details.)

Some types of equipment lend themselves more easily than others to accommodating different variants and thus, differing requirements. The NH-90, a helicopter being cooperatively developed between The Netherlands, Germany, France, and Italy will have two mission variants that will satisfy the naval and ground forces needs of all the partners with plenty of capacity for further individual tailoring. The NH-90 will have an all composite hull and be the first operational helicopter to use fly-by-wire.²³

The long lead times of European procurement programs, often a result of budget constraints, have created other problems in cooperation. A good example is the Eurofighter, whose origins

can be traced to the early 1970s. Over such a long period of time, circumstances inevitably change, causing arrangements to be adjusted accordingly. Eurofighter followed the typical arrangement of tying work share to off-take. In 1986, when the project first took the form that is recognizable today, the shares were the U.K. 33 percent, Germany 33 percent, Italy 21 percent, and Spain 13 percent. Nine years later, all four partners had reduced their orders by different proportions. However, it was not possible to reformulate the work share strictly by the new numbers for technical industrial reasons at that stage of development. After some difficulty, a new work share arrangement of 37/30/20/13 was agreed to when Germany committed to 40 additional aircraft.²⁴

Production of the Eurofighter was also delayed by the complexity of the consortia arrangement by which development was conducted. The four national airframe manufacturers (BAe, DASA, Alenia, and CASA) and engine manufacturers (Rolls-Royce, MTU, FiatAvio, and ITP) formed Eurofighter GmbH and EuroJet Turbo GmbH respectively. The principle of unanimity governs their decision-making, making it difficult to reach flexible, disinterested solutions to the problems that inevitably arise.²⁵

Focus on work share can lead to absurd outcomes as the case of the 27mm cannon for the Panavia (Germany, U.K., and Italy) Tornado illustrates. Each nation had its own assembly line for the aircraft. The cannon was manufactured by Mauser in Germany, assembled and tested, dismantled, then shipped as a kit to England where it was reassembled for installation in the U.K. production line.²⁶ Hence, work was duplicated solely to meet work share requirements.

Quality of work is a factor that both complicates work share negotiations and causes

inefficiency. European national champions involved in collaboration typically bid for work that will give them valuable experience in a new area, rather than accept an assignment based on comparative advantage. In the Tornado program, Germany insisted on developing the center section of the fuselage which included the mechanism for the variable geometry wing, work for which the U.K. partner was clearly more competent.²⁷ Quality of work concerns will be reduced if the more ambitious vision of OCCAR is realized and national stakes are spread across programs. Thus, a country that receives less than its normal fair share of work in one program will be compensated for this difference in other programs.

Intra-European cooperation does not take place in a vacuum. European partners often have significant relationships with firms in the U.S. and Asia. Because of those ties, some of the technology that they possess may not be transferable within Europe. One area in which the U.S. holds a generally acknowledged lead is stealth technology. Because of the special relationship between the U.K. and the U.S. in recent decades, there has been a considerable amount of sharing of this information. (Discussion of U.S. security procedures, export controls, and technology transfer can be found in Chapter 2.) Consequently, in the process of laying the foundation for collaboration, it has become an issue between France and the U.K. to develop a stealthy, long-range strike aircraft. The U.K. MoD instructed BAe not to share any stealth research with the French, constituting an early stumbling block in the program.²⁸

Notes

Cooperation in Europe is evolving. Concern over work share is said to be diminished in the Franco-Italian Horizon Frigate Program, ushering in a new era for the EU. Horizon is also

maximizing off-the-shelf equipment and minimizing that furnished by the government.²⁹ According to Peter Watkins, Finance and Secretariat Director for the Eurofighter and Tornado programs, artificial industrial consortia are being discouraged in European cooperation in favor of one company from one country taking a leading role and acting through subcontracting or a joint venture arrangement.³⁰ European industrial consolidation promises to make this easier. OCCAR's (see Chapter 3)

future as a vehicle for intra-European cooperation is not yet clear as the organization is only a few years old. Certainly the concept is sound in that it addresses some key challenges such as work share. At present, however, no significant new programs have been consigned to it. Finally, a reduction of funds committed to new programs and those already in existence is likely to retard arms cooperation within Europe generally.

ENDNOTES

1. Interview with a U.S. officer assigned to armaments liaison in Europe (March, 2000).
2. Interviews with German armaments officials (March 7-8, 2000).
3. *Collaborative Development of Main Battle Tanks: Lessons from the U.S.-German Experience, 1963-1978*, Defense Technical Information Center technical report (Alexandria VA, February 1984).
4. German interviews.
5. Interviews with French armaments officials (March 2-3, 2000).
6. German and French interviews.
7. Douglas Barrie, "European Giants to Unify Industrial Policies," *Defense News*, Vol. 15, No. 15. (April 17, 2000).
8. German and French interviews.
9. German interviews.
10. French interviews.
11. Ibid.
12. Interview with a U.S. acquisition official (April 2000).
13. French interviews.
14. Alan Childress and James Larson, "A Case for International Cooperative Acquisitions," *Acquisition Review Quarterly* (Fall 1998), p. 366.
15. Gertrud Humily, Peter Roller, and Trevor Taylor, *A Comparison of the Defense Acquisition Systems of France, Great Britain, Germany, and the United States*, ed. Tony Kausal (Fort Belvoir, VA: DSMC Press, September 1999).
16. Robert P. Grant, "Transatlantic Armament Relations Under Strain," *Survival*, Vol. 39, No. 1, International Institute for Strategic Studies, Oxford University Press (Spring 1997), p. 126.
17. Interview with a European national armaments representative at NATO headquarters (February 28-29, 2000).
18. Interviews with U.K. armaments officials (March 9-10, 2000).
19. Mark Lorell and Julia Lowell, *International Weapons Procurement Collaboration* (Santa Monica, CA: National Defense Research Institute, Rand Corporation, 1995), pp. 26-27.
20. Ibid, p.25.
21. Ibid, p.18, table 1.
22. French interviews.
23. French interviews.
24. "Eurofighter Typhoon," <http://www.pso-online.businesswebworks.com/aircraft/Eurofighter/history.html>.
25. Peter Watkins Speech at European and Transatlantic Armaments Cooperation Symposium (Fort Belvoir, VA: DSMC, June 11, 1996).
26. Guy Challands, *Sense About European Defence: Affordable Interoperable Arms Procurement Through Collaboration?*, Fellowship Paper, St Antony's College, Oxford (December, 1999), p. 15.
27. Lorell and Lowell, p. 14.
28. Nick Cook "Europa," <http://pollux.com/defenseweb/1996/may96/europa.htm>.
29. French interviews.
30. Watkins speech.

PART III

**FINDINGS
AND
CONCLUSIONS**

6

FINDINGS

*“Success is not final, failure is not fatal;
it is the courage to continue that counts.”*

— Winston Churchill

Time

Time is working mostly against the prospects for meaningful transatlantic cooperation. Despite some countercurrents, there are significant trends in evidence that could mitigate against the U.S.’s initiating new cooperative programs with European partners.

Perhaps the most powerful single trend is European consolidation in the form of the European Union (EU). This should be viewed as not just an economic and political phenomenon, but a cultural one as well. The European movement (or project as it is often termed) draws a great deal of emotional energy from the notion of a shared identity, distinct from that of the U.S. Though not unanimous, it is a sentiment shared from the man on the street to the highest levels of government. Transatlantic disputes, particularly those with a moral component such as hormone-enhanced meat or trade relations with developing countries, resonate in the European public. The political coalitions that give those concerns voice have traditionally been more skeptical of military

relations with the U.S. and they have assumed power in the EU in the wake of the fall of the Berlin Wall and diminishing security consciousness. This is an environment where arguments for cooperation based on interoperability or a gesture of transatlantic solidarity will carry less influence.

The current generation of European leaders is more marked by the anti-war movement of the late 1960s than by U.S. aid in the immediate postwar era. Additionally, the status of the U.S. as the sole remaining “superpower” has raised fears and suspicions. French Foreign Minister Hubert Védrine refers to the U.S. as a “hyperpower,” which is not to be understood as a compliment.¹ Indeed, France often exercises its leadership within the EU at cross purposes to the U.S. Felix Rohatyn, U.S. Ambassador to France, recently said that European anxiety over American power “negates the notion that our interest is also in their interest. It creates the totally opposite point of view—that only the weakening of America can be good for them.”² Less dramatically, but perhaps equal in importance is a diminishing commitment to

atlanticism among mid-level officials in Europe. Within most European professional military establishments, there is still a preference for strong transatlantic ties including armaments cooperation, but it is countered by strong political pressure to go European.³

It could be argued that the economic rationale for armaments codevelopment remains, albeit the mutual political impulses and military justifications are somewhat weakened. However, with the continuing integration of Europe and its defense industry, partnering among Europeans promises to become easier for the reasons set forth in the previous chapter. Though the track record of intra-European cooperation to date is uneven and the continent's military R&D spending is only a fraction of that spent by the U.S., it is undeniable that the continent is overall becoming more technologically and industrially capable. The world's growing fleet of Airbus airliners, produced by a consortium of aerospace companies from four European nations, proves that. The example of Airbus, subsidized by its parent European nations, is likely to be seen in the short run as a lesson that a cost will have to be paid to foster European capabilities. Hence, future cooperation with the U.S. may have to be significantly more attractive than an exclusively European alternative to overcome the impulse to nurture Europe's own capabilities. Currently, programs that provide technology transfer from the U.S. to Europe are still attractive. (See Chapter 4.) Despite growing European technical and industrial capabilities, there is a significant gap in defense technology that was demonstrated in the Balkans.

The Atlantic alliance was built specifically to counter the Soviet threat. Allied forces were, therefore, oriented and equipped to counter heavy, mechanized forces in intense ground combat. With the dissolution of the Soviet

Empire, there has been a divergence of strategic orientation within the alliance. Since World War II, the U.S. has maintained significant deployable forces designed to deal with worldwide contingency operations, although its ground forces only recently moved to strengthen their ready reaction capability. France maintains some force projection capability and plans to move further in that direction with the goal of being able to deliver and sustain a force twice the size that she put into place during the Gulf War.⁴ The U.K. is planning the construction of new conventional aircraft carriers in a move to improve its own global reach. In both cases, unfortunately, progress will be severely constrained by resources. Other European nations are unlikely to pursue power projection as a goal. In the midst of such a divergence of missions, the likelihood of finding common requirements (the basis for cooperation) is diminished. The transatlantic gap in power projection capability revealed by the Balkan conflict might have prompted Europeans to seek closer alignment with the U.S. Rather, performance in the Balkans is viewed as proof of the need for an independent European capability as set forth at St. Malo in 1998. The recent NATO Defense Capabilities Initiative (DCI) has the potential to provide common ground for defense equipment initiatives. However, within some European circles DCI is viewed as yet another U.S. attempt to promote the development and procurement of equipment that will primarily benefit U.S. industry.

Cooperative R&D can set the technological base for cooperation and development and establish the dialogue to go forward. Recent trends in downsizing cooperative R&D organizations, in conjunction with overall DoD downsizing due to budget pressure, will potentially reduce future armaments cooperation. With fewer people available to explore and coordinate these activities, resulting development

programs will correspondingly diminish. This outcome seems likely in the context of defense spending trends on both sides of the Atlantic.

There continues to be some high level support within the U.S. DoD for increased transatlantic cooperation and there is some reason for hope, given developments such as the recent Declaration of Principles for Defense Equipment and Industrial Cooperation between the U.S. and the U.K. Individuals on both sides of the Atlantic are alarmed at the prospect of a split between the two camps and the formation of military-industrial “fortresses,” with newly created defense giants on both sides exacerbating the competition for sales in the developing world. More ominously (for some), the resulting friction could seriously undermine the NATO Alliance. With the end of the Cold War and continuing high unemployment in Europe, however, the transatlantic dialogue over arms increasingly assumes the form of a conventional trade dispute. Moreover, Congress lacks the champions of internationalism who at one time were able to gather bipartisan support for transatlantic initiatives. Taken together, an environment is created that is not conducive to cooperation.

Reputation

The U.S. has acquired a reputation as a difficult partner in armaments cooperation. This is a view held nearly universally among European PMs and other officials in acquisition circles, though the impression is stronger for some than for others.

