BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Joint Major System Acquisition By The Military Services: An Elusive Strategy

The military services have missions requiring the use of similar aircraft, missiles, vehicles, and other high cost systems. At first glance, it appears that there could be considerable savings by developing and using the same or reasonably common systems to fit the needs of all.

The idea is attractive, but impediments complicate the acquisition process so that, to date, there have been no real successes in the joint acquisition of high cost major systems. This report identifies those impediments to this elusive problem and discusses some suggested solutions.

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

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To the President of the Senate and the
Speaker of the House of Representatives

This report discusses joint major system acquisitions by the military services. This practice has long been supported by many in the Congress and elsewhere as an attractive economy measure. This review was undertaken to see how the merger strategy has been working. We found numerous obstacles which frustrate the successful completion of jointly developed major systems.

This report presents recommendations to the Congress and the Secretary of Defense. Our recommendations to the Secretary of Defense include a set of guidelines for use in selecting the more workable joint programs.

We are sending copies of this report to the Director, Office of Management and Budget, and to the Secretary of Defense.

Charles A. Bowsher

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

JOINT MAJOR SYSTEM ACQUISITION BY THE MILITARY SERVICES: AN ELUSIVE STRATEGY

D I G E S T

An ideal joint major system acquisition program is two or more military services getting together, early on, to agree on the military capability needed, collaborating through development, and procuring versions that are substantially alike. (There are, however, many kinds of lesser joint arrangements.)

The intent is to save money through multiservice development, procurement, logistics, and support while not impairing military effectiveness. The idea is attractive, but full-scale joint acquisition programs have been very difficult to launch and carry out. Compatibility of the joint system with each service's needs and timing of the merger are critical factors.

This review concentrated on the joint acquisition of major systems: military aircraft, ships, missiles, electronic gear, vehicles, and other high cost equipment. Designated as major by the Secretary of Defense, such systems will usually cost over a billion dollars to procure. —> to p. iv

The first joint major system acquisition program initiated in the early 1960s was the F-111, a fighter plane intended for both Navy and Air Force use. Since then a number of other joint programs have been formed. Many are still in development; the process takes 8 to 15 years or more, even for single-service programs.

Most joint or multiservice programs are initiated by the Congress or the Secretary of Defense. Joint programs are decided upon empirically; specific criteria have not been established. GAO offers some guidelines for use in developing criteria. (See pp. iv and v.)

Tear Sheet

If joint acquisition success is measured as substantial commonality in systems deployed, reasonably satisfied services, and actual documentable savings, there have been none. (See chs. 1 and 3.)

Instances where one service monitors another's program or buys another service's finished product are not considered here to be joint acquisitions although GAO believes that these are good ways to conserve acquisition dollars and avoid duplication. (See ch. 1.)

GENESIS OF JOINT ACQUISITIONS

Single-service programs are merged into one because of their perceived similarity and the prospects of lifetime economies. Duplicative type development programs arise primarily as a result of the pursuit of technology by each service and interservice disagreement about the kind of military capability and system features needed. (See ch. 2.)

GETTING INTERSERVICE AGREEMENT IS THE MOST DIFFICULT PHASE

Service differences in doctrines, operations, logistics, and procedures tend to diversify system designs. When joint acquisitions are ordered by the Secretary of Defense or the Congress, the biggest hurdle is getting the services to agree on joint requirements. Each service believes that its concept of a new aircraft, missile, or vehicle will be best for the mission and will oppose compromise of its design or performance goals.

Agreement is still more elusive when one or another system is already well into development with a "hardened" design, decisions firmed, costs sunk, and a dedicated constituency in place. This is when many program mergers are ordered. (See ch. 3.)

ADMINISTERING AND MANAGING JOINT PROGRAMS

Historically, each Secretary of Defense has pushed for joint programs. The various Under Secretaries, Defense, Research and Engineering, have been charged with reconciling service requirements and curbing duplication, but results have been mixed. The sheer number of acquisitions underway is one problem. Another

is that the Department of Defense (DOD) has had few formal processes to harmonize the mission needs of the services and their often strongly held doctrinal and operational differences. Lastly, the Joint Chiefs of Staff have not been authoritative in these matters. (See pp. 23 and 24.)

Joint programs require exceptional management skills, particularly from the system program manager. Highly placed advocates, however, may help in the overall management of programs and in dealing with reluctant participants. (See pp. 21 and 27.)

SOME OBSERVATIONS OF THE ACQUISITION COMMUNITY

GAO interviewed approximately 50 system acquisition experts, policymakers, military officers, program managers, and civilians, about joint program issues and possible solutions. Most interviewees in the private sector had been senior DOD executives. Many had direct experience with joint programs.

The interviewees were pessimistic about joint acquisitions or "forced marriages" under present arrangements. None could point to a real success. Doctrinal differences, not-invented-here parochialism; civilian-military polarity; pursuit of service distinction; and legitimate, real differences in technical and operating requirements were seen to be formidable obstacles.

They said that joint programs "take lots of money and lots of executive time." Some said that economies are really not achievable; and that joint system acquisitions, in general, trade-off military versatility and effectiveness for trivial savings, if any.

It was also argued that if all of the features demanded by all participants are added on, duplication costs are not avoided but simply "internalized" in the consolidated system. (See pp. 28 and 29.)

Several ideas for conducting joint programs by a number of experts interviewed have been included in this report. (See pp. 30 to 33.)

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CONCLUSIONS

In this report, GAO discusses approximately 15 system mergers that split up or are troubled in one way or another. Fundamentally, the services are opposed to joint programs and merging of their requirements. Even though willing to compromise on some needs, the services may still not be able to resolve all requirements stalemates, and there has been no supraservice military umpire to have the final word and make it stick. The various entities in DOD have lacked the sustained 'clout' to gain service acceptance and implementation of requirement decisions. (See ch. 3.)

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JOINT ACQUISITION GUIDELINES

While there are many impediments to overcome in conducting joint programs, the reality is that single-service systems cannot be afforded for every possible use. Joint programs, properly launched and administered, are a way to lessen budget affordability problems and at the same time satisfy the needs of more than one user.

Success cannot be assured, but the following guidelines might help in selecting promising joint program candidates.

--Essential service doctrines will not be unduly compromised.

--The programs are still malleable, that is, not too far down the development road at merger time.

--Military effectiveness will not be unduly lessened.

--The potential for economies is persuasive.

--There is conspicuous support by the Congress, the Office of the Secretary of Defense, the top military officers, and the Joint Chiefs of Staff.

Although these guidelines are stringent, they should bring more realism to the joint acquisition strategy.

OTHER JOINT EFFORTS

There is also a spectrum of lesser collaborative arrangements among the services that deserve resolute support of the Congress and the Secretary of Defense. These include monitoring each other's research and development efforts, using common subsystems such as power plants and electronic equipment, and interservice buying of each other's finished systems.

The joint program guidelines suggested above are also applicable to such lesser collaborations, but perhaps not so intensively as in "high profile" prestigious programs. Allowing a reasonable amount of postdevelopment customizing too, may render these lesser ventures more acceptable to the services.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

GAO recommends that specific criteria be developed for use in selecting joint programs. The guidelines suggested above should be helpful in developing criteria. Future program mergers should be in accordance with such criteria.

Ideally, the time to consolidate is when the single-service programs to be joined are both at the "front end" of the acquisition process. If, however, one or another system concept is well into development--and thus relatively immune to compromise--the benefit of cutting back to one combined system ought to be very convincing.

RECOMMENDATIONS TO THE CONGRESS

For proposed new joint acquisitions, the Congress ought to be assured that the selection criteria have been applied.

For the many joint programs underway, the Congress should require DOD to explain its plans to cope with the joint acquisition problems discussed in this report.

AGENCY COMMENTS

DOD agrees with this report's central theme that joint major acquisition programs constitute a very difficult management challenge. GAO was told that DOD is trying to improve the chances of success and has chartered the Defense Science Board to make recommendations in this area. A report is expected next spring. DOD's comments are in appendix II.

One aspect of the report with which DOD differed is in the definition of joint programs. DOD prefers a definition which includes subsystems and less than major programs, and cases where the services collaborate on any segment of the acquisition process. For example, DOD would consider the Air Force's buying of the Navy's F-4 aircraft and AIM-7 and AIM-9 missiles as successful joint programs.

As indicated in this report, GAO believes that these are all good ways to conserve acquisition dollars and avoid duplication. GAO favors any kind of interservice collaboration that reduces costs without degrading military effectiveness. However, in this review GAO defined a joint major acquisition as one involving early and continuing collaboration from development through deployment.

Contents

ABBREVIATIONS

DOD	Department of Defense
GAO	General Accounting Office
JCS	Joint Chiefs of Staff
OSD	Office of the Secretary of Defense
USDRE	Under Secretary of Defense, Research and Engineering

CHAPTER 1

INTRODUCTION

The idea of two or more military services joining up to develop and procure major systems for common use is an attractive one. It seems obvious, that joint acquisition should achieve substantial savings if similar, single-service programs are merged into one. Duplicative research and development, production, and operating costs, should be forestalled. It is not so straightforward a solution, however. The line between excessive "duplication" and useful overlap is not always clear, and joint programs are very difficult to carry out.

Duplicative weapon systems occur for both tolerable and less justifiable reasons. The drive for technological superiority is a major factor. Rivalry among hard charging military services may generate overlapping systems; the services also have sound legitimate reasons for differentiated requirements and operating features. The objective, the Commission on Government Procurement recommended:

> "should not be to eliminate all overlap or duplication . . . among or within the services; it should be to insure that where such duplication or overlap exists, it is visible, controlled, and purposeful."[1]

THE POSITION OF THE CONGRESS AND THE OFFICE OF THE SECRETARY OF DEFENSE

Excessive duplication in weapon systems has been a perennial concern on Capitol Hill. In reviewing the 1977 Department of Defense (DOD) budget, the House Committee on Appropriations remarked:

> "This year's hearings identified . . . developing hardware that duplicates equipment already in the inventory or under development by another service. The Committee has admonished the Department [of Defense] in the past . . . yet duplication continues to occur."[2]

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[1] Report of the Commission on Government Procurement, Vol. 2. (Wash.: Government Printing Office, 1972) p. 76.

[2] U.S. Congress, House, Committee on Appropriations, Department of Defense Appropriations Bill, 1977 Report (94th Cong., 2nd Sess., 1976) p. 120.

A Deputy Secretary of Defense has asserted:

> "In cases where their use is identical, there is absolutely no reason why both services should not use the same weapon. In many cases when a new common weapon is developed, it might be desirable to have competitive developments . . . possibly one in each service. This course has the same advantage as competitive developments, in general, and is useful when appropriate. Generally, after development, one weapon should be selected and both services should be expected to standardize on it."[3]

JOINT PROGRAM DEFINITION

An ideal joint major system acquisition program is two or more military services getting together, early on, to (1) agree on a joint system's functional requirements--military capabilities and operating features needed, (2) cooperate through development, and (3) procure system versions for themselves that are substantially alike. Identical or nearly identical systems are seldom feasible, but many components may be interchangeable.

Whether to consolidate particular single-service programs into one is decided on empirically, there are no specific criteria. We offer five. (See p. 34) The general premise has been that, if there can be enough commonality in subsystems or parts, a joint program should be worthwhile technically and economically. The services, however, may not be persuaded of its military effectiveness. Compatibility of the combined systems for interservice use and timing of the merger are critical.