The difference in scale between U.S. and European partners leads to U.S. dominance in most transatlantic cooperative programs. European partners often have less influence because of much smaller production shares. Consequently, European interests are sometimes

ignored or inadequately addressed. In the same vein, it is also widely felt that the U.S. is unwilling to compromise in the important area of military requirements.

Technology transfer and third party sales are problematic aspects of cooperation with the U.S. that have no equivalent in intra-European collaboration. Europeans see the U.S. as unduly restrictive in both areas, and a sharing of technology is an important result of cooperation for them. Europeans feel that they should no longer accept “black boxes” from the U.S. and should insist on treatment as full partners with unrestricted access to technology involved in the program. Third party sales are a desired method of recouping costs and the U.S. exercise of veto power over those sales is deeply resented. This same control at the component level causes concerns over security of supply. The admonition of Manfred Bischoff, CEO of DASA, to find European suppliers to back up U.S. components is widely referenced.⁵

The bureaucratic process by which export licenses and TAAs are generated is roundly criticized. “The State Department is the problem; even the U.S. suffers from it,” according to one official.⁶ The time it takes for approvals is seen as a major obstacle to smooth cooperation.

Aggravating the aura of unpredictability in a transatlantic cooperative program is the uncertain and convoluted U.S. budget process and the penchant for Congress or the military services to reduce or cut funding for a program with little or no regard to what are seen as international obligations. The recent funding cut of the FSCS/TRACER program by the U.S. Army is the most current example. Europeans consider commitments made in cooperative programs as contractual and are vexed by the uncertainty of U.S. funding.

Europeans often perceive a difference between what they hear from high ranking U.S. officials and the attitudes of lower ranking personnel in program management. They readily quote senior members from the DoD, but say the grass-roots effort rarely matches the rhetoric. One official put it thus: “We are tired of hearing about interoperability. We want to see some results.”⁷

Europeans cite an attitude among Americans that Europeans are underfunded, unprepared, and unable to make meaningful contributions.⁸ This contributes to the suspicion that cooperative programs are often paralleled by black programs. The fear is that if a black program succeeds, the U.S. then withdraws from cooperation. The MLRS TGW and BAT programs are a case in point. (See Chapter 4.) Europeans consequently lack confidence that a cooperative effort undertaken with the U.S. will be followed through in good faith.

The U.S. is seen as unpredictable and sometimes inscrutable. During recent collaborative development of the GMLRS rocket the reasons for the U.S. prime contractor’s rejection of EU subcontractor bids never became clear to the European partners.⁹ There was a similar reaction to the lack of explanation for the modifications the U.S. “mandated” for the MIDS.¹⁰ Generally, the U.S. is seen as not understanding the European viewpoint.

Harmonization Problems

The difficult process of harmonizing requirements does not promise to become any easier without significant changes. Even after political and economic concerns are satisfied, the very foundation of cooperation, addressing a common need, remains. The successful programs examined closely in this study reveal the extent of this challenge.

A fundamental problem of requirements harmonization is that each nation has a unique history and set of circumstances and hence, differing military requirements. This fact is reflected in tactical doctrine. The example of the abortive MBT-70 program (discussed in Chapter 3) shows how two different doctrines are sometimes not reconcilable in a collaborative project. German notions of firepower were built on the assumption (based on experience) of intense engagements at relatively short range, which clashed with the U.S. desire to prevail at longer ranges. Armament was thus a source of disagreement, significantly contributing to the program’s demise.

Moreover, the national process by which military requirements are agreed upon is often lengthy and difficult, involving much high-level dialogue. Those officials who discuss and consider requirements with potential partners are generally not the same national authorities that approved them in the first place. There is, therefore, reluctance to go back to the drawing board and refer issues back to the original authority. The tendency is to avoid compromise.

In reality, unless two or more parties are perfectly in agreement, compromise is essential in cooperation. Some situations are easier than others. Undoubtedly, the ubiquitous cruise missile threat that emerged in the late 1960s gave not only a sense of urgency, but also an advantage in harmonizing requirements to both the NATO NSSMS and the RAM programs. (See Chapter 4.) The participants faced the same threat in the same environment (salt water). Naturally, additional desired capabilities and differing platforms needed to be taken into consideration, but those challenges are not the same as trying to reconcile several different missions or several different doctrines.

Attempts so far—aimed at systemically improving the harmonization process—have not been very successful. The CNAD has facilitated some scattered efforts, but given the composition of NATO and the threat faced prior to 1990, the full potential was—and still is—far from realized. The lines of communication between allied armaments authorities have been kept open but CNAD lacks the authority to induce armaments cooperation. It remains to be seen whether the recent NATO Armaments Review and the fallout from the Kosovo crisis will enable CNAD to realize a greater degree of collaboration in allied armaments. The NATO Armaments Review is expected to provide a top-down focus on priority areas for armaments cooperation, improve coordination of cooperative opportunities at NATO headquarters, and increase the visibility of those opportunities through an expanded database of allied military requirements. These efforts are aimed at easing the harmonization problem preemptively.

ICOG's purpose is similar to that of the CNAD, though its membership is limited to the largest NATO nations in terms of defense spending, the U.S., France, U.K., Italy, and Germany. It has been in existence for four years, perhaps not enough time for a fair trial of its ability to promote cooperation. Nothing substantial has been achieved so far.

All three military services have maintained international cooperative R&D offices that have been only minimally effective in spurring the give and take essential to harmonizing requirements. Recent reductions in staffing of cooperative R&D offices only make the prospects for progress in harmonization more remote.

The progress that can be made in ongoing projects within program offices is evident. The NATO Seasparrow Project Officer (NSPO) and

RAM Project Office (RAMPO) are both headed by U.S. Navy captains with staffs at the O4-O5 level. The day-to-day working relationships in those offices have often produced the trade-offs essential to success. The follow-on programs that developed out of the MLRS and F-16 programs are also examples. (Further discussions can be found in Chapters 4 and 5.)

Perhaps the most successful harmonization efforts have been selective mid-level discussions. Examples include the agreements reached in the FSCS/TRACER and LW155 howitzer digitization programs. At the U.S. (or U.S.-equivalent) O-6 level, participants have the right combination of experience, specific expertise, and influence to understand challenges encountered, to propose harmonized solutions, and to realize them. Colonels or their equivalents are the most senior officials normally dedicated full-time to an individual program, so close working relationships form and trust is established. Though these professionals cannot normally bind their respective governments, they can determine if the military requirements of their nations are common enough to justify a cooperative program. At the mid-level career plateau there is often field experience with similar equipment and a degree of follow-through. Some officers have worked on the program in earlier stages, acquiring technical expertise, and are often in a position to influence harmonization decisions favorably through their credibility. The personal commitment to make the extra effort required to earnestly pursue international cooperation has often been the crucial factor in reaching common requirements.

Standardization of the format by which requirements are set forth, at least on a NATO basis, can render similarities and differences more clear and aid in identifying areas for cooperation. The U.S. has mandated that all DoD

components follow a standard format for requirements documents. (See Chapter 1.) It is hoped that this will aid harmonization among U.S. Service components and smooth the path toward the creation of joint programs. The methods by which requirements are determined can also be standardized. Modeling and simulation could be aligned as well as the set of assumptions (threat, munition effects, environment, etc.) from which requirements are derived.

The fact that harmonization is a difficult process mitigates against an Airbus scenario for Europe's defense industry. Airbus is able to produce airliners that are competitive with those produced by Boeing because the effort is supported by a large global market with common requirements. European national defense requirements are still different enough to preclude the development of a standardized product line that meets the needs of all nations.

Though harmonization generally presents a difficult problem in cooperation, there are programs that deal with it successfully. Yet the potential to reach mutually agreed-upon requirements has not been realized. An exchange of ideas is inherent in the process and a degree of compromise is usually required to arrive at common requirements.

Difficulty of Cooperative Programs

Cooperative programs are hard but achievable. It is obviously easier to serve one master than to have to accommodate the needs, business practices, and personalities of several different nations. However, given strong shared objectives, these and other obstacles can be overcome.

Harmonization is addressed above and in Chapters 1 and 4. All the forms of consensus

decision-making are more time consuming and difficult. A key component to success, and one that cannot be over emphasized, is the human dimension—the right people in the right positions. Failure or success is often the result of leadership since a special quality of that attribute must be exercised in a situation where the lines of authority are ambiguous. It is essential to international cooperation that people who are flexible enough to see the value in compromise be led by those with the skills to build a consensus. (See Chapter 4.) NSSMS is one example, but the point is that even with needs perfectly aligned and an ideal management arrangement, the program will fail without mature, dedicated leadership.

Program security is always a challenge and requires extra effort in a cooperative program. The boundaries need to be clearly set forth in the program's governing documents and the procedures outlined in Chapter 2 adhered to. The key is to start the security process early and to ensure that the rules are communicated to all concerned.

Export licenses and disclosure authority should be similarly approached. (See Chapter 2.) Although time-consuming, there is a designated path and it eventually produces results. Smoothing the export license process has been described as the "number one thing in the DoD," so there may be improvement in the near term.¹¹ Great care must be exercised not to give cooperative partners false impressions regarding the technology to be released and the timing.

Although industrial teaming is not unique to international cooperation, it can sometimes take on some added dimensions. The objective is to form a more responsive and efficient relationship. There are nearly always the issues of work share, industry benefits, and the politics

associated with them. Over the years, certain conventions have been formed (work share equal to cost share, etc.) and the arrangements should be clearly defined in the governing document. Examples of industrial teaming arrangements are provided in Chapter 4.

Differences in contract types (fixed price vs. cost plus) and acquisition systems (phase, IPTs, performance specifications) must be accommodated, as discussed in Chapter 5. In the successful programs examined, each had to tailor an approach to fit the circumstances.

There are developments that may ease some of the challenges of international cooperation. The introduction of the euro will help address currency fluctuations for programs with several European partners even if it does not eliminate the problem. (Further discussion in Chapters 3 and 5.) In addition, some bureaucratic initiatives may bear fruit. The new acquisition phases introduced by the proposed update of the DoD 5000 series of acquisition regulations, if approved, will be more flexible and permit better alignment with international partners. Nevertheless, international cooperation will always present a unique set of problems that only an early and thorough approach can successfully address.

Accepting that the cases cited in Chapter 4 were largely successful, their treatment of potential problem areas bears recapitulation. Military and programmatic requirements were successfully harmonized. Industrial teaming was an attention area in all cases, usually aided by thoughtful leadership and an ethos of teamwork. An adaptive, responsive management structure anticipated and enabled resolution of tough issues. Technology transfer aspects were thought out largely in advance and benefited from unambiguous treatment in the program MOU. Creativity in developing the unique

business management practices for cooperative programs led to functional financial and contracting processes. Industrial partners were often a resource to solve tough problems.

Cooperation is indeed doable, if entered into with all partners fully informed of the potential problem areas that must be anticipated.

Lack of Incentives

While there is generally high-level support for armaments cooperation, the military services and PMs lack incentives to seek that route. This is a clear difference across the Atlantic in many countries and perhaps the major reason that the U.S. engages in so few projects of this kind. Interoperability and coalition building are persuasive arguments in the abstract, but it is hard to quantify and measure progress at any level.

There is no carrot, and neither is there a stick. Although consideration of international opportunities is required by law (see Chapter 1), the possibility is not emphasized at program decision reviews. Only in rare instances does a PM have to seriously defend the proposition that the program would not benefit from international cooperation. The 1996 Defense Science Board recommended that “administrative procedures that require acquisition executives and program managers to demonstrate attention to international opportunities should be required.”¹² There is no evidence to date that this recommendation has been effectively acted on and the proposed update of DoD 5000 series of acquisition regulations places even less emphasis on international cooperation.

In an era of budget consciousness, the military services are particularly diligent in seeking savings in all stages of the acquisition process. The problem with cooperative programs is that

the actual savings are difficult to quantify. Even though cooperative development programs cost more in total than solely national development efforts, dividing development costs among partners normally produces at least some savings for each participant. The exceptions are when one partner pays for the majority of the effort, as the U.S. has sometimes done, or when excessive gold plating of requirements dramatically drives up the program's cost. Promised production cost savings based on greater economies of scale have almost always been negated by government-driven national work share apportionment and less than optimal industrial arrangements. Recently, life cycle logistics costs have been given more attention in DoD, but it remains to be seen what this will portend for international cooperation. Hence, the significance of whatever cost savings are expected must be carefully weighed against the difficulties that cooperation will bring.

From the PM's perspective there is little incentive to expose him or herself to the added difficulties of an international program. PMs are evaluated by the cost, schedule, and performance of the programs they manage. Cooperative programs inherently take longer for reasons already discussed. The likelihood of a schedule slip due to technical or industrial problems is greatly increased with additional contributors. Additionally, despite the potential for cost savings, international cooperative programs carry a greater risk of baseline cost increases. Finally, there is likely to be greater difficulty in meeting performance parameters in order to satisfy all concerned. Cooperative programs are not recognized as a distinct case, however and while the PM involved in a cooperative program usually has significantly less of the control enjoyed in a national undertaking, he or she is evaluated by the same criteria.

Correcting the structure of incentives for cooperative programs will require a substantial and coordinated effort. The DSB recommended career incentives for the best in the field, much as is the case for joint assignments in the Services, and public awards for those who succeed internationally. Assignment of personnel with international experience is also advocated, though the development of that particular pool of talent, given the low rate of cooperation, will be difficult. Perhaps even more challenging will be to endow U.S. participation in international cooperative programs with the same funding stability enjoyed by intra-European partners. Finally, PMs need the assurance that their performance will be judged by criteria relevant to an international program.

Motives to Cooperate

U.S. participants should recognize that in many cases their motives for cooperating with an international partner may be very different from those of their partner(s). Development cost savings are always a reason to cooperate, but for U.S. programs it is really only a motive if it is a low priority effort. This is probably not the case with international partners. In most instances, the only way they can afford even their highest priority programs is through cooperation. Political reasons, such as furthering NATO unity, may be a strong reason for collaboration from the U.S. point of view, but probably will not carry as much weight for Europeans. Conversely, political reasons are one of the strongest drivers of intra-European cooperation. Technology is the principal attraction for many Europeans to cooperate with the U.S. Each program will have its own particular set of motivations on either side and the PM who is aware of them will be much more effective.

Organizational Culture

The U.S. does not have an organizational culture that is conducive to international collaboration. As noted above, these programs face difficult challenges, including harmonization of requirements (especially in the current era of an uncertain threat) and cooperative program management. An ineffective organizational culture combined with these challenges has aggravated the bad reputation of the U.S. as a cooperative partner, as discussed earlier. Much of the organizational culture problem lies within DoD, particularly in the lack of effective emphasis on or incentives for cooperative involvement. Although DoD officially has policies that are fully supportive of cooperative programs, they are not rigorously pursued. As one OSD official explained, “There is lots of cheer-leading for cooperative programs but very little championing of cooperative programs within OSD.”¹³ Another OSD official stated that although the U.S. says it wants maximum cooperation publicly, in most cases it really doesn’t want or need to cooperate.¹⁴

Any cooperative venture adds complications and to some degree ties the hands of the U.S. on future prioritization decisions. In the past, the DoD and the Services have not always been supportive of cooperative programs when difficult funding prioritization decisions were required. In many cases, these types of funding choices were made by the individual Services and DoD did not make the extraordinary effort

needed to override them. The result is an attitude within DoD and the Services that is it acceptable (although not good) to cut/eliminate funding for cooperative programs. Likewise, the failure to enforce effectively the policy requiring serious consideration of international cooperation at the start of a program has resulted in the policy’s being generally ignored.¹⁵ This is especially true because the challenges in harmonization of military requirements and program management that must be overcome to successfully cooperate add significant complexity for PMs who are taxed enough in U.S.-only programs. The few collaborative arrangements that result lead to a thin pool of U.S. international expertise to draw on when considering future cooperative opportunities. This lack of experience combined with little education in cooperation results in ignorance in the acquisition work force regarding international cooperative programs.¹⁶ Hence, the U.S. finds itself in a cycle that is hard to break.

Barriers to cooperation within the U.S. government, but outside DoD, reinforce the culture that ignores international opportunities. PMs and others in the acquisition workforce receive little encouragement from the daunting prospect of dealing with the bureaucracies of the Departments of Commerce and State, not to mention congressional budget issues. Moreover, cooperation for US personnel is difficult since they are not normally “internationalists.” Americans rarely speak other languages, know other customs, or the history of other nations.

ENDNOTES

1. John Vincour, "France Has a Hard Sell to Rein In U.S. Power," *International Herald Tribune* (February 6, 1999).
2. William Pfaff, "Falling Out Over European Defense," *International Herald Tribune* (April 13, 2000).
3. Interview with a European officer with extensive experience in armaments cooperation with the U.S. (January, 2000).
4. Gordon Adams, *Convergence or Divergence?: The Future of the Transatlantic Defense Industry*, Research paper, Elliott School of International Affairs, The George Washington University (February, 2000).
5. Interviews with German armaments officials (March 7-8, 2000).
6. Interview with a European national armaments representative at NATO headquarters (February 28-29, 2000).
7. Interviews with German armaments officials (March 7-8, 2000).
8. Interview with a member of the NATO International Staff (February 28-29, 2000).
9. Interview with French armaments officials (March 2-3, 2000).
10. Ibid.
11. Linda De France, "Export Process Reform is Cohen's Number One Issue, DoD Official Says," *Aerospace Daily* (April 12, 2000).
12. *Report of the Defense Science Board Task Force on International Armaments Cooperation, Summary of Task Force Recommendations* (August, 1996).
13. Interview with U.S. DoD official by the authors.
14. Ibid.
15. *International Cooperative Research and Development Program, Audit Report by the Office of the Inspector General*, DoD, Report Number. 98-121 (April 27, 1998), pp. i,ii.
16. Survey of intermediate level acquisition students at the Defense Systems Management College (DSMC) conducted in April 2000 by the authors.

7

CONCLUSIONS AND RECOMMENDATIONS

*“Even if you are on the right track,
you’ll get run over if you just sit there.”*

— Will Rogers

Transatlantic cooperation is worthwhile and should continue to be pursued.

Despite all the currents working against international armaments cooperation, the fundamental reasons for engaging in it are sound and remain intact.

Armaments cooperation constitutes a substantive and symbolic tie between the U.S. and its allies. A successful collaborative defense effort builds trust in a meaningful sense and proves to the world that we share security interests. The common or compatible systems that flow from transatlantic cooperation make NATO a more effective fighting force. MIDS is a good recent example of a system developed through collaboration, one that will allow allied pilots to communicate in future scenarios similar to Desert Storm or the Balkans. Interoperability is essential for allies to share the field. Perhaps the biggest public selling point for the pooling of effort in armaments development is cost, though the benefits are elusive in practice. As

development costs grow out of proportion to defense budgets, however, the potential for cost savings that cooperation offers cannot be ignored.

Important as RSI are, the most important single reason to engage in transatlantic defense cooperation is to help ensure the continued viability of the NATO alliance. Close military cooperation, to include collaboration in the development and production of armaments, is the glue that keeps the alliance intact. This is all the more true with the collapse of the Soviet Union. RSI was never achieved, even at the height of the Cold War, but alliance unity was served by cooperation. The operational incompatibility of allied forces in Kosovo underscored the importance of interoperability, however, and may help drive future transatlantic cooperation.

Should cooperation be abandoned or allowed to die on the vine, NATO allies will become competitors in a race for arms sales—in many

cases to unstable nations that may use their arms in regrettable ways. Acrimony between the EU and the U.S. will erupt and contact will weaken. In some ways this has been foreshadowed by transatlantic trade tensions. However ...

The objectives of cooperation are only served by successful undertakings.

A failed program is worse than no program at all. The resentments that are bred through the failure of a cooperative project linger at all levels. Most important, the well for future cooperation is poisoned and the resulting suspicions may spill over into other areas of policy. The result will be missed opportunities and isolation in security matters. The longer the situation persists in which European allies have their negative perception of the U.S. as a partner reinforced, the more difficult future undertakings become.

Successful programs, however, often yield additional cooperative opportunities in the form of follow-on efforts. Several of the programs reviewed in Chapter 4 demonstrate this. The over thirty-year history of NATO Seasparrow has seen successive improvements to the missile and the project office continues to serve as an incubator for, and an example of, NATO cooperation.

In order to replicate this success ...

Cooperative programs must be carefully selected with a view toward long-term success.

If the U.S. undertakes cooperation as a hedge against the failure of a parallel program, the chances of that cooperation coming to fruition are low. The system in consideration must fill an important need and the date on which the requirement needs to be filled for all partners must comport with the program's projections.

It must be reasonably likely that the expectations of all partners will be met. Technology transfer and work share issues need to be surmountable. Preliminary cost estimates must have solid footing in the U.S. budget and a firm commitment of support made by the DoD. Funding for the entire cooperative program should be planned, programmed, and budgeted as a prerequisite to signing an MOU.

Despite trends against transatlantic cooperation, there will be opportunities as long as a technology gap exists.

The large disparity in R&D spending across the Atlantic (a three or four to one advantage in favor of the U.S. – see Figure 3-2), creates an incentive for Europe to seek cooperation with the U.S. According to Secretary of Defense Cohen, Europe seeks to “free-load” on U.S. defense spending. This applies to technology investments, and indeed, Europe is not likely ever to invest enough in R&D to close the technology gap. The numbers may understate the problem as Europe's R&D is divided between several nations which results in duplication of effort. This is not a question of capability but one of commitment of resources. It is one reason why black boxes are so disliked by European partners. It is also why, when making equitability decisions, the DoD Comptroller is steadfast to quantify the nonfinancial contributions (i.e., technical data) that partners bring into cooperative programs.

On the other hand, cooperative R&D efforts serve as the foundation for future cooperation. At a minimum, R&D produces exposure to and understanding of technologies developed among the transatlantic allies. This is a two-way street; although the U.S. holds an edge in technology overall, there are areas in which some European nations hold an advantage. With a better mutual understanding of technology, the

prospect of defining interoperable standards (such as STANAGS) improves, as does the technical basis for harmonization of military requirements. The trend of diminishing staffing for cooperative R&D activities should be reversed, sending the signal that the U.S. is serious about the future of transatlantic defense cooperation.

The U.S. needs to develop an organizational culture that supports international armaments cooperation.

The pursuit of a cooperative program in the U.S. DoD and Services is a lonely endeavor. There are many supportive statements from senior leaders and even official policies, but the fact remains that international cooperation is not a central concern in the realm of acquisition. For many years an organizational culture that is unfavorable toward cooperation has existed for the understandable reason that people within DoD or the Services value only those things that the leadership emphasizes and actively expresses interest in. That usually hasn't been the case regarding armaments cooperation with U.S. allies. Only with a concerted effort can this condition be reversed over time to create a culture that is positively disposed toward cooperation.

In order to increase the number and quality of cooperative opportunities and their chances for success, a series of steps are recommended below for the U.S. These steps are aimed not only at addressing European complaints, but also at better preparing the U.S. acquisition workforce and encouraging them to follow commitments through to a successful conclusion. Ultimately, an organizational culture within DoD must emerge that is more oriented toward international armaments cooperation.

Recommended Steps

Funding stability similar to that enjoyed by the European partners must be provided for U.S. international cooperative programs. DoD, the Service components, and Congress all play large roles in this regard. First, DoD should rigorously adhere to the long-standing requirement of programming for the entire expected program cost (whether a cooperative program or not) prior to entering any cooperative program. Temptations to deviate from this procedure in order to accommodate optimal timelines for initiation of a cooperative effort should be resisted. Second, DoD and the Services must instill within their organizational cultures that it is unacceptable, barring extraordinary circumstances, to cancel or withhold funding once a cooperative effort has been engaged in good faith. This cultural change cannot merely be another DoD policy proclamation; it must be effected by example every time DoD and the Services make funding priority decisions on programs. Third, Congress must view the funds in cooperative programs differently from those committed to national programs. DoD and Service staffs must associate armaments cooperative efforts with our allies as significant political benefits to the U.S. The influence of U.S. defense companies lobbying for funding of competing national efforts must be resisted. Congressional support of cooperative programs will send a strong signal to U.S. allies. The above actions will help ensure funding stability and provide significant incentives for the pursuit of cooperative programs.