A successful joint program would achieve substantial commonality in fielded major systems, satisfied participating services, and actual documentable savings.

OTHER USEFUL INTERSERVICE ARRANGEMENTS

Joint acquisition in this scope of this review is a full collaboration from early development to deployment. But any kind of interservice collaboration makes good sense. Most military technologies and activities overlap or interrelate to one degree or another. A service may monitor another's system development, exchange ideas, or buy another service's finished

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[3]Statement of the Honorable David Packard, Deputy Secretary of Defense, before the Military Operations Subcommittee, Committee on Government Operations, House of Representatives (Sept. 22, 1970).

product. These are good ways to conserve development costs and avoid duplication. The Marine Corps, for example, often benefits from developments in other services.

The Sparrow and Sidewinder air-to-air missile programs, although of single-service origin, have brought the Navy and the Air Force together for periodic missile updating and to share procurement. The Army also uses a Sidewinder variant in its Chaparral surface-to-air defense system. The collaboration appears satisfactory to all. Other examples include use of the Army's Blackhawk helicopter airframe and engine in Navy and Air Force helicopter programs.

A service may also buy another's end product, as the Air Force bought the Navy's A-7 and F-4 aircraft, and modify them to meet their needs. If subsequent customizing is moderate, buying another service's end product saves development money and reduces duplication.

OBJECTIVES, SCOPE, AND METHODOLOGY

We did this study to determine whether joint service acquisition has been, in fact, a realistic arrangement and if not, what procedural or organizational changes could foster acceptance and success. This study was to determine also if military reluctance to participate is the main problem, as often alleged, what means can be devised to encourage the services to settle their joint requirements conflict more readily.

In addition, the Chairman, Senate Committee on Governmental Affairs, asked us to cover certain points of interest to the Committee. (See app. I.)

The Secretary of Defense designates certain aircraft, missiles, ships, vehicles, and other equipment as major defense or weapon systems. Generally, they are expected to cost $1 billion or more to produce. This report concentrates on the joint acquisition of such systems.

Our analysts researched DOD's literature, our reports, and other sources on joint acquisition philosophy and practice. We identified about a dozen leading issues and laid out a plan of work. These were the agenda for discussions with approximately 50 acquisition experts in the Office of the Secretary of Defense (OSD), the services, joint program offices, academia, industry, and consulting. Their collective DOD experience spans from the 1940s to the present. Our idea was to explore various observations and solutions with present and former policymakers

of the DOD establishment. We also drew on our prior reviews of these particular programs:

--Light Armored Vehicle.

--Airborne Radar Warning Systems.

--Cruise missiles.

--Global Positioning System.

--Trainer Aircraft.

--Close Air Support Aircraft.

--Lightweight fighter.

--Battle Management System.

--Aircraft engines.

--Multiple stores ejector rack.

--Airborne Self-protection Jammer.

--TFX (F-111) Tactical Fighter Experimental.

--CLAW and Agile missiles.

--Joint Tactical Information Distribution System.

Our review was made in accordance with generally accepted government auditing standards.

Chapter 2 discusses how the pursuit of technological superiority, interservice differences, and certain acquisition practices breed overlap in systems. Chapter 3 explains the difficulties in getting interservice agreement on requirements and some of the problems in keeping joint programs on course. In chapter 4, the roles of the chief players are discussed. Chapter 5 summarizes some observations of the acquisition community. Chapter 6 concludes with some suggested criteria for selecting joint programs and recommendations to the Congress and the Secretary of Defense.

CHAPTER 2

THE GENESIS OF JOINT SYSTEM PROGRAMS

It is the apparent duplication or substantial similarity in emerging systems that leads to creation of joint acquisition programs. Most often the Congress or the Secretary of Defense initiate them. The quest for technological improvement and interservice differences over requirements (the kind of military capability needed) contribute substantially to the duplication phenomena.

TECHNOLOGY PURSUIT AND ITS EFFECTS

The pursuit of technological superiority is an imperative of United States defense policy. It seeks qualitative advantages in weaponry to compensate for the Soviet Union's quantitative advantage in manpower and machinery. Some side effects of this pursuit are overlap and proliferation because of the search for new equipment, changing threats, research and development redundancy, and desired versatility.

The tendency of the development community is to deprecate current systems as old technology, ripe for replacement. Modifying or systematic updating of existing systems may be harder to carry through than entirely new systems. The developer's case is that systems to be fielded 10 to 20 years ahead have to be much more advanced than today's systems.

As one analyst put it:

> "Defining new weapon systems may be almost as difficult as building them . . . how to develop weapon systems that will be effective against an unknown enemy having unknown weapons ten years in the future. . . . those who define requirements hedge their bets. They recommend the acquisition of the most sophisticated systems attainable."[1]

This has been the case with most new weapon systems of the last two decades or so. Recently, however, DOD has introduced the Pre-Planned Product Improvement program to help early fielding of adequate systems while providing for incorporation of advanced subsystems as they are created.

Design choices also cause overlap. At first glance there may appear to be duplication in weapon systems designed for use against the same kind of targets. The differences are not

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[1]J. Ronald Fox, Arming America: How the U.S. Buys Weapons (Harvard University, 1974) p. 102.

unwarranted; the best of missile designers, for instance, may disagree about which combination of warhead size, propulsion, and guidance is best for a particular kind of target. But once in late development, comparison may show that a joint program could have been the better route.

On the other hand, an argument can be made against joint programs--that a variety of weapons multiplies the enemy's uncertainty and complicates the enemy's response.2

Threat escalation and arms races

Threats may change rapidly and DOD must respond by either upgrading existing systems or creating new ones. Also, greater-than-expected threats and remote contingencies are the proper scope of prudent military planners in all the services. Their views, however, may foster more technological escalation and tend to outdate present but still useful systems.

An arms competition by its nature is a multiplier. The tactical "mini" arms race between electronic countermeasures to confuse the enemy and counter-countermeasures (to nullify the enemy's equipment), for instance, leads to frequent replacement and considerable variety of like equipment in the services. A former Under Secretary of Defense, Research and Engineering (USDRE), observed,

> "There is a measure, countermeasure, counter-countermeasure cycle that goes on. . . .The race goes to the swift. Its whoever can stay ahead."3

Precision guidance, computers, and command, control, and communications are among other very active fields where the lead may alternate and hasten replacement. The Soviets have deployed 25 different fire control radars since 1970.4 United States forces have 42 discrete infrared programs and 35 different inertial navigation systems.5 In the rush to field a new technology there may not always be time for joint programming.

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[2]Edwin N. Luttwak, Why We Need More Waste, Fraud and Mismanagement in the Pentagon, Commentary (February 1982) p. 22.

[3]Walter S. Mossberg and Felix Kessler, Power of Small Missiles in the Falklands Leads U.S. to Mull New Defense, Wall Street Journal (June 14, 1982).

[4]The Honorable Richard DeLauer, Under Secretary of Defense, Memorandum Electronic Warfare Acquisition (June 19, 1981).

[5]Anthony Battista, quoted in Aerospace Daily (Oct. 19, 1981) p. 261.

Cruise missiles are now proliferating in another phase of the arms race. Cruise missile programs are rushing forward faster than doctrinal concepts can rationalize them, according to one source.[6] We recommended, in a series of reports over the past several years, that some cruise missiles programs be slowed down.

Redundancy in research and development

It is important to discriminate between overlapping hardware in the field versus budding ideas in the service laboratories, research and development commands, and DOD industries.

In early research and development, a realm of technical unknowns, it is useful to explore many promising concepts. A new breakthrough such as laser technology would warrant exploiting along several design paths. Research and development resolves uncertainties and accumulates valuable learning. Some concepts require rendition into prototype or "proofing" hardware in the process, but substantially overlapping ones should not get into the field.

INTERSERVICE DIFFERENCES BREED PROLIFERATION

The separate services have the initiative in requirements setting. Each service, with its finely drawn doctrine, unique capabilities, and particular operating-technical requirements, believes strongly that its choice of technology, aircraft, missile, or vehicle will be best for the mission and the country. A service is very reluctant to compromise its ideas through consolidation with other systems, or to accept the design of another service. The "not invented here" attitude and parochialism is often operative in service acquisition organizations. All these views, often tenaciously held, lead to weapon system variety, unnecessary or otherwise.

The conflicts in doctrine

Each service's weapon requirements are shaped by doctrine, the body of principles and regulations governing a service's tactics, methods, training, operations, and integration of its forces and equipment. The service's assumptions about the nature, severity, and imminence of enemy threats are the counter points.

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[6]Richard K. Betts, ed., Cruise Missile Technology, Strategy, Politics (Wash.: The Brookings Institution, 1981) p. 558.

Doctrine is distilled from tradition, battle legacies, analysis, training, and top echelon policies. A service's doctrines and the military requirements derived from them are not lightly held. Interservice activities, like joint acquisitions, which expose such canons to outside debate and analysis, are understandably sensitive.

High doctrinal or requirement conflict, as in Navy/Air Force tactical air concepts, is very hard to reconcile under present circumstances, except at the penalty of substantial and costly service modifications. For instance, the Navy was directed by the Congress to procure one of two Air Force developments--YF-16 or YF-17 lightweight fighters--but instead went on to redesign the YF-17 to the F-18 to meet Navy-specific performance and operational requirements.

In a different case, the Air Force was pressed to buy the Navy's F-4 aircraft. This fighter plane proved to be quite compatible with Air Force missions and doctrine and was well liked by Air Force pilots. Little customizing was done.[7]

To cut down on attack aircraft variety and to save the costs of developing a new plane, the Air Force was pressed to buy the Navy's A-7, already operational. However, the A-7 airplane was then customized to suit Air Force doctrine, doubling its cost and reducing its commonality with the Navy's A-7 to 40 percent. Savings were much less than expected.[8]

Differing technical-operating requirements

Besides doctrinal disagreements, there are clear cut objective differences in service needs. They are often difficult, if not impractical, to accommodate in a single system. In the TFX (F-111) program to develop a fighter aircraft for both the Air Force and the Navy, the requirements were often in flux during development, but essentially both services' performance needs were not aerodynamically compatible in a single aircraft.[9]

In joint programs, features that are vitally important to one service may be of only minor interest to others. Whether a proposed missile will fit on its aircraft is of prime concern to

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[7]Robert F. Coulam, Interservice Rivalry, Bulletin of the Atomic Scientists (June 1977) p. 28.

[8]Coulam, Illusions of Choice: The F-111 and the Problem of Weapons Acquisition Reform (Princeton University Press, 1977) pp. 252, 333, and 334 f.n..

[9]Robert J. Art, The TFX Decision: McNamara and the Military (Boston: Little, Brown & Co., 1968) pp. 18 and 36.

the Air Force. It is important to the Navy as well, but that service must also consider the below-deck magazine storage of missiles, elevator capacity, flight deck handling, and so forth. Air Force maintenance and support means at austere jungle bases are quite different from aircraft carrier facilities. The Navy must deal with salt spray, fog, and pitching deck. The Air Force wants high-altitude high-speed pilot ejector seats; the Navy prefers low-altitude low-speed ejection. The presence of many conflicting requirements may argue for letting the services proceed with their separate designs with whatever commonality is appropriate.