Export controls have received a great deal of emphasis within DoD recently. An effort is under way to reduce significantly the time and amount of bureaucracy associated with processing export licenses. DoD recently signed a bilateral agreement with the U.K. to facilitate defense trade and armament cooperation with

the U.S. DoD is attempting to reach similar understandings with other allies. To be fully effective, DoD's efforts to reduce bureaucratic export burdens must be supported by the Department of State and Congress.

False Impressions regarding technology transfer must be assiduously avoided by U.S. officials. Technology is likely to remain a very emotional and controversial issue on both sides of the Atlantic because of the importance it plays in determining military capabilities and its potential value in industrial applications. Officials at all levels (including high levels) of DoD and the Services should be particularly conscious of the importance of technology and should not create an expectation that it will be shared when approval is uncertain.

Education of PMs and other members of the DoD acquisition workforce on all aspects of international cooperative programs would help in ensuring that viable cooperative programs are selected as well as ensuring the success of those that are already engaged. Since the U.S. has only a small percentage of experienced personnel, education is the only effective means to address the existing general ignorance of cooperative programs in the acquisition workforce. The DSMC has recently increased the amount of time (from two to seven hours) devoted to international acquisition education in its Advanced Program Manager's Course (APMC). This initiative will help and should continue, but alone it will only provide exposure to and awareness of some fundamental considerations in international acquisition. It will not create the expertise that is needed to initiate or manage them. DSMC also continues to offer one-week courses on technology/export controls, international program management, and MOU negotiations and development. It is to be hoped that these courses, along with distribution of this book and subsequent initiatives,

will arm PMs and the acquisition workforce with substantial knowledge of cooperative programs.

Harmonization efforts should be rigorously and systematically pursued by the U.S. The Services should promote additional periodic mid-level (O-6 or equivalent) discussions with the allies focused on opportunities for harmonization. These mid-level discussions have been one of the most productive means of harmonizing requirements in the past and hold the same promise for the future.

The recent NATO armaments review process should be fully supported by the U.S. Although CNAD has been only minimally effective at promoting cooperative programs in the past, this new approach may prove more fruitful. Only time will tell, since the new NATO procedures are focused on a long-term systematic fix. The ICOG, although relatively new and lacking any conspicuous success, should continue. The early focus of ICOG discussions will likely prove productive over the long term. Europe's experience with the Western European Union is instructive. Some fora or organizations remain dormant until conditions permit their flowering—an opportunity for the ICOG to foster.

Leadership on the U.S. side of any cooperative program must be selected with special care. Managers of cooperative programs face a significantly more complex leadership challenge than their U.S.-only counterparts. Leaders require the temperament to build consensus, to operate within ill-defined bounds and ambiguous lines of authority, yet to drive aggressively toward program goals. Sensitive cultural antennae, patience, and strong interpersonal skills need to be combined with the firmness and consistency that produce success in any endeavor. Such a person will engender

trust, an essential ingredient in international cooperation. The same considerations apply to the selection of all participants in cooperative programs.

Incentives for acquisition professionals to involve themselves in cooperative programs are lacking. PMs who initiate and administer cooperative programs face many more challenges than their counterparts who manage national programs, in spite of which, they receive no benefit or compensation for the extra headaches. The idea of rewarding international program PMs with increased promotion opportunities, as joint assignments for uniformed personnel are treated, would be a positive incentive for cooperative programs. However, since there are so few cooperative programs, it would be difficult to systematically implement this within the structured promotion systems of each of the Services, particularly for military officers. Additional incentives, such as public recognition for successful cooperation, would help to a degree and certainly should be implemented, but these measures hold little promise to motivate PMs to seek international programs.

Emphasis is a more realistic approach to ensuring guidelines already in place that mandate the consideration of cooperation where feasible are followed. Usually PMs have so many requirements related to cost, performance, and schedule, that if something is difficult or perceived to be so, and is not emphasized (as seeking cooperative partners is not), PMs will follow the path of least resistance. Therefore, if DoD desires to maximize

cooperative programs, the leadership must underscore the point at program decision reviews by closely questioning PMs to determine whether they have exercised due diligence in seeking cooperative partners. International cooperation must be stressed in the Acquisition Strategy and Analysis of Alternatives. In Germany and France, two countries with an abundance of collaborative programs, PMs universally stated that seeking cooperative partners is seriously emphasized by their leadership. In most cases in those countries, it would be unacceptable to propose only a national solution when initiating a new program. The opposite is true in the U.S.; rarely does leadership in the DoD or the Services emphasize finding cooperative partners. It is a written policy that is not enforced in practice.

OSD and Service-level support must improve for cooperative programs. PMs currently involved in these programs often feel that they are isolated. The organizations in OSD and the Services that are chartered to advocate international armaments cooperation could be more consistently effective in their support role. PMs involved in cooperation need someone in their corner who has a vital interest in their work, someone to smooth the path and clear the obstacles inherent in these international endeavors. DoD and Service leadership must inculcate the view that support for the PMs working to establish and manage these particularly challenging programs serves U.S. long-range policy objectives. A degree of flexibility and willingness to compromise in the short term is also consistent with those objectives.

APPENDIX A

**GUIDELINES FOR
THE PREPARATION OF
SUMMARY STATEMENT
OF INTENT (SSOI)**

APPENDIX A

GUIDELINES FOR THE PREPARATION OF SUMMARY STATEMENT OF INTENT (SSOI)

Header Information:

- Short Title of Proposed Project
- DoD Proponent
- Country/ies Involved

1. Overview of International Agreement

- Briefly describe the project. Be specific as to what the project will deliver. Is this a new or existing U.S. project? Is there currently a Memorandum of Understanding or other international agreement in effect that is applicable to this effort?
- Is this proposed for Nunn funding? If so, what technological development is to be pursued which is necessary to develop new defense equipment or munitions, or what existing military equipment would be modified to meet U.S. requirements?

2. Operational Requirement

- What U.S. operational requirement would this project satisfy and/or what critical deficiency or shortfall would this project address? If known, cite applicable documents.
- Briefly describe the project's objectives.
- Provide an estimated schedule for the project, and Initial Operational Capability (IOC), if applicable.

3. Partner Nation(s)

- Which nations are proposed partners? Which nations have agreed to be partners? What is the assessment (and your basis for it) of foreign interest/commitment?
- Briefly describe the proposed negotiation strategy and negotiation schedule.
- Describe any planned variations from the policy guidance contained in the latest approved version of the International Agreements Generator ("IA Generator") and any resulting variations to the required International Agreement text that are known.

4. Legal Authority

- State the statutory legal authority for the proposed agreement. If section 27 of the AECA is not being used, explain why not.

5. Project Management

- Briefly describe how the project will be structured and managed.

6. Benefits/Risks to the United States

- List the advantages and disadvantages of this cooperative project. Address project timing, developmental and life cycle costs, technology to be shared and obtained, impact on U.S. and foreign military capability, and rationalization, standardization and interoperability (RSI) considerations. Indicate whether there are any risks associated with conducting this project as an international cooperative program, and briefly describe how these risks are to be managed. Is a similar project currently in development or production in the U.S. or an allied nation? If so, could that project satisfy or be modified in scope to satisfy the U.S. requirement?

7. Potential Industrial Base Impact

- Briefly describe the potential industrial base impact. Do you anticipate workshare arrangements, requests for offsets, or offshore production of items restricted to procurement in the United States? Are you aware of any key parts or components with single source of production? What U.S. Government facilities and/or contractors would be likely to participate in this cooperative effort? Will there be any significant effects (pro or con) on any U.S. companies or U.S. industrial sector(s)?

8. Funding Availability and Requirements

- List the total estimated cost (in U.S. dollars) of the International Agreement. The total cost should include all U.S. and foreign government financial and non-financial costs.
- List the cost shares (in U.S. dollars) of each participant. Also list any non-financial contributions, their value (in U.S. dollars), and describe how the value was determined.
- If not equitable financially, justify on a program basis (show the relative benefit to the DoD). An equitable agreement is defined as one which a participant's share is commensurate with that participant's share of the anticipated benefits from the agreement.
- List the Department's estimated costs (in U.S. dollars) by fiscal year, appropriation, and program element. Indicate if the funds required to pay these costs have been, or will be, approved in the budget and are available for use.
- List other participant's estimated costs (in U.S. dollars) by fiscal year. If applicable, outline the likelihood of follow-on research or acquisition and the proponent's commitment to fund such follow-on action.

9. Procurement

- Will the Department of Defense participation in the project involve contracting? If so, what agency will perform the contracting, and for what part of the project work?
- Will a participant other than DoD perform contracting? If so, which participants and for what part of the work?
- Will contracting be done on a competitive basis? If not, what justification will be used?

10. Information Security and Technology Transfer Issues

- Briefly identify the products and/or technologies involved in the program and their NDPC category and classification. The Militarily Critical Technologies List (MCTL) may be used as a guide.
- Is an exception required to the National Disclosure Policy? If so, provide date of approval or date that a request will be submitted to the National Disclosure Policy Committee (NDPC).
- If known, describe the foreign availability of comparable systems and technologies and whether the U.S. technology has been shared through other programs, e.g., FMS, DEA, etc.
- Briefly describe the risk of compromise of classified and export controlled technology and/or products and the technology advantages in the event of such compromise (e.g., negating primary U.S. technological advantage(s), revealing U.S. system weaknesses, development of countermeasures, susceptibility to reverse engineering).
- Identify any measures proposed to minimize the potential risks and/or minimize any damage that might occur due to loss, diversions, or compromise of sensitive classified or unclassified controlled data or hardware. Specify NDPC categories involved, where applicable. Include any phased release of information designed to ensure that information is disseminated only when and to the extent required to conduct the program; restrictions on release of specific information (including classification, description, and disclosure methods); release of components, software or information in modified form (e.g., export versions, exclusion of design rationale and deletion of data on weapons not sold to the participant); and special security procedures (both government and industrial) to control access to restricted material and information.

11. Proponent's Points of Contact

- Include organization, name, telephone, fax, and Internet address. Assure that this POC or an alternate is available to answer any questions from reviewing offices during the RAD review period.

Source: Appendix A, Volume 12, Chapter 9 of the DoD Financial Management Regulation

APPENDIX B

**SUMMARY OF
SECURITY PROCEDURES
FOR NATO PROGRAMS**

APPENDIX B

SUMMARY OF SECURITY PROCEDURES FOR NATO PROGRAMS

A. NATO has four levels of security classification:

1. COSMIC TOP SECRET (CTS)
2. NATO SECRET (TS)
3. NATO CONFIDENTIAL (NC)
4. NATO RESTRICTED (NR)

The marking “ATOMAL” is used to identify U.S. Restricted Data and Formerly Restricted Data (RD/FRD) and UK ATOMIC information shared with NATO. Each NATO member nation must establish a central registry to manage the receipt, dissemination, and control of NATO classified information. These central registries may establish sub-registries and control points. The Central U.S. Registry (CUSR) is located in the Pentagon.

- B. **Access.** U.S. personnel with a U.S. security clearance may have access to NATO information at the level of their clearance when there is a need-to-know in the performance of their duties and responsibilities and they have been briefed on NATO security procedures. Access to NATO Restricted information does not require a clearance, but recipients must be informed of NATO procedures for its protection. Contractors may have access to NATO classified information only to bid on or perform on a NATO contract or on a U.S. Government Agency or NATO member nation non-NATO contract that requires access to NATO information.
- C. **Facility Clearance.** A NATO Facility Clearance Certificate is required for any contractor to negotiate or perform on a NATO classified contract. A U.S. facility clearance qualifies if cleared personnel requiring access have been briefed on NATO procedures.
- D. **Marking and Downgrading/Declassification.** Normally, NATO documents are not portion marked and do not contain downgrading and declassification instructions. However, U.S. documents prepared for NATO are to be so marked. NATO classified documents cannot be declassified or downgraded without prior consent of the originating or otherwise responsible NATO nation or civil or military body. U.S. documents must be marked to identify any NATO information contained in them.
- E. **Storage.** NATO classified documents are stored in the same manner as U.S. documents of an equivalent classification level, but they must be segregated from other non-NATO documents. Material containing NATO RESTRICTED information may be stored in locked filing cabinets, desks, bookcases, or other similar locked containers to preclude unauthorized access, or in locked rooms to which access is controlled.