In the Joint Tactical Missile System, a recent Army and Air Force merger directed by OSD, missile size is a critical issue. Major trade-off decisions must be made if the missile is to meet Air Force aircraft physical size constraints as well as Army range and payload requirements.

The motivational conflict

There are not only doctrinal and technical obstacles to joint programs, but a motivational conflict may be present as well, according to some observers. Vigorously competitive services are being directed by their civilian leaders to set aside their traditional rivalry, open their doctrines and requirements to challenge, and to collaborate on projects promising little or no profit to themselves as the services see it.

The incentives may run the other way. According to some observers, it is the successful individualized weapon system that enables a service to stand out, demonstrate professional competence, and symbolize military excellence that may enhance budget claims. A service's automony, its total operational control over its own forces and funds, is enhanced by service-specialized systems.[10]

A joint acquisition, on the other hand, blends missions, homogenizes system concepts, dilutes service control of its resources, and tends toward centralization about which the services are wary. (See p. 14.) A joint system shows that "anyone" can perform the mission; therefore, little distinction or "psychic reward" is to be gained by collaboration.

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[10]Cols. N. A. McDaniel and D. A. Lorenzini (USAF), An Analysis of Joint Service Programs (Newport, R. I.: Center for Advanced Research, Naval War College, June 1979) p. 33.

Independent requirements analyses tend to justify different systems

As mentioned before, each semiautonomous military branch sees that the needs and goals for its proposed system conform to its own view of defense missions and priorities.[11] Requirements analyses, the sowing ground for new systems, are usually done independently by each service even though many missions overlap. The Joint Tactical Information Distribution System, a command, control, and communications program, is an example of separate mission-need analyses justifying independent solutions.

Little supraservice review of these studies exist although the coordinating mechanisms for joint service analyses is within the Joint Chiefs of Staff (JCS) and OSD.

Versatility or overlap?

The services compete actively for the lead position in defense missions by pursuing not only technical superiority, but all around military excellence. This kind of rivalry enhances esprit de corps and sharpens the Nation's defenses. Redundancy, for good or ill, however, sometimes evolves from the spirited competition among the four military services.

Tactical air missions, for example, have Air Force and Marine Corps ground-based aircraft, Navy carrier-based aircraft, and Army helicopter gunships--four partly complementary, partly substitutable, and qualitatively similar fleets. These air resources are arguably the best in the world, but overlaps are present.

Each service has sought to establish a unique role for its overlapping capability. For instance, the Army dissatisfied with the Air Force's dedication to close air support of Army ground troops, developed a helicopter gunship for a new capability called advanced aerial fire support. The Air Force responded by proposing the A-10, its first aircraft optimized for close air support since World War II. Meanwhile, the Marine Corps wanted the Harrier jump jet to fill its requirement for air support of amphibious troops.

The Congress agreed with OSD's recommendation to procure the three close air support systems. Costs would rise because of triplicated production, but two possible advantages resulted--interservice conflict was muted and military versatility was gained.

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[11] Our report entitled A Critique of the Performance of the Defense Systems Acquisition Review Council (PSAD-78-14, Jan. 30, 1978) p. 19.

General Maxwell D. Taylor, former Chairman of the JCS, has held that each service should possess all the systems habitually necessary for its operations.[12] Others see a moderate degree of duplication as a tolerable cost of sustaining four hard-driving military branches; vigorous rivalry they say should not be inhibited even though some "waste" may be inevitable.

Another case for military versatility was made this way by one military expert:

> "We equip all our ground forces with only one type of antiaircraft gun, one type of shoulder-fired antiaircraft missile, and just one type of full-size missile which is supposed to intercept enemy aircraft in a wide band of altitudes. . . . The Russians, by contrast, have a wide variety of antiaircraft guns and missiles each specialized in some way or other, with the low altitude SAM [Surface-to-air missile]-7s, SAM-2s, and SAM-5s; and medium-altitude SAM-3s, SAM-4s, and SAM-6s."[13]

To paraphrase the Procurement Commission's remark about system duplication (see p. 1), the aim should be not to eliminate versatility, but to ensure that it is controlled and purposeful from the beginning.

The next chapter tells why so many well-intentioned joint programs die on the vine.

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[12]General Maxwell D. Taylor, The Uncertain Trumpet (New York: Harper & Brothers, 1960) p. 167.

[13]Luttwak, p. 13.

CHAPTER 3

GETTING AGREEMENT ON JOINT REQUIREMENTS IS THE NUMBER ONE PROBLEM

Joint acquisition appears to be a straightforward business-like solution: combine the partly complementary, the partly substitutable, and the technically similar into fewer types, use common parts, simplify the acquisition, and save considerable money. Economies should come in development, logistics, support operations, and production if large quantities are to be procured.

However, several impediments to applying this theory exist. First, the services have a natural inclination to resist the joint development and use of common weapon systems. Second, the services find it very difficult, for defensible and sometimes not so defensible reasons, to agree on joint requirements. Third, mergers are often arranged too late.

Again, most joint developments are ordered by the Congress or the Secretary of Defense. Joint use of another service's finished product is usually also required. For instance, the Air Force was pressed to buy and use the Navy's F-4 and A-7 aircraft and Sparrow and Sidewinder missiles.

Different perceptions of requirements, doctrines, and operational features keep the services apart. Agreements on mission need and doctrinal requirements are especially difficult to achieve. The present USDRE told the House Committee on Armed Services in March 1982:

> "The hardest thing to do in the Defense Department is to have joint programs be fully embraced by all the players. . . . that is the toughest job I have."[1]

In chapter 1, we defined a successful joint program as one which has brought about substantial harmonization in fielded systems, satisfied participating services, and realized actual savings. By these measures, no successes have been achieved so far.

A caveat is in order. Several systems, not discussed in this report, have the potential for becoming successful joint programs. These include the Navy managed high-speed

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[1]U.S. Congress, House Committee on Armed Services, Hearings, Department of Defense Authorization for Appropriations for Fiscal Year 1983, Research and Development, Title II (97th Cong., 2nd sess., 1982) p. 421.

antiradiation missile program and the Air Force managed advanced medium range air-to-air missile. These missile programs began in the 1970s. The degree of success can only be measured if large quantities are procured and actual deployments are made by the two services involved--the Air Force and the Navy. Other more recently initiated joint programs include the Joint Tactical Missile System, the vertical lift aircraft, and the Joint Surveillance and Target Attack Radar. Joint systems like single-service ones, may take 8 to 15 years to get into the field.

THE TIMING OF SYSTEM PROGRAM MERGERS IS OFTEN OUT OF STEP

Many consolidations are decided on when one or another system program is well ahead of the others, often at the threshold of engineering development, or beyond. By this time, the "lead" system design is all but locked up.

The farther into development a system concept is, the greater its momentum and the stronger the sponsoring service's opposition to compromise. Fundamental decisions have been firmed, investments are sunk, a dedicated constituency has formed, and contracts are often in place when many mergers are mandated. The follower service or services directed to join up at this stage have very little leverage. Merging such "out of step" programs may sometimes increase rather than save acquisition cost.

It is also very difficult to hold up one program until the others catch up, much less to send any maturing program back toward square one. Also, one system may be needed sooner. The outcome more often is a drift back to single-service endeavors.

Avionics programs out of step

The Joint Tactical Information Distribution System, a troubled electronics program, is a coalescence of systems in different development stages. By merger time, contractors had already sunk millions on their various system concepts. It took 2 years to reach agreement on the joint program charter. The services were also reluctant to release development money for the program. Few if any joint mission analyses were done. The Army had no requirement when told to join up, but is now teamed with the Air Force. The Navy is pursuing a different path to secure its technical requirements.

The NAVSTAR Global Positioning System program, a spaced-based navigation and positioning system, joined separate Air Force and Navy programs that were well into development. Requirements analyses were done separately and may have tended to justify different approaches. To sustain the joint program,

OSD keeps overturning military service decisions, slowing in effect or backing away from the joint Global Positioning System.

In an analogous situation, OSD directed the Navy and the Air Force to achieve maximum commonality in their acquisitions of the ALR-67 and the ALR-69 radar warning receivers. Eighty percent commonality seemed attainable. However, the services pursued separate developments with little or no emphasis on commonality. A contractor study indicated that only 19 percent commonality had been attained to date.[2]

Command, control, communications, and intelligence systems equipment like the Joint Tactical Information Distribution System, Global Positioning System, Pave Mover, and others, would seem to be natural candidates for joint programs since they link up forces in the war theater and are "service-color blind." The military branches, however, are usually lukewarm about the idea. A Brookings Institution command, control, and communications systems expert suggests that the systems tend toward centralization about which the services are "inherently suspicious."[3]

Other belated mergers

The light armored vehicle is another program that has requirements trouble. The Marine Corps was 12 to 18 months into development with its design when OSD directed the Army to join up. In a recent report, we pointed out that the Army joined the program after the Marine Corps had already solicited proposals for test vehicles. Thus, none of the possible Army configurations could be tested before contract award.[4]

At the urging of the Congress and OSD, the Navy reluctantly joined up with the Army to acquire laser-guided artillery shells. The Army was 2 years ahead. Subsequently, the services went their separate ways.

Lastly, an attempt to merge three laser-guided missile seeker programs into one fell through. Among other things, the Navy Bullpup was ready for production at merger time, the Air Force laser Maverick was beginning advanced development, and the

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[2]Walton H. Sheley, Jr., Director, Commonality of Radar Warning Receivers Statement before the Committee on Government Operations (GAO: June 15, 1982).

[3]Aerospace Daily, July 16, 1982.

[4](Letter report to the Secretary of Defense) Progress of the Light Armored Vehicle Should be Closely Monitored (GAO/NASAD-82-41, Aug. 10, 1982) p. 5.

Army Hellfire was still in the conceptual stage. All the services eventually dropped out of the joint seeker program.

NEGOTIATING MULTISERVICE REQUIREMENTS

Rigid service positions on the system features wanted are a major stumbling block. In reference to inflexible requirements, the Defense Science Board said:

> "This is the situation where the initial program requirements and specifications are viewed as sacred and unalterable, even though as the acquisition program progresses, there are almost always opportunities for revising . . . to achieve reduction in cost or schedule, or even optimization of performance. . . ."[5]

Once a joint program is ordered and an interservice committee formed, long and arduous negotiations are started to accommodate each service's wants in the combined system. For the opening rounds--negotiations ordinarily run from 6 months to 2 years--long lists of requirements are presented by each side. Many are "nice to have" features, bargaining chips perhaps, rather than necessities. Others involve environmental factors or critical integration with existing systems. According to experienced joint program personnel, agreement among the services on the priority of their listed requirements is even more difficult to achieve.[6]

Incomplete requirements

Some requirements may be omitted, held in reserve, or will evolve later on. Others, however, are so irreconcilable that they may be dropped from the discussion, to surface later and set back acquisition plans and interservice agreement.

In the case of Navy/Air Force negotiations for a common bomb rack for their aircraft, the rack's incongruity for supersonic aircraft was overlooked. A prototype rack 4 years later exhibited serious shortcomings in size and aerodynamic drag. Subsequently, the Navy dropped out of the program to

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[5]Defense Science Board, Report of the Acquisition Cycle Task Force (Wash.: DUSDRE, Mar. 15, 1978) p. 47.

[6]McDaniel and Lorenzini, p. 46.

pursue its own specifications. The Air Force decided to continue with the new rack for its own use.[7]

Each service has its own way of doing business

Besides their apartness in doctrine and technical needs, the services have different organization arrangements, standards, data requirements, manuals, provisioning, integration of military specifications and standards, occupational skills, training methods, test requirements, and so forth, all of which affect the ultimate design and configuration. Service differences in logistics are among the knottiest problems. Fogging the negotiations are interservice differences in nomenclature and interpretation, no small matter according to some joint program participants.

FENCING OUT PARTICIPANTS

Requirements presented by one service may prescribe or dictate a certain technical approach, a performance mode, or cost that deters would be participants. The Navy's position on the Airborne Self-Protection Jammer, a joint Air Force/Navy program, appeared to preclude Air Force participation. The Navy budget statement was:

> "It involves the development of Defensive Electronic Countermeasures (DECM) for self protection of Navy tactical aircraft against radar-controlled weapon systems . . ."[8]

The Air Force had appeared to be lukewarm on the program as shown by the lack of funding support for research and development, an unfilled liaison billet and general foot-dragging, according to one source.

Similarly, we found that despite congressional interest in a biservice trainer aircraft, the Air Force's Request-for-Proposal language ". . . virtually eliminated any aircraft like the [Navy] T-34C that did not have two engines and side-by-side seating".[9] Our reports on this subject indicate that Navy/Air Force doctrinal differences on pilot training are high.

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[7](Letter report to the Secretary of Defense) Reassessment of the Multiple Stores Ejecter Rack Reduced Performance and Increased Cost Warrant (GAO/MASAD-82-26, Mar. 26, 1982).

[8]Defense Marketing Service "Advanced Self-Protection Jammer AN/ALQ-165, PE64226N, and PE64237F," Market Intelligence Report (Greenwich, Conn.: DMS Inc., June 1980) p. 1.

[9]Our report Review of Air Force's Next Generation Trainer Aircraft Program, DOD (GAO/MASAD-81-2, Feb. 9, 1981) pp. 1 to 20.

NECESSARY FOR ONE SERVICE, SUPERFLUOUS TO ANOTHER

As a result of trade-offs in negotiations and perhaps relative bargaining strength, one service is likely to get more than it wants, another service may get less, and both parties may be unhappy with the outcome. For instance, in 1982 OSD ordered the merger of the Air Force's Pave Mover and the Army's Battlefield Data System (now JSTARS). Both are intended to aid the commander's management of forces. The Pave Mover concept is more complicated and expensive than the Army wants or is willing to pay for. The Army prefers a derivative of an existing radar for its more limited task. What is cheaper and faster for the Army, however, may be more expensive, slower, and have less growth potential than the Air Force wants.

The Air Force was on the other side of the table with its CLAW air-to-air missile when the Navy's Agile was proposed for common use. The Agile was intended to make kills at high angles off the launch aircraft. The Air Force saw the missile as ". . . too much bang for too many bucks . . ." and turned it down. The Congress canceled both missiles.10

WITHDRAWING FROM THE PARTNERSHIP

It is always possible that one service may reduce its procurement quantity or drop out of the program entirely, leaving its variant requirements unpaid for, or saddling the others with higher small lot production costs, or expensive superfluous features. No penalty is incurred by dropping out of a joint program.

In the case of Air Force/Navy joint development of the F-100/F-401 aircraft engine intended for the F-15 and the F-14 fighters, the Navy came to believe that the engine would not be right for its needs and pulled out of the program. Thus, the Air Force had to shoulder a $500 million cost increase as a result.11

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10 Major Frank D. Maruzzi (U.S. Air Force), A Review of the Management of Air Force Air-to-Air Missile Research, Development, Testing and Production Problems (Fort Belvoir, Va: DSMC, March 1976) pp. 6. and 7.

11 Terry Edward Magee, Differences in Aircraft Acquisition Management Practices between the Air Force and Navy (Naval Postgraduate School, June 1977) pp. 90 to 91.

THE MOBILE ELECTRIC POWER PROJECT, A SUCCESS OF ITS KIND

Some of the acquisition experts we talked to suggested that commodities, field equipment, and other kinds of hardware should be more amenable to joint acquisition than such role sensitive "high profile" systems as fighter aircraft and missiles. Hardware standardizing, however, has not progressed very well although it should be a fertile area.

In some commodity cases, we found in general, the same problems as in joint major systems: weak service interest, disagreement over requirements, service-unique procedures, and dissatisfaction with the emerging joint product. However, the Mobile Electric Power Project was a clear-cut success. Although not a major acquisition program, the case illustrates what can happen when all the conditions are "right."

Fifteen years ago the armed forces in Vietnam had an acute shortage of reliable electric power to run their many installations and sophisticated equipment. According to a former OSD executive, 16 kinds of portable motor-generator sets were in use, procured from marginal low-cost producers, whose sets were unreliable, noninterchangeable, and presented substantial logistical problems. The situation, in fact, was desperate, and great pressure was exerted "from the top" to cure the problem. The aim was not for a new development, but simply to harmonize interservice requirements and to field reliable equipment.

A formal directive was issued. The program manager reported high--to the Commanding General, Army Material Command. The services all cooperated, joint operating procedures were agreed on, funds were not held up, and 80 people were assigned.[12] In response to the exigency, normal procurement regulations were overridden.

The Mobile Electric Power Project reduced 2,000 makes or models of motor-generator sets to about 40. Out of 800 specifications, only 7 remain. In the 60 kilowatt to 200 kilowatt category, parts were cut from 13,000 to 2,000. Technical manuals dropped from 4,000 to 1,000, with a goal of 100 manuals.[13]

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[12]LTC James D. Haney (U. S. Army), A Study and Evaluation of Selected Joint Service Program Managed Material Acquisitions (Fort Belvoir, Va.: DSMC, May 1976) p. 5.

[13]Ibid., pp. 18 and 17.

We believe the Mobile Electric Power Project's success was because of extraordinary circumstances. There was (1) a desperate wartime need, (2) direct personal intervention of top DOD executives, (3) a charged up "task force," (4) little or no doctrinal-requirements conflict, and (5) the bypassing of normal procurement regulations.

The Mobile Electric Power Project is not a very feasible model for joint major system acquisitions, however. First, wartime urgency can hardly be replicated. Second, the project had no development phase to speak of; it was instead standardization in a mature technological area. Third, to acquire very many systems on an exception basis would be self-defeating. Frequent skirting of normal procedures would cause institutional disruption; a hierarchal organization cannot tolerate very many end-runs. Still, there are lessons in the Mobile Electric Power Project case about top management expedition, service cooperation, and dedicated teamwork.

CONCLUSIONS

In this chapter, we discussed approximately 15 programs that came unjoined or seem likely to do so (some may still succeed of course). Fundamentally, the services are opposed to joint programming. But even when willing to compromise on some needs, the services may reach stalemates on others. There is no supraservice military umpire or professional "court of appeals" to have the final word and make it stick. The various entities in DOD as will be discussed in the next chapter, have lacked the sustained "clout" to gain acceptance and implementation of decisions; for example, requirements disputes that the services cannot settle on their own.

CHAPTER 4

ADMINISTERING AND MANAGING JOINT PROGRAMS

The basics of joint program success, again, are picking the "right" systems to merge, securing cooperation, and producing satisfactory versions of the system for the military partners. There will be more to say in the next chapter on how more positive results can be achieved. It is enough to note here that the present assignment of roles and authority does not often induce the ready cooperation of the services--unless the top-down advocacy pressure is extraordinary.

One veteran program manager remarked to us that a "godfather" is essential to keep a joint program going--meaning a highly placed, vigorous advocate in the DOD establishment. The Defense Science Board said much the same thing. (See p. 27.) The cruise missile program cited earlier had several powerful sponsors, key figures in the Pentagon, White House, and the Department of State. One reason: United States willingness or unwillingness to deploy cruise missiles had become an international political affair affecting the Strategic Arms Limitation Talks and the United States North Atlantic Treaty Organization relations.[1]

Cruise missiles were more or less pressed on the services who saw them as threats to their central missions and to their funding priorities. According to one source:

> "At every crucial stage in the development of each type of cruise missile, high level intervention was necessary either to start or to sustain it."[2]

According to several sources, the Congress has staunchly supported the joint program since inception.

For joint as well as single-service programs, administrative powers reside with the Secretary of Defense, the chief executives, particularly USDRE, and to a degree, the JCS. The will of the Congress is expressed in its recommendation or direction that certain joint programs be undertaken, and in congressional decisions to fund or withhold funds, depending on signs of interservice agreement or lack of it. For instance, in April 1982 the House Armed Services Committee deferred the joint-service rotary wing aircraft until the services

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[1]Betts p. 360 and 361.

[2]Ibid.

coordinated their agreement.[3] Some say that such congressional interventions are crucial. On the firing line is another key figure, the joint system program manager.

THE SECRETARY OF DEFENSE'S ROLE

All the Secretaries of Defense since Robert S. McNamara (1961-68), who launched the TFX (F-111) aircraft development, the first cross-service major system program, have pushed joint programs.[4] The practical problem, however, is that a secretary can order a program merger, but cannot mandate performance or degree of interservice cooperation. DOD has more management by negotiation than many critics appreciate. Choices among rival service systems are very difficult for the Secretary of Defense; consolidating programs represents a major challenge.

The secretary has the legal power to curtail, transfer, or abolish programs, but these options have been used sparingly. The secretary may want a consensus at top military levels before revising important military programs. The secretary can "ramrod" an occasional order, but if it is unpalatable to the bureaucracy, it may be diluted at lower levels, or "outwaited" and reversed when the secretary's term is up.

Secretary McNamara, who closely supervised the F-111 aircraft joint program from the start of his term, contended with considerable opposition and deep conflict in biservice requirements all through weapon development. One month after he left office, the decision was made to cancel the Navy version. The Air Force continued to develop the F-111 and the Navy went on to develop the F-14.

The F-111 program failure has haunted joint programming and people's opinions of joint programs ever since. It showed that a secretary of defense, however "strong," cannot always get the services to do what they strongly oppose.[5]

USDRE

The Office of the USDRE, is the Secretary of Defense's chief technical resource. It is staffed and situated to settle

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[3]U.S. Congress, House Committee on Armed Services, Department of Defense Authorization Act, 1983 (Rpt. No. 97-482, 97th Cong., 2nd sess, Apr. 13, 1982) pp. 14 and 15.

[4]Coulam, Interservice Rivalry pp. 25 and 26.

[5]Alain C. Enthoven and K. Wayne Smith How Much is Enough? Shaping the Defense Program, 1961-69 (New York: Harper and Row, 1971) p. 266.

conflicts over technical and operating requirements which the services cannot resolve on their own and want settled. Multiservice agreement on OSD-directed changes, however, is very difficult to bring about if one service or another perceives a threat its mission "ownership".

The under secretary has the general responsibility for curbing duplication in weapon systems, supporting standardization, and furthering joint programs. The USDRE office allocates funds to the services for such purposes, but after the allocation it has little control over exactly how or when the money will be spent or when it will be turned over to the system program manager. It is often very difficult to get reluctant joint acquisition partners to release those funds to the program office. (See pp. 26 and 27.)