- F. **Hand Carry.** The hand carrying of NATO SECRET, NATO CONFIDENTIAL, and NATO RESTRICTED documents across international borders may be authorized, following basically the same procedures used for U.S. material. However, NATO courier certificates and briefings are used. COSMIC TOP SECRET information cannot be hand-carried.
- G. **Extracts.** NATO classified information may be extracted from a NATO document and used in a U.S. document; the U.S. document must be marked to identify the NATO information.
- H. **Transmission.** Transmission of COSMIC TOP SECRET and NATO SECRET and all ATOMAL material must be through the Registry System. NATO CONFIDENTIAL and RESTRICTED material will be routed through the U.S. Postal Service and U.S. military postal channels (Certified mail within the United States and Registered mail for international transmission) to the U. S. organization effecting the transfer to the NATO recipient. The material may also be sent by courier or encrypted and sent electronically.
- I. **Destruction.** NATO SECRET information and below is destroyed in the same manner as equivalent U. S. material, but the destruction of NATO SECRET material must be witnessed and recorded; witnesses and destruction records are not required for NATO CONFIDENTIAL and RESTRICTED material. COSMIC TOP SECRET is destroyed in the Registry System and destruction must be witnessed and recorded.
- J. **Receipts.** A continuous chain of receipts is required for COSMIC TOP SECRET documents. Receipts are required for the receipt, disposition, and dispatch of NATO SECRET documents. Receipts are not required for NATO CONFIDENTIAL documents unless required by the originator, although receipts are required for packages containing NATO CONFIDENTIAL documents when transmitted outside an organization or facility and internationally. Receipts are not required for NATO RESTRICTED documents or packages unless required by the originator. Receipts must be retained for ten years for NATO TOP SECRET and three years for NATO SECRET.
- K. **Release to Non-NATO Entities.** Release of NATO classified information to non-NATO entities must be approved by the originating nation or the responsible NATO civil or military body that generated the document, as applicable.
- L. **U.S. Information Released to NATO.** U.S. information to be released to NATO will be marked with the U.S. classification level and the notation that it is releasable to NATO. NATO is responsible for applying the NATO markings. Some U.S. activities, if they are the last U.S. holder, prefer to apply the NATO markings themselves before providing the material to the NATO recipient.

Source: ODUSD(PS) International Programs Security Requirements Course

APPENDIX C

NATIONAL DISCLOSURE POLICY
COMMITTEE MEMBERSHIP

APPENDIX C

NATIONAL DISCLOSURE POLICY COMMITTEE MEMBERSHIP

The **General Members** of the National Disclosure Policy Committee are representatives of:

- The Secretary of State
- The Secretary of Defense (designates Chairman)
- The Secretary of the Army
- The Secretary of the Navy
- The Secretary of the Air Force
- The Chairman, Joint Chiefs of Staff

The **Special Members** are representatives of:

- The Secretary of Energy
- The Director of Central Intelligence
- The Under Secretary of Defense for Policy
- The Under Secretary of Defense for Acquisition, Technology and Logistics
- The Assistant Secretary of Defense for Command, Control, Communications and Intelligence
- The Assistant to the Secretary of Defense (Nuclear, Chemical and Biological Defense Programs)
- The Director, Defense Intelligence Agency
- The Director, Ballistic Missile Defense Organization

Source: ODUSD(PS) International Programs Security Requirements Course

APPENDIX D

SAMPLE OF

NDP-1 COUNTRY CHARTS

APPENDIX D **DELEGATIONS OF** **DISCLOSURE AUTHORITY**

Sample of **NDP-1 Country Charts**

		Country A	Country B	Country C
Organization, Training and Employment of Military Forces	1	S	C	
Military Materiel and Munitions	2	S	C	
Applied Research and Development Information and Materiel	3	C		
Production Information	4			
Combined Military Operations, Planning, and Readiness	5			
U.S. Order of Battle	6			
North American Defense	7			
Military Intelligence	8	TS	S	X
Source: Department of Defense, International Programs Security				

APPENDIX E

**DOD PRINCIPAL
DISCLOSURE AUTHORITIES**

APPENDIX E DOD PRINCIPAL DISCLOSURE AUTHORITIES

These officials have the authority to authorize the disclosure of classified information over which their agencies have original classification authority, provided the classification level of the information falls within the levels delegated in the NDP-1 charts, all of the disclosure criteria can be satisfied, and disclosure is not limited by a NDP-1 policy statement. DoD officials who are not listed must seek delegated disclosure authority from the Office of the Deputy Under Secretary of Defense (Policy Support).

OFFICE OF THE SECRETARY OF DEFENSE

- Under Secretary of Defense for Policy (USD(P))
- Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L))
- Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD(C3I))
- Chief of Staff, Defense Intelligence Agency
- Chairman of the Joint Chiefs of Staff
- Director, Ballistic Missile Defense Organization

MILITARY SERVICES

- Department of the Army: Deputy Chief of Staff for Intelligence
- Department of the Navy: Assistant Secretary of the Navy (Research, Development and Acquisition)
- Department of the Air Force: Deputy Under Secretary of the Air Force (International Affairs)

Source: ODUSD(PS) International Programs Security Requirements Course

APPENDIX F

**SUMMARY OF
THE MULTINATIONAL INDUSTRIAL
SECURITY WORKING GROUP (MISWG)
DOCUMENTS**

APPENDIX F SUMMARY OF THE MULTINATIONAL INDUSTRIAL SECURITY WORKING GROUP (MISWG) DOCUMENTS

- A. MISWG Document Number 1, “Arrangements For The International Hand Carriage of Classified documents, Equipment, and/or Components.” The Defense Security Service (DSS) normally authorizes its use for individual efforts. **SUMMARY:** This document addresses the issue of cross-border hand carriage of classified material; must be an urgent need, material not present, and no other way to get it there; cannot turn material over to customs or security; must stay in personal possession.
- B. MISWG Document Number 3, “Use of Cryptographic Systems” (Document #2 was merged with Document #7.) **SUMMARY:** Document #3 pertains to the use of cryptographic systems; requires use of NATO standards and consent of national communications authority for use.
- C. MISWG Document Number 4, “Security Clauses.” **SUMMARY:** Pertains to agreed security clauses to be used in cooperative program agreements.
- D. MISWG Documents Number 5, “Programme/Project Security Instruction.” **SUMMARY:** Provides a single document with sample format that includes all security procedures for a cooperative program; to comprise other MISWG procedures that are applicable to a particular program; content requires agreement of all participants.
- E. MISWG Document Number 6, “Procedures For the Protection of Restricted Information.” **SUMMARY:** The document contains procedures that were agreed to by the countries that have a Restricted classification.
- F. MISWG Document Number 7, “International Visit Procedures.” **SUMMARY:** The policies and procedures in this document are compatible with DoD Directive 5230.20, “Visits and Assignments for Foreign Representatives.”
- G. MISWG Document Number 8, “Controlled Unclassified Information Clauses.” **SUMMARY:** Describes additional clauses to be inserted into program agreements addressing the protection of CUI.
- H. MISWG Document Number 9, “Security Education and Awareness.” **SUMMARY:** Provides a topical outline of a security briefing for contractor employees; each participant is responsible for briefing its personnel and investigating breaches on its territory.

- I. MISWG Document Number 10, “Transportation Plan For The Transmission of Classified Material As Freight.” **SUMMARY:** Describes the content and use of a transportation plan for the movement of classified material as freight; provides a sample format; can be modified to meet circumstances; Annex contains provisions for recurring shipments.
- J. MISWG Document Number 11, “Control of Security Cleared Facilities.” **SUMMARY:** Annex to Document #5, PSI, to list all participating facilities and points of contact involved in a program.
- K. MISWG Document Number 12, “Facility Security Clearance Information Sheet.” **SUMMARY:** Document 12 is to be used in requesting and verifying facility security clearance information.
- L. MISWG Document Number 13, “Automated Data Processing (ADP) Security Plan.” **SUMMARY:** Provides a suggested format for preparing standard operating procedures when automated information systems are to be used within a program.
- M. MISWG Document Number 14, “Contract Security Clauses.” **SUMMARY:** These clauses are very similar to the contract clauses contained in the NISPOM.
- N. MISWG Document Number 15, “International Transportation by Commercial Carriers of Classified Documents and Equipment or Components as Freight.” **SUMMARY:** Describes the procedures for the transfer of classified material as freight; to be used with document Number 10 (Transportation Plan).
- O. MISWG Document Number 16, “Guidelines for Assessing Protection and Control of Classified Information in a Multinational Non-NATO Cooperative Defense Program.” **SUMMARY:** These guidelines are intended to assist government industrial security specialists in assessing security measures at contractor facilities involved in a cooperative program.
- P. MISWG Document Number 17, “International Hand Carriage of Classified Documents, Equipment, and/or Components by Visitors.” **SUMMARY:** This document expands the scope of MISWG Document Number 1 to permit visitors from a participating country who are dispatched for other purposes (e.g., on a visit outside of the international program, on loan, or to a conference) to hand carry classified material for the international program under specified procedures.
- Q. MISWG Document Number 18, “International Industrial Security Requirements Guidance Index.” **SUMMARY:** This document contains guidance for governments to use in providing participating contractors with the security requirements and classification guidance required for the performance of classified contracts. This document serves the same purpose as the DD Form 254, “Contract Security Classification Specification,” which the U.S. will use instead.

- R. MISWG Document Number 19, “Personal (sic) Security Clearance Information Sheet.” **SUMMARY:** This document contains a standard format for requesting and verifying personnel security clearances.
- S. MISWG Document Number 20, “International Transfer of Material Classified RESTRICTED by Express Commercial Couriers.” **SUMMARY:** This document describes eligibility and security requirements for the urgent international transfer by express commercial carriers of material classified Restricted. It is a test document only which is being validated by several MISWG countries that have a Restricted classification.

NOTE: In addition to the above documents, a number of MISWG countries have approved a format and procedures for the use of secure voice, fax, and digital communications in international programs. The DSS approves the use of these procedures when they involve contractors. Guidance should be sought from the DSS Headquarters, International Branch at (703)325-6050.

APPENDIX G

TECHNOLOGY CONTROL
PLAN (TCP)

APPENDIX G

TECHNOLOGY CONTROL PLAN (TCP)

The TCP should cover, at a minimum, the points described below. It is not necessary to prepare a TCP for each foreign national located at a cleared facility. A generic TCP can be prepared with annexes to cover specific access authorizations and restrictions and the identification of oversight officials for individual foreign national visitors or employees.

1. Responsible company officials, e.g., the facility security officer (FSO) and technology control coordinator or officer, and the responsible company officer or director who provide oversight of security and technology control measures.
2. Specific measures (i.e., unique badges, escorts, segregated work area, etc.) to control access within the facility and limit access to the specific information for which a government disclosure or export authorization has been obtained.
3. A description of the elements of export controlled information to which the foreign national may have access, and disclosure guidelines for that access.
4. Indoctrination of the foreign national and company personnel who will be in contact with the foreign national on government security and technology transfer policies, disclosure guidance, and the provisions of the TCP. The disclosure guidance shall be emphasized to those other employees who will have frequent contact with the foreign national.
5. Procedures for controlling access to reproduction equipment, automated information, and telefax equipment.
6. A requirement that the foreign national sign a certificate, witnessed by the FSO or designee, certifying that he or she acknowledges, understands, and shall comply with U.S. Government requirements regarding access to, use, and retransfer of technical data, and shall comply with applicable provisions of the TCP.
7. The designation of a company employee who shall be responsible for overseeing the activities of each foreign national assigned to or employed at the facility.