In select cases, USDRE has taken charge of joint programs (which some believe is the best way to go). For instance, a civilian-military executive committee was formed to expedite the cruise missile program. It was chaired by the under secretary to give programmatic and fiscal direction to the endeavor. Specific ground rules were laid down as to interservice staffing of the program office, program office funding, composition of the source selection advisory committee, and so forth. So far the cruise missile undertaking is deemed a developmental success by some. Others, however, say that "the jury is still out" on cruise missiles.

The Air Force's Air Launched Cruise Missile and the Navy's Tomahawk are two principal versions. Both were approved for production. There are several variants of the Tomahawk, and there is substantial commonality among them. Some subsystem commonality exists in the Air Launched Cruise Missile and the Tomahawk. Competition can be effective at the subcontractor level, but it is not very feasible at the prime contractor level since the Air Force and the Navy configurations differ widely. Another joint program, the Joint Tactical Information Distribution System, was also USDRE directed. As was noted earlier, it eventually split into two programs.

JCS

As mentioned before, no supraservice military umpire exists to settle effectively, such cross-service disputes as the mix of service forces, joint-service requirements, program priorities, and so forth. The Secretary of Defense has no substantial military staff. JCS could fill the vacuum very well it would seem, but as many observers have been pointing out, JCS is not set up or so detached from the services as to be able to resolve such conflicts or recommend one service's system concepts over another's. The Chairman of the JCS is the only officer in DOD

in a supraservice position.[6] "What we in the Congress desperately need from the Joint Chiefs" said a member of the Senate Committee on Armed Services, "are military judgments and recommendations, . . . free from Service bias."[7]

The lack of detached military counsel to bolster civilian DOD analysts and managers has been voiced by many JCS observers. A former Assistant Secretary of Defense, Program Analysis and Evaluation, wrote

> ". . . none should doubt my . . . conviction of the need for civilian analysts in [DOD] management. [But we should not rely] entirely on civilians . . . to fill the near-perfect vacuum of credible advice on multiservice matters. The current dearth of competent, disinterested, and professional military advice is dangerous . . ."[8]

Be that as it may, the Secretary of Defense is not always getting a balanced picture of joint program possibilities--advice on technical-economic feasibility from his civilian staff, coupled with independent professional military counsel on the war-fighting efficiency of a joint-service system versus single-service ones. A former chairman of the JCS said that "Defense Secretaries are given very little comprehensive advice on alternate strategies or systems." He added:

> ". . . the lack of adequate questioning by military professionals results in gaps and unwarranted duplications in our defense capabilities. What is lacking is a counterbalancing system involving officers not so beholden to their services who can objectively examine strategy, roles, missions, weapon systems . . . to offset the influence of the individual services."[9] (Emphasis added.)

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[6]John G. Kester, "The Future of the Joint Chiefs of Staff" AEI Foreign Policy and Defense Review (Vol. II, No. 1) p. 15.

[7]Senator John Culver quoted in: General Edward C. Meyer, Chief of Staff, U. S. Army, "The JCS--How Much Reform is Needed?" Armed Forces Journal International (April 1982).

[8]Russell Murray II, "Policies, Prices, and Presidents: The Need to Enlighten the Great Choices in National Security," Armed Forces International Journal (June 1982) p. 60.

[9]General David C. Jones, U. S. Air Force (Ret.), "What's Wrong With Our Defense Establishment," New York Times Magazine (Nov. 7, 1982) pp. 76 and 78.

MANAGING THE JOINT PROGRAM[10]

The Commandant of the Defense Systems Management College, where system program managers are trained, said in a foreword to the college's journal:

> ". . . the word joint does not necessarily mean togetherness. Most programs are the result of forced marriages . . . . Clearly, joint programs require the very finest in management skills particularly from the program manager . . . ."[11]

Organizing the program office

When a joint acquisition program is decided on, USDRE appoints the executive or "lead" service for the undertaking. Nomination is usually based on expertise, willingness, priority, interest in the program, or rotation. The lead service usually appoints the program manager, who should be of a rank commensurate with the size and importance of the program. The program manager's organization and conduct of the acquisition is usually governed by a charter authorized by service headquarters. The lead service's acquisition policies and strategies are expected to rule in the program office, but often the other services want theirs followed too.[12]

The lead service underwrites the joint program office, provides most of the staff support, and may finance most of the development. Development costs may also be prorated to cover service-peculiar requirements. The participants are expected to assign senior representatives for key positions, as full-time area specialists on location, or on call for part-time assistance.

Staffing the program office

Ideally, the participating services should assign representatives of appropriate rank, knowledgeable in the

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[10]Guidelines for conducting joint programs are in the 1973 "Memorandum of Agreement on the Management of Multiservice System/Programs/Projects" signed off by the top logistics commanders in the military departments. They became service regulations and were later expanded into a handbook. See Joint Logistics Commanders' Guide for the Management of Joint Service Programs (Fort Belvoir, Va.: Defense Systems Management College, revised Apr. 21, 1982).

[11]Rear Admiral Rowland G. Freeman III, U. S. Navy, Defense Systems Management Review (Spring 1979) p. 5.

[12]McDaniel & Lorenzini p. 38.

technology or functional areas (engineering, logistics, finance, test, and evaluation), enthusiastic about the program's aims, and able to locate in the program office. This is not always the case. Reluctant service partners may assign people unversed in the technology, uninterested, parochial in outlook, of too low a grade, or too few to make a contribution.[13] The joint program manager has little say in the selection or tenure of associates.

It may take 6 to 8 months to become familiarized with the joint program office, particularly in learning how the other services do business. Yet, assigning service representatives may be slow as was discussed earlier. It took the Air Force a year to staff the joint cruise missile office despite repeated OSD memorandums.

Representatives are not often located in the joint program office, but are geographically scattered. Some say this dispersion is a precursor of program split up. USDRE, perhaps mindful of that outcome, directly ordered colocation on the site in the important joint cruise missile collaboration.

Representatives appointed to the joint program have divided loyalty--to their continuing service affiliation and to the ad hoc joint program. They are in the program first and foremost to protect their service's interests. Promotions and reassignments are done by the parent service. Several sources told us that officer careers have been blighted due to loyalty conflict when their parent services were cool toward the joint program.

Nevertheless, there are very dedicated people in program offices who collaborate wholeheartedly. Service doctrine and requirements are not so rigidly guarded as in upper level service quarters, and much can be accomplished informally on the program office firing line by an enthusiastic team.

Funding the acquisition

Funding arrangements, among other things, are spelled out in the program manager's charter or interservice Memorandum of Agreement. Although the lead service more or less binds itself to the charter the other services need not. They are rarely signed off by the participating services. Funds for the acquisition are held in each service's budget program elements subject to service control, not the program manager's. The program manager often has a difficult job to get them released.

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[13] Ibid., p. 25.

The services are slow to give over money if cool to the program, if they envisage technical uncertainties or are doubtful of its outcomes. Withholding funds, too, is one way to steer a program. Program element funds, further, are subject to year-to-year budget changes, reprogramming, priority shifts, inflation, and so on. In some instances the lead service itself has reprogrammed development funds, thereby slowing the acquisition and causing the others to reconsider their participation.

Participating services are expected to pay for the development of their unique requirements, their production quantities, manuals, software, and so forth. Whether some features are indeed unique or, on the other hand, necessary to the joint system, is often heatedly debated; this also includes prorated costs of engineering changes.

Funding uncertainties and requirements conflicts are the program manager's biggest headaches. The single-service program manager has only one service budget to worry about. The joint-service manager must cope with the vicissitudes of several budgets.

THE JOINT PROGRAM MANAGER AS ORCHESTRATOR

The program manager must get funds from the participating services when needed, settle continuing requirements conflicts, muster enthusiasm, keep the partnership intact, reconcile existing contracts, negotiate multiple chains of command, maintain the program on a reasonable schedule, and get a product produced that meets DOD's many standards and also satisfies varied service needs. It is a very tall order. Some joint acquisition veterans say that program viability depends greatly on the resourcefulness, powers of persuasion, and negotiating skill of the program manager. The program manager needs lots of flexibility.

In any event, multiservice programs are extraordinary tasks to carry through in the multifaceted DOD. The Defense Science Board, in discussing system acquisitions in general, said:

> "The government procurement system is filled with 7-8 levels of management (above a program) all of whom (2-3 times a year) feel obliged to requestion the program's continued existence. Without a really strong advocate, these drops wear away armor."[14]

In a multiservice program, there are two or three times as many review ladders. Each service has different briefing

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[14]Defense Science Board, p. 46.

procedures to impose on the joint program manager. It might be said again, that as the program manager negotiates the higher links in the chains of command, the doctrine is found to be more unbending and the requirements more rigidly held. The Defense Science Board also remarked:

> "The need to obtain so many approvals tends to make the situation worse [with more complexity] since the system becomes the sum of all the minimum demands of each approver level. Multi-service programs are particularly bad from this point of view. (Emphasis added.)[15]

For another thing, the joint manager's negotiations are never over with while the joint program is alive because of continuing adjustments in requirements, engineering changes, funding uncertainties, and perhaps changes in the threat. The program manager must see that incremental engineering changes do not alter an agreed upon design into something else. When negotiations appear dead-ended, the program manager must not let controversial features be simply added on to keep the peace. While such action may keep the joint program going, it merely postpones the reckoning.

Every joint system is a committee product, a compromise to one extent or another. To add on all the requirements of each participating service may simply "internalize" the duplication costs which the joint program was originally intended to forestall. Performance may be degraded too. In the extreme case of the F-111 joint program, the Navy's physical and performance requirements were added on to those of the Air Force with the result that it became impossible to build the planned aircraft.[16]

Requirements can be contrived to be all things to all people, but it is another thing for the program manager to meet performance, cost, and schedule goals with an over compromised agg-egated design.[17]

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[15] Ibid., p. 38.

[16] Coulam, Illusions of Choice p. 83.

[17] Thomas L. McNaugher, Collaborative Development of Main Battle Tanks: Lessons from the U.S.--German Experience 1963-68 (Santa Monica. Cal: RAND, Aug. 1981) p. 19.

CHAPTER 5

SOME OBSERVATIONS OF THE ACQUISITION COMMUNITY

Nearly all the people we talked to were pessimistic or at best lukewarm about joint programs. Some thought, as we did too, that such programs ought to work, but none could point to a realized success and savings achieved. One former DOD executive summed up the views of many.

> "It's a snare and a delusion. What you get is high cost, lost opportunity cost, system elaboration and in the end, no product. Joint programs use up lots of money and lots of executive time."

Obstacles cited were interservice rivalry and associated issues--doctrinal differences, not invented here parochialism, civilian-military polarity, and differences in operating needs. The interviewees generally agreed on the need to start joint programs earlier, but doubts were expressed on whether real savings can take place under current practices. They also offered ideas for conducting joint programs.

IS INTERSERVICE RIVALRY A MAJOR ISSUE?

Some interviewees felt that interservice rivalry is overblown as far as joint acquisitions are concerned. It is the real differences, they say, in technical-operating-environmental requirements that transcend rivalries and which the services hold to be mission crucial. Understandably, a service will refuse compromises likely to suboptimize military performance, complicate interoperability, or violate service doctrine. The services want to save money to be sure, but not at the cost of military excellence as they see it. The services should not be expected to underestimate their wants or to be wholly objective. Basically, a difference of opinion about desired system capabilities,

> ". . . does not reflect upon the honor, integrity and dedication of the military officers involved. It is more likely the logical result of each officer's honest belief that his Service or his idea of a new weapon is in fact best for the country."[1]

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[1]Blue Ribbon Defense Panel, Report to the President and the Secretary of Defense on the Department of Defense (Wash.: GPO, July 1, 1970) p. 12.

COMMONALITY

The goal of joint acquisitions, as was said earlier, is not to produce identical systems for each service, but to use as many common components as are efficient. In several variants of the cruise missile (see p. 23), there is so far 15 percent commonality in airframes, 75 percent commonality in guidance components, 85 percent in engines, and 100 percent in radar altimeters.[2]

Commonality of parts makes good sense on the face of it, and doctrinal conflict is less, but as one acquisition expert warned, commonality should not override performance; the commonality tail should not wag the program dog. Standardization should not inhibit competition or restrain innovative designers especially in fast-moving technologies. Commonality should not seek the "lowest common denominator of mediocrity," said a top North Atlantic Treaty Organization[3] military commander.[4] It should be added that common subsystems spread common vulnerabilities. A widespread component may also inhibit the introduction of newer more capable equipment.

We believe, as we have reported many times, that components, common or not, should be competed to select those with the most efficient trade-off of performance and lifetime ownership cost. Such a trade-off should take into account logistics simplicity and combat readiness among other things.

ARE SAVINGS ACHIEVABLE?

Most of our interviewees and researchers on the subject of joint programs doubt that savings can be made under present practices. We found no documentation of savings achieved through joint acquisition of major systems as opposed to single-service ones. There are speculations and "ball park" estimates, but no hard numbers that we know of and no lifetime cost comparisons. Savings may be shown in the development phase, but they are academic if no joint system is eventually produced.

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[2]E. H. Conrow, G. K. Smith, and A. A. Barbour, The Joint Cruise Missile Project: An Acquisition History (Santa Monica, Cal.: Rand Corporation, Aug. 1983) p. 27.

[3]In reference to the North Atlantic Treaty Organization, it is worth noting that in international joint programs the same kind of problems are present, but exacerbated by differences in national culture, political systems, industrial organizations, and procurement practices. One former DOD executive remarked that the most frustrating years in the Pentagon were those spent on joint international programs.

[4]General Alexander M. Haig, Jr., quoted in Aerospace Daily (June 12, 1978) p. 222.

We were told that joint programs generally seem to require more, not less, development time than single-service ones, because of opposition, protracted negotiations over requirements, and multiple clearances through the "system." Some believe that the additional development time and costs of the system probably offset the hope for cost advantage.

Others believe that costs stemming from degraded performance are overlooked because of requirement compromises and loss of military versatility. New joint programs need very careful study before they are launched. There ought to be, besides technical and economic views, detached military appraisal of a joint program's net military worth.

LAUNCHING JOINT PROGRAMS EARLIER

There was agreement that mergers at the front end of the acquisition process, before ideas are cast in concrete, have the better chance of success. One way is to catch development concepts when they first emerge from research and development centers.

In confirmation hearings on December 14, 1982, before the Senate Armed Services Committee, the new Deputy Secretary of Defense, W. Paul Thayer, singled out for his attention, the need to improve the front end of the acquisition cycle to avoid proliferation of similar requirements.

IDEAS FOR CONDUCTING JOINT PROGRAMS

Among the suggestions we gathered for improving joint acquisition practices were stronger enforcement of regulations, mandated interservice buying of each other's new systems, "stronger" executives in key spots, and other measures of varying application. Our hope was to find ways to induce voluntary cooperation at higher service echelons where, as was said earlier, doctrine, requirements, and service differences are more rigidly adhered to. We also hoped for remedies that would survive administration turnovers.

There were several other suggestions of some popularity among our expert sources. The following is our summary and thoughts about them.

--Reserve a block of DOD funds to finance the development phases of joint major programs.

--Let USDRE manage all joint major programs.

--Empower the JCS to settle conflicting service requirements.

--Ask the Congress to exert its "power of the purse."

A special earmarked fund

This suggestion contemplates a block of funds set aside for joint major system development. Service funds would not be called for until the last stages of development or until procurement begins. The thought is that the services will be more willing to sign up and stay with a joint program if development is "cost free."

Some of our interviewees think it is a good idea and worth a try. Others feel that set-aside funds are still DOD money in the eyes of the services, and in one way or another, a deduction from their budgets (the services do not, in general, favor reserved or "fenced-off" funds). Others say that a service will still drop out anyway if the emerging joint system falls short of the service's requirements.

We believe that such funding might be a useful shot in the arm for joint programs when essential requirement differences are moderate. It is doubtful that separate funding will change minds, however, when the systems to be joined are clearly out of step or violate core requirements of any one service.

Whether the special funding approach would survive changes in administration is problematic. In the early 1970s, the Deputy Secretary of Defense, for instance, got a special congressional appropriation to encourage prototyping of new systems. The effects were positive at first, but impetus dwindled after the secretary's departure.[5]

Let USDRE manage all joint system programs

USDRE has the expertise to determine the technical feasibility of joint system programs. It has the detachment to resolve technical requirements disputes brought to it. It is also assigned to lessen duplication and to foster standardization. In a few excepted cases, it has intervened in the management of joint programs as in the cruise missile case. Most recently, it has redirected several individual service programs to form joint programs. In each case, however, a service was given management responsibility. The Army was selected as lead service for the Joint Tactical Missile System and for the Joint Services Vertical Lift Aircraft. (The latter program was most recently transferred to the Navy.)

Some interviewees suggest that the excepted way should become the rule. Given its character and influence, the Office

[5]Edmond Drews, Giles K. Smith, et. al., Acquisition Policy Effectiveness: Department of Defense Experience in the 1970s, R-2516-DRC (RAND, October 1979) pp. xi and 3.

of the Under Secretary should manage directly, all joint major system programs. Implicit in this suggestion is that through vigorous executive action the under secretary could end protracted bickering over requirements, expedite development, and bring joint programs to timely, successful conclusions.

It would be a significant role change. It would alter the character and structure of USDRE, requiring enlargement of control and the scope and depth of the staff. It might have to infringe on the military province--doctrine, capability selection, and service expenditure choices. It would be at odds with DOD administrations favoring decentralizing the decisionmaking to the military departments. In any event, the ramifications of such sweeping executive change reach beyond the area of joint programs.

This is not to say that USDRE should never manage joint programs. Whatever is the solution to most joint acquisition problems, there will still be the need for powerful advocate-expediters of nationally important weapon systems.

Get JCS involved

There are, as was said earlier, military requirements disputes among the services which they cannot resolve on their own. Although the JCS are strategically positioned to fill the vacuum, it is not now constituted to do so or sufficiently independent of the four services.

A host of top defense executives, military leaders, and expert observers have been speaking out, especially over the past year or so about reforming the JCS. They see a need for more detached forthright advice to the President and the Secretary of Defense on such matters as strategy, mission priorities, force structure, and weapon system choices.

In the joint acquisition arena, a number of our interviewees agree that a stronger JCS should have a direct authoritative voice. For instance:

> "Problems like joint programs would have a much better chance. . . .
>
> "The JCS should be more forceful with the services . . .
>
> "[It is] the body that should have the power and expertise to rule on joint requirements . . .
>
> "Could be the entity to resolve joint program conflicts. and,
>
> "The JCS, properly strengthened would be the best entity to rule on joint requirements . . . ."

Ask the Congress to exert its power of the purse

We were told that resolute action by the Congress as displayed in its funding decisions is critical, regardless of how DOD may be organized.

Thus, the Congress could encourage more joint programs successes by penalizing financially those services that are reluctant to join up, seek to fence out other services, or want to drop out of such partnerships. One way would be denial of funds for any alternative single-service program. Similarly, the Congress could foster still more interservice buying of finished products.

CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS, AND AGENCY COMMENTS

We entered upon this assignment, again, on the hypothesis that joint major system acquisitions should save considerable money and that there should be more of them. But we found the idea not working--no major system joint program successfully completed, that is, no combined system operating in the field and a number of developing programs in trouble. The key problems, again, are interservice disagreement on requirements (the military capability and features needed) and mergers arranged too late to succeed. Many programs seem, in hindsight, to have been ill-chosen or ill-timed.

CONCLUSIONS

We believe that expectations of savings will continue to be a "snare and a delusion" unless joint programs are more carefully chosen, timed, and conducted differently. Although joint programs are difficult to carry out, the reality is that single-service specialized systems cannot be afforded for every possible use.

Joint programs, properly launched and administered, are a way to lessen budget affordability problems and at the same time to satisfy the needs of more than one user.

Joint acquisition guidelines

Success cannot be assured, but the following guidelines might help in selecting more promising joint program candidates.

--Essential service doctrines will not be unduly compromised.

--The programs are still malleable, that is, not too far down the development road at merger time.

--Military effectiveness will not be unduly lessened.

--The potential economies are persuasive.

--There is conspicuous support by the Congress, OSD, the top military officers, and JCS.

Although these guidelines are stringent, they should bring more realism to joint program planning.

Other joint efforts

There are also a variety of lesser cooperative arrangements among the services that deserve resolute support of the Congress and the Secretary of Defense. These include monitoring each

other's research and development efforts, acquiring common subsystems, such as power plants and electronic gear, and interservice buying of each other's finished systems.

The joint program guidelines suggested above will still apply to most collaborations, but perhaps not so intensively as in "high profile" prestigious programs. Allowing a reasonable amount of postdevelopment customizing, too, may render these lesser ventures more acceptable to the services.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

We recommend that specific criteria be developed for selecting joint programs. The guidelines suggested above should be helpful in developing criteria. Future program mergers should be in accordance with such criteria.

Ideally, the time to consolidate is when the programs to be joined are at the "front end" of the acquisition process. If, however, one or another system concept is well into development--and thus relatively immune to compromise--the benefit of cutting back to one combined system ought to be very convincing.

RECOMMENDATIONS TO THE CONGRESS

For proposed new joint acquisition programs, the Congress ought to be assured that the selection criteria have been applied.

For the many joint programs underway, the Congress should require DOD to explain its plans to cope with the acquisition problems discussed in this report.

AGENCY COMMENTS

DOD provided oral comments on this report and confirmed them in their letter of October 4, 1983. See appendix II.

DOD agrees with this report's central theme that joint major acquisition programs constitute a very difficult management challenge. DOD representatives told us that they are currently trying to improve their chances of success in joint programs and have chartered a study panel of the Defense Science Board to make recommendations in this area. A report is expected next spring.

One aspect of the report with which DOD differed is our definition of joint programs, that is, major acquisitions in which participating services collaborate from early development to production. DOD prefers a broader definition that includes components, less-than-major programs, and those in which the services collaborate at any segment of the acquisition process. Thus, DOD would consider the Air Force's buying of the Navy's F-4, AIM-7, and AIM-9 as successful joint programs.

As indicated in this report, we believe that these are all good ways to conserve acquisition dollars and avoid duplication. We favor any kind of interservice collaboration that reduces system costs without degrading military effectiveness. However, in this review we defined a joint major acquisition as one involving early and continuing collaboration from development through deployment.