Source: ODUSD(PS) International Programs Security Requirements Course

APPENDIX H

**CHRONOLOGY OF
EUROPEAN DEFENSE INITIATIVES**

APPENDIX H

CHRONOLOGY OF EUROPEAN DEFENSE INITIATIVES

Date	Event
May 1955	Western European Union (WEU) was established as a result of the agreements signed in Paris in October 1954 modifying the 1948 Brussels Treaty.
March 25, 1957	Treaty of Rome was signed creating the European community.
February 2, 1976	The Independent European Programme Group was established to promote European cooperation in research, development, and production of defense equipment; improve transatlantic armament cooperation; and maintain a healthy European defense industrial base.
December 9-10, 1991	The Treaty on European Union was signed in Maastricht but was subject to ratification. The WEU member states also met in Maastricht and invited members of the European Union to accede to WEU or become observers, and other European members of the North Atlantic Treaty Organization (NATO) to become associate members of WEU.
May 21, 1992	The Council of the WEU held its first formal meeting with NATO.
December 1992	The European Defense Ministers decided to transfer the Independent European Programme Group's functions to WEU.
November 1, 1993	The Maastricht Treaty was ratified and the European Community became the European Union.
December 1993	French and German Ministers of Defense decided to simplify the management for joint armament research and development programs. The proposal for a Franco-German procurement agency emerged.
January 10-11, 1994	A NATO summit was held, which supported developing of a European Security and Defense Identity and strengthening the European pillar of the Alliance.

November 14, 1994	WEU Ministers issued the Noordwijk Declaration, endorsing a policy document containing preliminary conclusions of the formation of the Common European Defense policy.
March 1996	The European Union Intergovernmental Conference, or constitutional convention, convened.
November 12, 1996	The Defense Ministers of France, Germany, Italy, and the United Kingdom signed the political foundation document for the joint armaments agency <i>Organisme Conjoint de Coopération en Matière d'Armement</i> (OCCAR).
November 19, 1996	The Western European Armaments Organization was established, creating a subsidiary body within WEU to administer research and development contracts.
February 4, 1997	The four National Armaments Directors of France, Germany, Italy, and the United Kingdom met during the first meeting of the Board of Supervisors of OCCAR. The board reached decisions about OCCAR's organizational structure and programs to manage.
June 19, 1997	The European Union Intergovernmental Conference concluded. A new treaty was drafted, but little advancement was made to developing a common foreign and security policy. The treaty called for the European Union to cooperate more closely with WEU, which might be integrated into the European Union if all member nations agree.
July 3, 1997	The Board of Supervisors of OCCAR held a second meeting.
GAO/NSIAD 98-6 Oct 97 Defense Trade "European Initiatives to Integrate the Defense Market"	

APPENDIX I

**STANDING UP OR JOINING
AN INTERNATIONAL
PROGRAM OFFICE**

APPENDIX I INTERNATIONAL COOPERATIVE PROGRAMS

STANDING UP OR JOINING AN INTERNATIONAL PROGRAM OFFICE?

Some Nitty Gritty Details You Might Need to Know

Col. Alan E. Haberbusch, U.S. Air Force, Ret.

Haberbusch spent 27 years in the research, development, acquisition, and test field (1964–91), including assignments in the space, aircraft, and munitions systems areas. He is currently working as a contractor under the Technical and Acquisition Management Support contract at Air Armament Center, Eglin AFB, Fla. He is a graduate of PMC 76-1, DSMC.

So you're going to lead or be part of an international program office (IPO). Let me take you back to 1987 and tell you about my experience when I worked on an international cooperative program—the Modular Stand-Off Weapon (MSOW). As program director, I found a reasonable amount of assistance and information on developing a Memorandum of Agreement (MOU) and “big picture” management of such programs, much of which is covered in the Defense Systems Management College (DSMC) International Program Management courses. What is not readily available, I discovered, is greatly needed but hard-to-find *insight* into the detailed aspects of such an effort.

In this article, I describe some of these details I had to manage from my perspective as program director. As you read through the article, you will find, as did I, that no “one size fits all”; nor are there any magic “cookbook” solutions for international cooperative programs. What I hope you glean from this article is an appreciation of some of the things you may encounter and how we handled them in the MSOW IPO.

Getting Started

First, some background. The MSOW was originally a seven-nation (later five-nation) collaborative effort under a General MOU signed in July 1987.¹ This MOU had the basic “rules of the road” but did not commit anyone to spend any money. Each phase was to be further defined by a supplementary MOU that would contain a financial annex and, when approved through the national approval process and signed by the appropriate officials, would commit that nation to that phase of the program.

When I came to the program in September 1987, the Project Definition (PD) Phase MOU was being negotiated.² The text was agreed upon by November 1988, and the program office used it as a directive. Eventually, the Management Group approved the financial annex, but the MOU was never signed.

The program was set to enter the PD Phase [NATO terminology], which would be equivalent to the current Program Definition and Risk Reduction Phase (Demonstration/Validation Phase in the MSOW time frame). Program management was a three-tier international structure with a Steering Committee at the top (a two-star/civilian equivalent membership), a Management Group (colonel/civilian equivalent membership), and an IPO at the bottom. For the top two groups, this structure put all the participants in an equal position.

MSOW was unique in that it began the collaboration on a major system much earlier in the development process than did the more familiar F-16 and Airborne Warning and Control System (AWACS) programs. MSOW had to build its day-to-day management structure (the IPO) from scratch. This was necessary because MSOW had no infrastructure already in place, such as the F-16 System Program Office (SPO) or the AWACS SPO, to aid in its collaborative efforts.

A Home for the IPO

The PD Supplement MOU identified the United States as the host nation and Eglin AFB as the location of the IPO. The IPO was therefore an international tenant on Eglin AFB. This particular agreement was different than the usual agreement the base had developed for other tenants because of the non-U.S. Government nature of the IPO. Therefore, it took considerable time and several iterations to get all the

items included that were needed. The final iteration was not completed before the United States withdrew, the program ended, and the IPO disbanded.³ The IPO operated on Eglin without a formal agreement for over three years.

The construction of a building for the MSOW was another aspect of defining a home. The initial direction to the host base through a Program Management Directive was to construct a modular relocatable building whose “funded cost” was not to exceed \$200K. It took me some time to get someone in the civil engineering community to define funded cost, but it meant that this was the cost ceiling for all the site preparation work. After that, as much could be spent on the structure itself as was desired by the funding agency. As it turned out, a later ruling stipulated that the structure cost was not an appropriate expenditure for U.S. MSOW program funding. This delayed the construction process until funding was sorted out. Because funding was delayed about five months—a potentially embarrassing situation for the United States—it took action by the Commander, [then] Air Force Systems Command with the Secretary of the Air Force to obtain release of emergency funding.

The building was eventually finished, taking about twice as long (eight months) as originally envisioned. By that time, the U.S. withdrawal had terminated the program. While the IPO was in existence, it temporarily occupied existing buildings at Eglin AFB.

Organization, Staffing, and Other Personnel-Related Items

The IPO would be staffed by the participating nations in consonance with their financial contribution. So if a nation contributed 20 percent of the financing, it would provide 20

percent of the approved staffing for the IPO. First, opinions differed on how many people it would take to properly staff the IPO. Depending on the nation, the numbers varied from six to 40. The compromise was 28 from the nations, with direct support staff (U.S. personnel funded by the participants) providing specialist expertise (e.g., contracting) or administrative support (e.g., secretarial).

The second task was to determine how the 28-member IPO would be organized and who would provide personnel to fill what positions. Two personnel selections were decided up front: the program director (United States) and the deputy director (United Kingdom). As the program director, I worked with my deputy to define the organization structure. For the remaining 26 members of the IPO, it was fairly easy to come to agreement on the functions and distribution of personnel.⁴

Third, we had to answer two questions: What countries would provide the chiefs of the various functions; and what countries would provide the working level in each function? The former question turned out to be politically “sticky” because we had more countries than chief positions (not counting the director and his deputy). This had to be resolved by the Steering Committee and was only resolved when one participant agreed not to seek a chief position but instead was granted preference for certain other positions.

As for the working level, we came up with a process where each participant offered to fill certain positions. In almost every case, we had more offers than positions.^{5,6} At this stage, particular individuals and their qualifications were not put forward. This never came to final resolution because the program did not go forward. In hindsight, we most certainly would have considered each offer based on individuals

and their qualifications, while keeping in mind that each nation had to provide a certain number of people to meet their commitment. Again, this would have been a politically sticky job at best.

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An additional factor was that some nations were not prepared to assign their personnel to the IPO permanently until their respective countries approved the PD Supplement MOU. Notwithstanding, there were exceptions—the British deputy and the total German contingent became permanent members of the IPO as soon as we defined and obtained approval on the IPO structure. However, all nations fully supported the source selection process with temporary duty personnel, as required.

The direct support positions presented another interesting challenge. The direct support concept was to hire U.S. employees on term positions. (We could establish a term position based on the fact that we had known funding available over a specific period to do jobs only a U.S. employee could do [contracting] or where it made more sense that a U.S. employee perform the task [secretarial/administrative].) The participating nations would share the costs of these positions in the same way that they shared other program costs. While the IPO encountered no problem when these positions required someone full time, part time *was* a problem. For part time, the only way to get needed support was to have an existing, authorized, and filled U.S. position and reimburse for the actual use. This created a problem in two ways.

- First, when the particular specialty already had its currently authorized people fully engaged in other work, no way existed to establish a “partial term position” to cover MSOW needs.

- Second, even if the U.S. employees in the particular specialty were available to support the IPO, the United States was unwilling to accept “pay as you go” and wanted a minimum use guarantee. No good solution emerged for either of these problems, and again the overall approach was never tested due to program termination.

The last portion of the personnel area was performance reporting. Quoting the General MOU, “The Terms of Reference for the IPO will make clear that staff members are dedicated to the Programme only and that Participants will not place other national tasks on their respective IPO members.” This, in essence, said everyone in the IPO is, as we say in the United States, “purple”; that is, representing everyone involved. To me, this clearly meant we needed a system of performance evaluation *inside* the IPO for our members. Since IPO members were administered by their respective home nations, we were mindful that this performance reporting must also “feed” the national personnel system of each of the five participating nations. Toward that end, I developed, presented, and gained approval of the Management Group for a system that had the following parameters:

- Immediate supervisor must be an integral part of the process.
- Process must lead to an accurate and fair reporting into the national systems.
- System must be based on task definitions.

For those IPO personnel below the division chief level, the Senior National Representative or SNR (the most senior person from a given country in the IPO) would brief supervisors on key aspects of the national system. SNRs would stay knowledgeable on the performance of their

particular nation’s IPO members. To develop a task definition, reach agreement with the ratee on the task definition (IPO director and deputy review), observe and record performance, and provide feedback to the ratee, the supervisor would use the Terms of Reference for the position.

Next, SNRs would receive the supervisor’s performance evaluation of their respective nation’s IPO members and transpose the evaluations onto national forms peculiar to each country. Each form would then be reviewed with the ratee’s supervisor, the IPO director, and deputy. Finally, the supervisor would feed each evaluation into the national system of the ratee.

For those personnel at the division chief level, the system works the same, with the IPO director or deputy as the supervisor. Similarly, the IPO director is the supervisor for the IPO deputy director. For the IPO director, the Management Group would provide an input to the officer evaluation reporting official who prepares the national form.⁷

National Approval Processes

During the life of the program, the five participating nations had their own approval processes for the MOU supplements. What drove these processes were the text and the Not-to-Exceed Cost Annex of the supplement. In most cases, the parliament stayed involved in the approval process. To assure a timely contract award, I needed to be confident that the approval processes could be successfully completed somewhere close to the end of the source selection process. As the program moved through the source selection process, I began to ask about the time lines of these processes.

During the source selection process, I looked into this situation and discovered that the topic of the national approval processes had been discussed at the Management Group before I came to the program; but somehow the discussion never reached a clear definition of each country's process. These processes were on the critical path to a contract award, so I was finally able to convince the two-star Chairman of the Source Selection Advisory Committee and the four-star Chairman of the Source Selection Authority Committee to use their influence and force this topic onto the table.

The prior reluctance to get this in the open, in my view, was that no one wanted their nation's process to be the "long pole in the tent." All these approvals were in two stages: first, the signatures of the MOU supplement, and second the process to make the money available to the IPO. Once all the information became available, it showed that the key element was a four-month gap between the two parts for one of the countries, and that gap began just about when the source selection decision was due. What this told me was that we needed to get an agreement among all the other participants to front-load their funding and allow this trailing country to back-load its funding; otherwise, we would have a four-month delay in the contract award. We did, in fact, get this agreement.