In our report draft we proposed cross-service competition in early development. In view of DOD concerns, it was decided that the proposal needs additional study and was accordingly dropped from our report.

DOD disagreed with our recommendation that the Congress should require DOD to explain how it plans to cope with the joint acquisition problems discussed in our report. DOD stated that it continually reports to the Congress through testimony and other means on joint acquisition programs. Although we recognize that substantial information is provided to the Congress, we continue to believe that discussions of the systemic problems described in our report would be helpful and accordingly, have retained our recommendation.

In addition, after reflecting on DOD's comments and the absence of criteria for selecting joint programs, we concluded that DOD should develop such criteria. Therefore, a recommendation to this effect was added to the report.

APPENDIX I

United States Senate

COMMITTEE ON
GOVERNMENTAL AFFAIRS
WASHINGTON, D.C. [redacted]

March 12, 1982

The Honorable Charles A. Bowsher
Comptroller General of the United States
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Chuck:

As you know, my Committee held hearings last year concerning the acquisition practices of the Defense Department. During those hearings, the issue of joint service acquisition projects was raised. Although the Committee could not explore this matter in depth, I believe it deserves a thorough review. I understand that the General Accounting Office has already begun a review of this issue and I am requesting that the study, in addition to matters already under review, be directed toward several specific points.

Our Committee hearings revealed that there are relatively few successful examples of joint-service acquisitions. The reasons for this lack of success include lack of coordination for new program starts, withdrawal of a service from a joint project before completion and interservice rivalry and competition. I would like GAO's review of this issue to concentrate on identifying the major reasons for the failure of DOD to conduct more joint service acquisition projects and, if data is available, the savings which might accrue to the Department if multi-service procurements were pursued in appropriate areas such as ground support attack aircraft and common fuses for missiles, torpedoes and bombs. A review of specific examples of projects which might have benefitted from the joint service project approach would also be useful.

In addition, one other aspect of this issue should be reviewed. General David C. Jones, the current Chairman of the Joint Chiefs of Staff, has written an interesting article which makes the point that the current organizational framework of the Defense Department makes it difficult if not impossible to synchronize service projects and ensure effective interservice cooperation. The question of how the organization of DOD contributes to service rivalries and coordination problems should also be reviewed in the study I am requesting.

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I appreciate your assistance in this matter. If your staff has any questions, please have them contact Link Hoewing or Linda Townsend of my Committee staff at 224-4751.

Sincerely,

William V. Roth, Jr.
Chairman

WVR/kkp

APPENDIX II

THE UNDER SECRETARY OF DEFENSE

WASHINGTON D C 20301

RESEARCH AND
ENGINEERING

4 OCT 1983

Mr. Frank C. Conahan
Director, National Security and
International Affairs Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Conahan:

This letter is in reply to your General Accounting Office (GAO) Draft Report, "Joint Major System Acquisition: An Elusive Strategy," dated June 1, 1983 (GAO Code No. 951673) - OSD Case No. 6270.

In general, we agree with the report's central theme that joint major acquisition programs constitute a very difficult management challenge. We are currently in the process of improving our chances of success in managing joint programs. In this regard, we have chartered a study panel of the Defense Science Board (DSB) to make recommendations in this area. Preliminary results from the DSB should be available soon.

The digest of the draft report states that the intent of a joint program is to save money through joint development, procurement and logistics support while not impairing military effectiveness. It should be noted that the intent of some joint programs, however is not necessarily to save money, but to improve military effectiveness across a mission area. This may be done by optimally employing a set of subsystem elements in the most efficient manner, and achieving where possible efficiencies in resources through economics of scale.

Another aspect of the draft GAO report with which we take issue is the definition of joint programs, i.e., major acquisitions in which participating Services collaborated from early development through production. By using this narrow definition, GAO concluded there were no successful joint acquisitions. We believe the definition should include programs in which the Services collaborated on any portion of the total acquisition cycle (e.g., the production phase). Using this definition, examples of programs we would consider successful include the F-4, AIM-7, and AIM-9. There are also a large number of joint programs currently underway, and we believe hindsight will show that a number of these have achieved our objectives. In summary, I think we were just using different yardsticks for success rather than disagreeing on which programs had beneficial outcomes.

A final general comment deals with some of the methodology of the report. A number of the prominent observations and findings are based on the opinions of anonymous interviewers. It is likely that a reader of the report will mistakenly regard these opinions as "findings"

APPENDIX II

supportable by analytical data rather than as "suggestions" whose value may be uncertain.

We hope to be able to dialogue with you further on this important area. Our more detailed comments are attached.

Sincerely,

Jim Wade

James P. Wade, Jr.
Principal Deputy Under Secretary of
Defense for Research & Engineering

Attachment
a/s

GAO DRAFT REPORT, DATED JUNE 1, 1983
(GAO CODE NO. 951673) OSD CASE NO. 6270

"JOINT MAJOR SYSTEM ACQUISITION:
AN ELUSIVE STRATEGY"

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS
TO BE ADDRESSED IN DOD'S DRAFT REPORT

* * * * *

FINDINGS

- **FINDING A:** There Are No Specific Criteria Related to Joint Programs. GAO found that whether to merge single-Service programs into a joint one is decided upon empirically; there are no specific criteria. The general premise is that if there can be enough commonality in subsystems or parts a joint program should be worthwhile technically and economically. Compatibility of the combined system for interservice use and timing of the merger are critical. However, the services may not be persuaded of its military effectiveness. (p. 2, GAO Draft Report)

- COMMENT: DoD partially concurs. There are no specific criteria for deciding when a program should be joint. This is not the type of question that lends itself to a "cookbook" approach. Defense Acquisition Circular, "Major Systems Acquisition Policies & Principles," contains general policies for joint programs, and the Defense Science Board is currently studying Joint Acquisition Programs. The DSB may provide guidelines which will improve our chances of success in this area.

- **FINDING B:** Useful Interservice Arrangements in Joint Acquisition. GAO found that joint acquisition is full collaboration from early development to deployment but any kind of interservice collaboration makes good sense. Most military technologies and activities overlap to interrelate to one degree or another. A Service may monitor another's system development, exchange ideas, or buy another Services' finished product. These are good ways to conserve development costs and avoid duplication. (pp. 2-3, GAO Draft Report)

- COMMENT: DoD nonconcurs in the sense that the GAO definition of joint acquisition of "full collaboration from early development to deployment" is overly narrow and restrictive.

The other degrees of jointness, such as a Service monitoring another's system development or buying another Services' finished product are indeed good ways to conserve costs and avoid duplication. The narrowness of this definition is a primary factor leading to the erroneous conclusion later in the report that we have no successful joint acquisitions.

- **FINDING C:** The Pursuit of Technology and Its Effects Within DoD. GAO found that the pursuit of technology superiority is an imperative of U.S. defense policy. Some side effects of this pursuit are overlap and proliferation due to preference for new equipment, threat escalation, R&D redundancy and desired versatility. Recently, however, DoD has introduced the Pre-Planned Product Improvement Program (P3I) to facilitate early fielding of adequate systems while providing for incorporation of advanced subsystems as they are created. (pp. 6-8, GAO Draft Report)

- Comment: DoD concurs in this finding.

- **FINDING D:** Interservice Differences Breed Proliferation. GAO found that each Service appears to have its own finely drawn doctrine, unique capabilities and particular operating technical requirements and believes strongly that its choice of technology, aircraft, missile or vehicle will be best for the mission and the country. It is very reluctant to compromise through merger with other system programs or to accept the design of another Service. The not-invented here attitude and parochialism is often operative in service acquisition organizations. All these views, lead to weapon system variety, unnecessary or otherwise. (pp. 8-13, GAO Draft Report)

- COMMENT: DoD partially concurs. Valid differences between Service requirements often exist and must be recognized. There is also a natural tendency on the part of the Service most interested in the hardware to want to avoid complicating the management of a program by making it joint. These factors have to be weighed against the benefits of jointness.

- **FINDING E:** Getting Agreement in Joint Requirements is the Number One Problem. GAO found that on the surface joint acquisition appears to be a straight-forward business like solution but there are several real impediments to applying this theory. First, there is a natural inclination in the services to resist the joint development and use of common weapon systems. Second, the Services find it very difficult for defensible (and not so defensible) reasons, to agree on joint requirements. Third, mergers are often arranged too late. (p. 14, GAO Draft Report)

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- COMMENT: DoD partially concurs. Getting agreement on joint requirements is especially difficult for major systems. This is particularly true when the nature of the hardware involves basic Service pride, roles, and missions, etc. Major Systems such as tactical aircraft can be so closely associated with the operating environment (i.e., sea based vs. land based) and Service doctrine as to make commonality particularly difficult. Numerous, smaller systems and items, however, are routinely developed and/or produced in a joint fashion and the Services do not pass up the opportunity to reap savings from these joint efforts. With regard to the point about arranging mergers too late, we believe that it is sometimes easier to recognize similarities in systems once they begin to evolve in the development process. Some successful programs have become joint in the production phase (e.g., F-4 aircraft).

- **FINDING F:** The Timing of System Program Mergers is Often Out of Step. GAO found that most collaborations are ordered when one service program is well along and at the threshold of engineering development or beyond. The farther into engineering development, the greater is its momentum and as a result a strong resistance by the sponsoring service to change. Discussions have been held, investments are sunk, a dedicated constituency has formed and contracts are often in place when mergers are mandated. Merging such "out of sync" programs is more likely to increase rather than save acquisition costs. (See examples described on pages 15-17). (pp. 15-17, GAO Draft Report)

- COMMENT: DoD partially concurs. While we would agree that ideally, joint developments should start from the beginning, opportunities for joint savings sometimes become evident only after a program or programs have progressed to a certain degree on their own. As illustrated in the comment on Finding E above, we should try to take advantage of these situations whenever and wherever they arise, and not stop looking for joint opportunities just because a program has already entered into development.

- **FINDING G:** Negotiating Multiservice Requirements. GAO found that once a joint program is ordered and an interservice committee formed, a long and arduous negotiation to accommodate each Service's wants in the combined system begins. Negotiations ordinarily run from six months to two years and there are long lists of requirements presented by each side. Many are nice-to-have features, rather than necessities. Others involve environmental factors or critical integration with existing systems. In addition some requirements may be omitted, held in reserve or will evolve later on. Each

service also has its own way of doing business in that there are different organizational arrangements, standards, data requirements, manuals, etc., all of which affect the ultimate design and configuration. (pp. 17-18, GAO Draft Report)

- COMMENT: DoD generally concurs.

- **FINDING H:** Fencing Out Participants. GAO found that requirements presented by one Service may prescribe or dictate a certain technical approach, a performance mode or cost that deters would-be participants. As an example, the Navy's position on the Airborne Self-Protection Jammer, a joint Air Force/Navy program, appeared to preclude the Air Force in the Navy budget statement, "It involves the development of Defensive Electronic Countermeasures (DECM) for self protection of Navy tactical aircraft against radar-controlled weapon systems...." The Air Force had appeared to be lukewarm on the program as shown by the lack of funding support for R&D, an unfilled liaison billet and general foot-dragging, according to one source. (pp. 18-19, GAO Draft Report)

- COMMENT: DoD partially concurs. As stated earlier, one Service's requirements may indeed dictate a certain technical approach that could deter other would-be participants. We would argue that this is not done as a deliberate attempt to preclude a joint program, but rather to try to insure that the original Services' requirements are best met by the program to be undertaken. The example given by the GAO of the Navy POM describing an electronic countermeasure device as being for Navy aircraft (when the program was actually joint and was being developed for Air Force aircraft as well) is more likely an oversight than anything else. These documents were descriptive rather than directive in nature, and the omission of any recognition of the Air Force in the referenced Navy POM was most probably the result of a simple oversight.