A Word From the Author

I provided all the documents listed as references to the DSMC International Department. In addition to these documents, three others (also supplied DSMC) contain additional information that may be helpful to U.S. personnel involved in international collaborative efforts:

- Munitions Systems Division History Office Interview of Air Force Col. Alan E. Habermusch, Program Director, MSOW IPO, Eglin AFB, Fla. 32542, Dec. 15, 1989.
- "Modular Standoff Weapon Management, the Programme Manager's Perspective," an article that appeared in the magazine *NATO's Sixteen Nations*, April/May 1988.
- "The Modular Stand-Off Weapon, Federal Acquisition Regulation Waivers and Deviations in an International Acquisition," published in *Proceedings*, 1991 Acquisition Research Symposium, Volume II.

Editor's Note: *The author welcomes questions or comments concerning this article. Contact him via E-mail at haberbus@eglin.af.mil.*

REFERENCES

1. General Memorandum of Understanding Concerning General Arrangements for the Collaborative Development and Production of a Modular Stand-Off Weapon, July 1987.
2. Supplement No. 1 to the Memorandum of Understanding Concerning the Collaborative Project Definition Phase of the Modular Stand-Off Weapon System, Draft, Nov. 10, 1988.
3. MSOW IPO/CC Letter, Jan. 24, 1990, Lessons Learned, Appendix 1, "Some Special Topics," Attachments 6-7, MSD/MSOW IPO Program Office Support Agreement.
4. MSOW IPO/CC Letter, Jan. 24, 1990, Lessons Learned, Appendix 1, "Some Special Topics," Attachment 3, MSOW IPO Organization.
5. MSOW IPO/CC Letter, Jan. 24, 1990, Lessons Learned, Appendix 1, "Some Special Topics," Attachment 2, MSOW IPO Organization in the PD Phase.
6. Addendum to Lessons Learned on Modular Stand-Off Weapon (MSOW).
7. Ibid.

APPENDIX J

**EXAMPLES OF
EUROPEAN DEFENSE COMPANY
TRANSNATIONAL COOPERATIVE
ACTIVITIES**

APPENDIX J

EXAMPLES OF EUROPEAN DEFENSE COMPANY TRANSNATIONAL COOPERATIVE ACTIVITIES

Joint company	Company participants and percentage shareholding ^a	Countries involved	Product
Airbus Military Company	Aerospatiale (37.9%), Daimler-Benz Aerospace (37.9%), British Aerospace (20%), CASA (4.2%), Alenia (Associate Member)	France, Germany, Italy, Spain, and the United Kingdom	Future Large Aircraft (planned)
Eurocopter Holding	Aerospatiale (60%), Daimler-Benz Aerospace (40%)	France and Germany	Tiger helicopter and various military and civilian helicopters
Eurodrone	Matra Hachette (50%), STN Altas Elektronik (50%)	France and Germany	Brevel surveillance and reconnaissance drone
Eurofighter Jagdflugzeug	Daimler-Benz Aerospace (30%), Alenia (19.5%), British Aerospace (37.5%), CASA (13%)	Germany, Italy, Spain, and the United Kingdom	Eurofighter 2000
Eurojet Turbo	MTU (33%), Fiat Avio (21%), Industria de Turbo Propulsores (13%), Rolls Royce (33%)	Germany, Italy, Spain, and the United Kingdom	Turbo jet engines for the Eurofighter 2000
Euromissile	Aerospatiale (50%), Daimler-Benz Aerospace (50%)	France and Germany	Milan and Hot antitank missiles and Roland air defense missile
European Helicopter Industries	Agusta (50%), GKN Westland Helicopters (50%)	Italy and the United Kingdom	EH-101 helicopter
Eurosam	Thomson-CSF (33.3%), Aerospatiale (33.3%), Alenia (33.3%)	France and Italy	Future surface-to-air family of missiles
GTK/MRAV/VBCI	Two competing consortium: ^b (1) GKN Defense, Krauss-Maffei Wehrtechnik, Giat Industries, Wegmann & Co., MaK System (2) Henschel Wehrtechnik, Alvis, Vickers Defense Systems, Panhard & Lavassar, KUKA Wehrtechnik	France, Germany, and the United Kingdom	Family of wheeled armored vehicles

Horizon International Joint Venture	Direction des Constructions Navales (33.3%), Fincantieri (33.3%) GEC-Marconi Naval Systems (33.3%)	France, Italy, and the United Kingdom	Horizon frigate
NH Industries	Eurocopter (66.4%), Fokker Aerostructures (6.7%), Agusta (26.9%)	France, Germany, Italy, and the Netherlands	NH-90 helicopter
Panavia Aircraft	Daimler-Benz Aerospece (42.5%), British Aerospace (42.5%), Alenia (15%)	Germany, Italy, and the United Kingdom	Tornado combat aircraft
<div> <div> ^aCompany participants and shareholdings obtained from Forecast International. </div> <div> ^bData on shareholdings are not available. </div> <div> GAO/NSIAD 98-6 Oct 97 Defense Trade "European Initiatives to Integrate the Defense Market" </div> </div>			

APPENDIX K

GLOSSARY

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GLOSSARY

ACAT	Acquisition Category
AECA	Arms Export Control Act (1976)
AFB	Air Force Base
ANG	Air National Guard
AoA	Analysis of Alternatives
APMC	Advanced Program Manager's Course
ARC	Air Reserve Component
ASD(C3I)	Assistant Secretary of Defense (Command, Control, Communications and Intelligence)
ASF	Systems Architect
ASTOVL	Advanced Short Take-Off Vertical Landing
AWACS	Airborne Warning and Control System
BENELUX	Belgium, The Netherlands, and Luxembourg (Customs Union)
BoD	Board of Directors
BUR	Bottom Up Review
BWB	Federal Office of Military Technology and Procurement
BXA	Bureau of Export Administration (Department of Commerce)
C&F	Contractual & Financial Subcommittee
CAIV	Cost-As-an-Independent-Variable
CCL	Commerce Control List
CEO	Chief Executive Officer
CFIUS	Committee on Foreign Investment in the U.S. (CFIUS)
CJCS	Chairman, Joint Chiefs of Staff
CMI	Classified Military Information
CNAD	Conference of National Armaments Directors
CPA	Cooperative Production Agreement
CRD	Capstone Requirements Document
CUI	Controlled Unclassified Information
DAB	Defense Acquisition Board
DASA	DaimlerChrysler Aerospace

DCI	Defense Capabilities Initiative
DCMA	Defense Contract Management Agency
DCS	Direct Commercial Sale
DDL	Delegation of Disclosure Authority Letter
DDR&E	Director, Defense Research & Engineering
DGA	<i>Délégation Générale pour l'Armement</i>
DLA	Defense Logistics Agency
DOC	Department of Commerce
DoD	Department of Defense
DOS	Department of State
DPA	Defence Procurement Agency
DSB	Defense Science Board
DSMC	Defense Systems Management College
DSS	Defense Security Service
DTRA	Defense Threat Reduction Agency
DUSD	Deputy Under Secretary of Defense
EAA	Export Administration Act
EADS	European Aeronautic Defense Space Company
EDC	European Defense Community
EEC	European Economic Community
EMC	Executive Management Committee
EMD	Engineering and Manufacturing Development
EO	Executive Order
EPG	European Production Group, European Participating Governments
ESSM	Evolved Seasparrow Missile
EU	European Union
FAR	Federal Acquisition Regulation
FGI	Foreign Government Information
FMS	Foreign Military Sale
FOCI	Foreign Ownership, Control, or Influence
FOIA	Freedom of Information Act
FORDTIS	Foreign Disclosure and Technical Information System
FOUO	For Official Use Only
FPIF/AF	Fixed Price Incentive Contract with an Award Fee

FRG Federal Republic of Germany
FSD Full Scale Development
FTMA Future Tank Main Armament
G.I. Government Issue
GAO General Accounting Office
GDP Gross Domestic Product
GMLRS Guided Multiple Launch Rocket System
GPS Global Positioning System
GSA General Security Agreement
IA International Agreement
IAP International Acquisition Program
IAW In Accordance With
ICOG International Cooperative Opportunities Group
IEPG Independent European Program Group
IPO International Programs Office
IPT Integrated Product Team, Integrated Process Team
ITAR International Traffic in Arms Regulation
IWSM Integrated Weapon System Management
JAST Joint Advanced Strike Technology
JIRD Joint Interim Requirements Document
JORD Joint Operational Requirements Document
JSC Joint Steering Committee
JSF Joint Strike Fighter
JTIDS Joint Tactical Information Distribution System
JV Joint Venture
KPP Key Performance Parameter
LCC Life Cycle Cost
LMAC Lockheed Martin Aeronautical Company
LMVS Lockheed Martin Vought Systems
LOA Letter of Acceptance
LTF Lead the Fleet
M&S Modeling and Simulation
MDA Milestone Decision Authority
MIC MLRS International Corporation

MIDS Multifunctional Information Distribution System

MIDS-LVT Multifunctional Information Distribution System-Low Volume Terminal

MILDEP Military Department

MIMIC Microwave Millimeter Wave Monolithic Integrated Circuit

MISWG Multinational Industrial Security Working Group

MLRS Multiple Launch Rocket System

MLU Mid-Life Update

MNFP F-16 Multi-national Fighter Program

MNS Mission Need Statement

MOA Memorandum of Agreement

MoD Ministry of Defence

MOU Memorandum of Understanding

NAAWS NATO Anti-Air Warfare System

NAD National Armaments Director

NADGE NATO Air Defense Ground Environment

NADREP National Armaments Director Representative

NAG Naval Armaments Group

NATO North Atlantic Treaty Organization

NAVSEA Naval Sea Systems Command

NBMR NATO Basic Military Requirement

NDP National Disclosure Policy

NDPC National Disclosure Policy Committee

NIAG NATO Industrial Advisory Group

NISPOM National Industrial Security Operating Manual

NNAG NATO Naval Armaments Group

NSDM National Security Decision Memorandum

NSPO NATO Seasparrow Project Office

NSPSC NATO Seasparrow Project Steering Committee

NSSMS NATO Seasparrow Surface Missile System

OCCAR *Organisme Conjoint de Cooperation en Matiere d'Armement*

OCEM Corresponding Coherence Services Officer

OCO Operational Coherence Officer

ODTC Office of Defense Trade Controls

ODUSD(PS) Office of the Secretary of Defense (Policy Support)

OEEC	Organization for European Economic Cooperation
ORD	Operational Requirements Document
OSC/LSC	Operational & Logistics Subcommittee
OSD	Office of the Secretary of Defense
P3I	Preplanned Product Improvement
PDDP	Product Definition Data Package
PDRR	Program Definition and Risk Reduction
PEO	Program Executive Officer
PG2	Project Group 2
PM	Program Manager
PPP	Program Protection Plan
PSI	Program Security Instruction
R&D	Research and Development
RAD	Request for Authority to Develop
RAM	Rolling Airframe Missile
RAMPO	Rolling Airframe Missile Program Office
RFA	Request for Final Authority
RFP	Request for Proposal
RSI	Rationalization, Standardization and Interoperability
SABCA	<i>Société Anonyme Belge de Constructions Aéronautiques</i>
SACEUR	Supreme Allied Commander Europe
SAE	Service Acquisition Executive
SAG	Stork Aerospace Group
SCA	Steering Committee Arrangement
SCG	Security Classification Guide
SCIM	Subcommittee on Industrial Matters
SNR	Senior National Representative
SNR(A)	Senior National Representative, Army
SOI	Statement of Intent
SOW	Statement of Work
SPAWAR	Space and Naval Warfare Systems Command
SPD	System Program Director
SPO	System Program Office
SSOI	Summary Statement of Intent

STANAG Standardization Agreement
STOVL Short Take-off Vertical Landing
TA/CP Technology Assessment/Control Plan
TAA Technical Assistance Agreement
TACAN Tactical Air Navigation
TCP Technology Control Plan
TDP Technical Data Package
TGW Terminally Guided Warhead
TVI Trial Verification Installation
U.K. United Kingdom
USAF United States Air Force
USD(AT&L) Under Secretary of Defense (Acquisition, Technology and Logistics)
USML U.S. Munitions List
WEAG Western European Armaments Group
WEAO Western European Armaments Organization
WEU Western European Union