- **FINDING I:** Necessary For One Service Superfluous To Another. GAO found that as a result of trade-offs in negotiations and relative bargaining strength, one Service is likely to get more than it wants, another Service less. Both parties may be unhappy with the outcome. For example, in 1982, OSD ordered the merger of the Air Force's Pave Mover and the Army's Battlefield Data System (now JSTARS). The Pave Mover concept is more complicated and expensive than the Army wants or can afford. The Army prefers a derivative of an existing radar for its more limited task. What is cheaper and faster for the Army, however, may be more expensive, slower and have less growth potential than the Air Force wants. (p. 19, GAO Draft Report)

- COMMENT: DoD partially concurs. When any compromise is reached between two positions, it is likely that each side will have to give a little. An objective is an improvement in overall mission area effectiveness. Therefore, when a joint requirement is established, one Service may get more than it wants and one Service less than it wants. The result still may be superior (e.g., more affordable while still accomplishing the overall mission) than two independent programs. This is a matter of judgement and must be determined on a case-by-case basis.

- **FINDING J:** Withdrawing From the Partnership Has No Penalty. GAO found that there is always the possibility that one Service may reduce its procurement quantity or drop out of the program entirely, leaving its unique requirements unpaid for, or saddling the other Service (s) with higher small-lot production costs or expensive superfluous features. There is currently no penalty for dropping out of a joint program. For example, in the Air Force/Navy joint development of the F-100/F-401 aircraft engine, the Navy came to believe that the engine would be inadequate for its needs and pulled out of the program. The Air Force had to pick up a $500 million cost increase as a result. (p. 19, GAO Draft Report)

- COMMENT: DoD concurs in reference to current procedure.

- **FINDING K:** Administering and Managing Joint Program. GAO found that for a joint program to succeed it depends on picking the right systems to merge, securing cooperation, and producing satisfactory versions of the system for the military partners. However, the present assignment of roles and authority does not often induce the ready cooperation of the Services unless there is extraordinary pressure to do so. Although the Secretaries of Defense since Robert McNamara have pushed joint programs, the problem is that a Secretary can order a program merger but cannot mandate performance or degree of interservice cooperation. In the OUSDR&E, lies the general responsibility for curbing duplication in weapons systems, supporting standardization and furthering joint programs. However, after OUSDR&E allocates funds to the Services for such purposes, it has lessened control over exactly how or when the money will be spent or turned over to the system program manager (pp. 22-26, GAO Draft Report).

- COMMENT: DoD concurs. The Services ultimately determine how the money is spent on a joint program. It is very difficult for anyone to force the Services over the long hall to do something they don't want to do. This highlights the need for some form of agreement among the Services and OSD when a joint program is established.

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- **FINDING L:** Managing the Joint Program. GAO found that USDR&E appoints the "lead" Service when a joint acquisition program is decided upon. The lead Service usually appoints the program manager, sets up the authorized charter, underwrites the office, provides most of the staff support and may finance most of the development costs. While ideally the participating Services should assign staff members of appropriate rank and knowledgeable in the technology or in functional areas, this is not always the case. Reluctant Service partners may assign people unversed in the technology, uninterested, parochial, low grade or too few. Service billeting of representatives may be slow and members may be geographically scattered and have divided loyalty to their affiliation and to the joint program. Also, while funding arrangements are spelled out in the program managers charter, the funds of the participating Services are held in those budget elements subject to Service control. Often the program manager has a difficult job to get the funds released. Other problems with the participating Services include problems in identifying payment for unique requirements, manuals software, etc. Also, the Services are slow to release funds if there are technical problems or doubt of the programs' outcome. (pp. 26-29, GAO Draft Report)

- COMMENT: DoD generally concurs. These problems usually occur in joint programs when one Service considers the program to be lower in priority than the other Service. Again, this is not always the case.

- **FINDING M:** The Joint Program Manager Needs Flexibility. GAO found that the joint program manager must be flexible. The manager must get funds from the participating Services when needed, settle continuing requirements conflicts, muster enthusiasm, keep the partnership intact, reconcile existing contracts, negotiate multiple chains of command, maintain the program on a reasonable schedule and get a product produced that meets DoD's many standards and also satisfies varied interservice needs. It is a tall order. Some joint acquisition veterans say that program viability is very dependent on the resourcefulness, powers of persuasion and managerial style of the program manager. In any event, multi-service programs are extraordinary tasks to carry through in the multifaceted DoD. (p. 29, GAO Draft Report)

- COMMENT: DoD concurs.

- **FINDING N:** Interservice Rivalry As A Major Issue In Joint Programs. GAO found that while some DoD personnel feel that interservice rivalry is overblown as far as joint acquisi-

tions are concerned, in its view interservice rivalry is a factor in joint acquisition but is not too serious an obstacle unless the joint system threatens a Service's key roles and missions. Further, GAO believes that doctrinal requirements are sometimes inflated in vigorous interservice negotiation. (pp. 31-32, GAO Draft Report)

- COMMENT: DoD concurs that interservice pride and espirit-de-corps become factors when a joint program threatens a Service's key roles and missions. This is why successful joint programs are generally easier to accomplish at the subsystem or less than major system level.

- **FINDING O:** Suggestions and Ideas For Conducting Joint Programs. GAO gathered the following suggestions for improving joint acquisition practices; (1) stronger enforcement of regulations, (2) mandated interservice buying of each other's new systems, (3) "stronger" executives in key spots and other measures of varying application, (4) reserve a block of DoD funds to finance the development phases of joint major programs, (5) let USDR&E manage all joint major programs, (6) empower the Joint Chiefs of Staff to settle conflicting and service requirements, and (7) ask the Congress to exert its "power of the purse." (pp. 33-36, GAO Draft Report)

- COMMENT: Partially concur. The suggestions and ideas are not supported fully by analytical data in the report and the values are, therefore, uncertain. However, DoD is interested in any suggestions that might improve the effectiveness of its Joint Test Program and will consider, and take appropriate action on, these suggestions and ideas. Accordingly, they will be referred to the DAR Study Panel for consideration. 7

CONCLUSIONS

- **CONCLUSION 1:** Results of A Successful Joint Program. In connection with Finding A, GAO concludes that a successful joint program would achieve substantial harmonization in fielded major systems, satisfied participating Services, and actual documentable savings. (p. 2, GAO Draft Report)

  COMMENT: Partially concur. We do not agree with the GAO definition of a joint program as being only one in which Service collaboration spans the entire acquisition cycle from early development through production. There are successful joint programs where Service collaboration does not span the entire acquisition cycle. Examples include the F-4, AIM-7, and AIM-9. The failure of the GAO report to identify a

single successful joint program reflects the undue restrictiveness of its definition. We also think that "satisfied partici-pating services" and "actual documentable savings" are inadequate measures of joint program success. "Satisfaction" is too subjective; an objective measure, such as compliance with established specifications and requirements, would be more meaningful. Moreover, it is unlikely that any "actual" documentation of savings will be reliable because any such analysis must ultimately rest on a rough estimate of the difference between, for example, two hypothetical independent acquisitions and the actual joint program which is conducted. The reliability of any such estimate will be highly suspect due to the numerous uncertainties regarding the hypothetical acquisitions which were foregone in favor of the actual joint program.

- **CONCLUSION 2:** Unwillingness By The Services To Make Joint Programs Work. In connection with Findings B through J, GAO concludes that fundamentally, the Services are opposed to joint programming. Although some mergers might be ill-chosen, or ill-timed, there could be an appreciable number of successful programs if the Services, especially at the higher echelons, are willing to make them so. Nevertheless the Services, though willing, may still not be able to resolve all requirements disputes and there is no supraservice military umpire to have the final word and make it stick. The various entities in OSD, have lacked the sustained "clout" to gain acceptance and implement decisions, e.g. requirements disputes, that may be unpalatable to one military bureaucracy or another. (p. 21, GAO Draft Report)

  COMMENT: Partially concur. Agreement on requirements is a major key to successful joint programs. When the Services recognize a common requirement, they will usually voluntarily collaborate, and these voluntary collaborations usually work well. In addition to the potential successes of HARM and AMRAAM cited in the report, examples are the Air Force and Navy variants of the Army Blackhawk helicopter, as well as a number of projects related to life support systems and aircraft engine technology, to mention only a few.

- **CONCLUSION 3:** Need To Choose Joint Programs More Carefully And Use A Different Approach In Conducting Them. In connection with Findings K through O, GAO concludes that expectations of savings will continue to be a "snare and a delusion" unless joint programs are more carefully chosen, and conducted differently. Joint programs can work out if:

  (1) essential service doctrines will not be unduly compromised,

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(2) the programs are not too far down the development road at merger time,

(3) military effectiveness will not be unduly lessened,

(4) the possibilities of savings are persuasive, and

(5) there is conspicuous support by the Congress, the Office of the Secretary of Defense, and the Joint Chiefs of Staff. (p. 37, GAO Draft Report)

COMMENT: Partially concur. We disagree that all mergers must come at the earliest possible point in the program acquisition cycle. Collaboration may make sense at a number of points in the acquisition cycle, including production (e.g., F-4, AIM-7 and AIM-9).

RECOMMENDATIONS

- **RECOMMENDATION 1.** GAO recommends that since there are many joint program mergers now underway, the Congress should require Defense to explain how it plans to cope with the joint acquisitions problems discussed in this report. (p. 38, GAO Draft Report)

  COMMENT: Non concur. DoD reports to the Congress on a continuing basis concerning joint acquisition problems, e.g., testimony on joint programs.

- **RECOMMENDATION 2.** Ideally the time to merge is when the programs to be joined are at the "front end" of the acquisition process. If, however, one or another system concept is well into development--and thus relatively immune to competitive adjustment, GAO recommends to the Secretary of Defense that the economies of cutting back to one combined system ought to be very convincing. (p. 38, GAO Draft Report)

  COMMENT: Partially concur. Although it may be desirable to join programs as early as possible, we think collaboration can make sense at any point in the acquisition cycle, and the definition of "joint" should recognize this fact. The GAO report itself recognizes the value of collaborations falling outside its own definition (p. 2-3).

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APPENDIX II

- **RECOMMENDATION 3.** GAO recommends to the Secretary of Defense that when a multi-Service program is decided upon at thefront end, there ought to be competition from the start between the services and their contractors in accordance with Office of Management and Budget Circular A-109. If procurement quantities are sufficient there should be dual-service production competition as well.

  COMMENT: Nonconcur. Cross-Service competition as suggested is not really practical and does not necessarily comply with A-109 policy. A-109 primarily envisions competition between 2 or more contractors working against a single set of requirements developed by one agency. Competition between different designs from 2 or more Service/contractor teams would make it very difficult to eventually choose one and discard the other. This would essentially be two programs competing rather than two approaches within a program. Once a Service/contractor team (and therefore a "constituancy") is established, each Service will push for continuation of its program and an agreement on a single program would be all the more unlikely.

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