APPENDIX L

**INTERVIEWS AND
PERSONAL CONTACTS**

APPENDIX L

INTERVIEWS AND PERSONAL CONTACTS

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APPENDIX M

SELECTED BIBLIOGRAPHY

APPENDIX M

SELECTED BIBLIOGRAPHY

- “About Western European Union, The Birth of the EU.” <http://www.weu.int/eng/info/1948.htm>.
- “About Western European Union, WEU From 1955 to 1984.” <http://www.weu.int/eng/info/1955.htm>.
- Abbott, Gerald. *US and Transatlantic Cooperation in Armaments: Theory, Practice and Promise*. January 6, 1997.
- Adams, Gordon. Research Paper: *Convergence or Divergence?: The Future of the Transatlantic Defense Industry*. Elliott School of International Affairs, The George Washington University: February 2000.
- Agostino, Davi M. “Transatlantic Cooperative Weapons Development: How Can We Better Ensure Success?” *Acquisition Review Quarterly*, Fall 1996.
- Andrews, Edmund L. “Growing Pains for an Expanding EU.” *International Herald Tribune*, December 21, 1999.
- Antweiler, Werner. “The Euro.” <http://pacific.commerce.ubc.ca/xr/euro/euro.html>.
- Barrie, Douglas, and David Mulholland. “JSF Negotiations Pivot On Technology Access.” *Defense News*, December 20, 1999.
- Barrie, Douglas. “European Giants to Unify Industrial Policies.” *Defense News*, April 17, 2000.
- Bialos, Jeffrey P. “The Transatlantic Defense Industry on the Eve of the 21st Century: Cooperation in the Face of Consolidation.” Speech delivered at Toulouse, France: December 6, 1999.
- Blackburn, Raymond III, Slide presentation: *NATO Seasparrow Surface Missile Project*. January 6, 1999, slide 6.
- Blackburn, Raymond III. “*The NATO Seasparrow Project*.” Printed in *50 Years of NATO*, 1999.
- Bull, Norman S. *Multifunctional Information Distribution System Low Volume Terminal (MIDS-LVT), A Case Study Providing a History of the MIDS-LVT Program*. Fort Belvoir, VA, November 1998.
- Center for Strategic & International Studies. *Making Transatlantic Defense Cooperation Work, Finding and Recommendations of the Atlantic Partnership Project*. Washington, DC, 1996.
- Cevasco, Francis M. & Marini, John J., *Navy Reinvention Lab Report*, National Defense Industrial Association & U.S. Navy International Programs Office (October 26, 1998).
- Cevasco, Frank, Slide: *Armaments Cooperation – The Congress* McLean, VA: Hicks & Associates.

- Challands, Guy. *Sense About European Defence: Affordable Interoperable Arms Procurement Through Collaboration?* Fellowship paper. Oxford: St Antony's College, December 1999.
- Childress, Alan, and James Larson. "A Case for International Cooperative Acquisitions." *Acquisition Review Quarterly*, Fall 1998.
- Cook, Nick. "Europa." <http://pollux.com/defenseweb/1996/may96/europa.htm>.
- "Data Link Solutions Completes MIDS-LVT Production Readiness." Aviation Week's Show News Online, <http://www.awgnet.com/shownews/paris1/pressr26.htm>, June 15, 1999.
- De France, Linda. "Export Process Reform is Cohen's Number One Issue, DoD Official Says." *Aerospace Daily*, April 12, 2000.
- Defense Institute of Security Assistance Management. *The Management of Security Assistance*. 18th ed. Wright-Patterson AFB, OH: June 1998.
- Defense Systems Management College. Case Study: *The Rolling Airframe Missile (RAM) International Cooperative Acquisition Program*. Fort Belvoir, VA: DSMC Press, August 1998.
- Defense Systems Management College. Guidebook: *For Preparation and Negotiation of International Armaments Cooperation, Memoranda of Understanding (MOU)*. Fort Belvoir, VA: DSMC Press, December 1997.
- Defense Systems Management College. Report: *Multiple Launch Rocket System Lessons Learned*. Fort Belvoir, VA: DSMC Press, July 1980.
- Defense Technical Information Center, Fort Belvoir, VA. FY1998 RDT&E Budget Item Justification Sheet (R-2 Exhibit), Program Element 0603800F. http://www.dtic.mil/cgi-bin/fulcrum_main.pl, February 1997.
- Defense Technical Information Center. Technical Report: *Collaborative Development of Main Battle Tanks: Lessons from the U.S.-German Experience, 1963-1978*. Alexandria, VA: February 1984.
- Department of Defense Inspector General Report. *International Cooperative Research and Development*. Report Number 93-009. October 21, 1992.
- Department of Defense Inspector General Report. *International Cooperative Research and Development*. Report Number 98-121. April 27, 1998.
- Elliott, Michael. "Goodbye to All That." http://www.newsweek.com/nw-srv/printed/special/emu/emu5_4.
- Eurofighter Typhoon, <http://www.pso-online.businesswebworks.com/aircraft/Eurofighter/history.html>.
- F-16 Mid-Life Update Background, http://home.wanadoo.nl/tcc/rnlaf/mlu_back.html.
- Farr, Charles Michael. *An Investigation of Issues Related to Success or Failure in the Management of International Cooperative Projects*. Diss. University of North Carolina, 1985.

- GDP per capita, 1998*. National Accounts of OECD countries, Main aggregates. Volume 1. <http://www.oecd.org/std/gdpperca.htm>.
- Grant, Robert P. "Transatlantic Armament Relations Under Strain." *Survival* 39.1, International Institute for Strategic Studies. Oxford: Oxford University Press, Spring 1997.
- Hough, Michael, MajGen, U.S. Marine Corps. Briefing: *The Affordable Solution – JSF*. Arlington VA: <http://www.jast.mil/html/progbriefs.htm>, undated.
- Humily, Gertrud, Peter Roller, and Trevor Taylor. *A Comparison of the Defense Acquisition Systems of France, Great Britain, Germany, and the United States*. Ed. Tony Kausal. Fort Belvoir, VA: DSMC Press, September 1999.
- Jenner, M. K. *Doing Defence Business in Washington*. Raytheon Company, September 1997.
- Johnson, Collie J. "Gansler, International Partners Accept Initial Delivery of MIDS-LVT at Pentagon Ceremony." *Program Manager Magazine*. Fort Belvoir, VA: DSMC Press, May – June 1998.
- Joint Strike Fighter Program Office, Arlington, VA. *Joint Strike Fighter Program Office Organization, International Directorate*. <http://www.jast.mil/html/ipo.htm>, undated.
- Joint Strike Fighter Program Office, Arlington, VA. *Joint Strike Fighter Program Office Organization*. <http://www.oecd.org/std/gdpperca.htm>, undated.
- Joint Strike Fighter Program Office. *Joint Strike Fighter Master Plan*. Arlington VA: http://www.jast.mil/html/body_mpsection1.htm, December 15, 1998 (update).
- Joint Strike Fighter Program Office. *Joint Strike Fighter White Paper*. , Arlington VA: http://www.jast.mil/html/body_jsfwhitepaper.htm, December 2, 1999 (update).
- Kennedy, Michael, Hugh Levaux, Mark Lorell, and Daniel P. Raymer, *The Gray Threat*. Santa Monica, CA: Rand, 1995.
- Kwatnoski, Richard. "National Cultures and Practices, Barriers and Facilitators in International Cooperative Acquisition Projects." *Program Manager Magazine*. Fort Belvoir, VA: DSMC Press, November – December 1998.
- Kwatnoski, Richard. "Negotiation of International Cooperative Defense Acquisition Agreements." *Program Manager Magazine*. Fort Belvoir, VA: DSMC Press, September – October 1992.
- Lockheed Martin Aeronautics Company. Press Release: *First F-16 Production Upgrade Kits Delivered Ahead of Schedule*. http://www.lmtas.com/News/Press/F16/f16pr_4.html, November 12, 1996.
- Lockheed Martin Aeronautics Company. Press Release: *Lockheed Martin Receives Order for Additional F-16 Upgrade Kits*. <http://www.lmtas.com/News/Press/F16/f16990215.html>, February 15, 1999.

- Lockheed Martin Aeronautics Company. Press Release: *Portugal To Expand Its F-16 Fleet*. http://www.lmtas.com/News/Press/F16/f16pr_62.html, December 4, 1998.
- Lok, Joris Janssen, and Bill Sweetman. "Making More Room For Partners, JSF Collaboration Is Good Business, But Not Without Its Problems." *Jane's International Defense Review*, March 2000:52-53.
- Lorell, Mark, and Julia Lowell. International Weapons Procurement Collaboration. Santa Monica, CA: National Defense Research Institute, Rand Corporation, 1995.
- Management of Multinational Programs; A Handbook for Managers Entering the World of International Acquisition*. 2nd ed. Ft. Belvoir, VA: DSMC Press, 1987.
- Mulholland, David, "Debate Widens Over JSF Contest." *Defense News*, March 13, 2000.
- NATO Research and Technology Organization. *Conference of National Armaments Directors*. <http://www.rta.nato.int/CNAD.htm>.
- Office of the Secretary of Defense, International and Commercial Programs. *International Armaments Cooperation Handbook*. Washington, DC, June 1996.
- Pfaff, William. "Falling Out Over European Defense." *International Herald Tribune*, April 13, 2000.
- Pike, John. *F-111*. Federation of American Scientists Military Analysis Network. <http://www.fas.org/man/dod-101/sys/ac/f-111.htm>, December 24, 1998 (update).
- Report of the Defense Science Board Task Force on International Armaments Cooperation, Summary of Task Force Recommendations. August 1996.
- Report of the Defense Science Board Task Force on Globalization and Security. December 1999.
- Requirements Generation System. Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01A. August 10, 1999.
- Rohatyn, Felix. Speech on U.S.-European Defense Industry Issues delivered April 15, 1999. <http://www.usis.it/wireless/wf990415/99041511.htm>.
- Schaller, Michael E. The Impact of Technical Data Transfer Problems During a Transition of Weapons System Production Between Nations. *Acquisition Review Quarterly*, Winter, 1996.
- Schmid, John. "Euro Becomes a Force of Political Integration." *International Herald Tribune*, December 21, 1999.
- Steering Committee Arrangement No. 44, Agreement for Predevelopment Phase of F-16 Derivative Program*, (March 31, 1989) (Amendment to *Memorandum of Understanding between The Government of the United States and the Governments of Belgium, Denmark, The Netherlands, and Norway Relating to the Procurement and Production of the F-16 Aircraft*, June 10, 1975).

Steering Committee Arrangement No. 45, Multinational Agreement for the F-16 MNFP Mid-Life Update Program, (January 21, 1991) (Amendment to *Memorandum of Understanding between The Government of the United States and the Governments of Belgium, Denmark, The Netherlands, and Norway Relating to the Procurement and Production of the F-16 Aircraft*, June 10, 1975).

U.S. Department of Defense, Office of the Secretary of Defense, Director of Operational Test & Evaluation. *FY98 Annual Report, Multifunction Information Distribution System Low Volume Terminal (MIDS-LVT)*. <http://www.dote.osd.mil/reports/FY98/navy/98navymids.html>.

U.S. General Accounting Office. *MLRS Terminal Guidance Warhead*. GAO/NSIAD-92-7. Washington, DC, October 31, 1991.

U.S. General Accounting Office. *U.S. Issues in the MLRS TGW Program*. GAO/NSIAD-92-55. Washington, DC, April 21, 1992.

U.S. General Accounting Office. *Defense Trade, European Initiatives to Integrate the Defense Market*. GAO/NSIAD-98-6. Washington, DC, October 29, 1997.

Vincour, John. "France Has a Hard Sell to Rein In U.S. Power." *International Herald Tribune*, February 6, 1999.

Watkins, Peter. Speech given at European and Transatlantic Armaments Cooperation Symposium. Fort Belvoir, VA: DSMC Press, June 11, 1996.

Western European Armaments Group, <http://www.weu.int/weag/eng/info/weag>.

APPENDIX N

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APPENDIX N

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