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BY THE U.S. GENERAL ACCOUNTING OFFICE

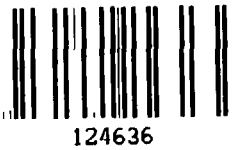
Report To The Secretary Of Defense

Increased Joint Avionics Standardization Could Result In Major Economies And Operational Benefits

The Congress, the Office of the Secretary of Defense, and the military services recognize that standard avionics equipment for military aircraft is needed. Standard avionics is viewed as desirable, feasible, and economical when compared to the traditional military practice of procuring aircraft-unique avionics.

In December 1980, the Joint Services Review Committee for Avionics Components and Subsystems was established to promote the development of standard avionics equipment. Based on the Committee estimates, potential cost avoidance of $770 million could be realized by developing and procuring five of its subsystem standardization candidates. However, the Committee has not received adequate funding support for its candidates.

This report discusses the potential benefits of avionics standardization and the impediments encountered by the Committee and recommends actions necessary to achieve desired objectives.



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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

NATIONAL SECURITY AND
INTERNATIONAL AFFAIRS DIVISION

B-215379

The Honorable Caspar W. Weinberger
The Secretary of Defense

Dear Mr. Secretary:

This report discusses the Department of Defense's efforts to standardize tactical avionics subsystems and the need to provide better support for these activities. Our objective was to look at the progress made in standardizing core avionics subsystems by the Joint Services Review Committee for Avionics Components and Subsystems.

This report contains recommendations to you on page 16. As you know, 31 U.S.C. 720 requires the head of a federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Director, Office of Management and Budget and the Secretaries of the Army, the Air Force, and the Navy. Copies are also being sent to the Chairmen of the Senate and House Committees on Armed Services and Appropriations, the House Committee on Government Operations, and the Senate Committee on Governmental Affairs.

Sincerely yours,

Frank C. Conahan

Frank C. Conahan
Director

GENERAL ACCOUNTING OFFICE
REPORT TO THE
SECRETARY OF DEFENSE

INCREASED JOINT AVIONICS STANDARDIZATION COULD RESULT IN MAJOR ECONOMIES AND OPERATIONAL BENEFITS

D I G E S T

Recognizing the need to control spiraling avionics costs, the military services started a program in December 1980 to standardize avionics and formed the Joint Services Review Committee (JSRC) for Avionics Components and Subsystems. JSRC was chartered to identify and support standard avionics subsystems. The JSRC initially estimated that about $500 million could be saved by developing and producing just 5 of the more than 30 candidates its members identified. This estimate has since been updated to $770 million. In addition to the dollar savings, the services and the Office of the Secretary of Defense believe standard equipment helps meet the increasing demands for joint operations and improved maintenance capabilities. (See p. 3.)

Because of the many opportunities for cost avoidance and other savings through standardization, GAO evaluated the services' efforts at standardizing avionics systems. GAO's specific objective was to look at progress made by the JSRC during the last 3 years.

While most participants have expressed strong support for avionics standardization, the JSRC program has been hindered by funding deficiencies, coupled with insufficient high-level commitment to implement stated policies. (See p. 11.)

In the first 3 years, the services provided only $21 million of the $64 million considered necessary to begin developing the five systems. The outlook for the fiscal years

1985-89 is not much better, since the services have budgeted only a little more than one-third of the funds JSRC believes necessary. Subsequently, the services told GAO that they would provide about 60 percent of the funds needed by the JSRC. (See p. 7.)

If needed funds are not allocated to develop and procure joint subsystems, each service will continue to acquire its own equipment. This results in service and aircraft-unique configurations that generally cost more to buy and maintain and hampers joint operational effectiveness.

Several factors have precluded successful avionics subsystem standardization. Because of low visibility, ad hoc management, and the small size of the JSRC projects, attempts to get top management's attention can be difficult. In addition, organizations responsible for promoting equipment standards, including JSRC and the Defense Materiel Specifications and Standards Office, have neither the authority nor the resources to manage joint standard avionics programs. (See p. 11.)

Another problem is funding instabilities. Even after required funds are initially approved, subsequent reprogramming actions and budget cuts occur because of conflicting priorities within the services. Standard avionics projects have lost out in this budget process because they are relatively small, low-priority items. The efforts are jointly funded and can be cut by any of the services at higher levels. Their visibility is such that decisionmakers are often not aware that program elements being cut contain funds for standard joint projects. (See p. 12.)

CONCLUSIONS

GAO believes the Department of Defense (DOD) and the services have taken some positive steps toward avionics standardization by establishing JSRC. It is not enough, however, to simply issue policies and set objectives. Top management commitment must be enhanced and funds must be allocated to projects expected to provide major cost-saving and operational benefits. Only if this is done will the systems be produced and installed on the targeted aircraft.

RECOMMENDATIONS

GAO recommends that the Secretary of Defense direct the secretary of each service to

--establish a management structure for standardization that includes a high-level sponsor accountable for supporting the JSRC programs through the budget process,

--determine whether funds for fiscal year 1984 and subsequent years should be reprogrammed to ensure that joint standard avionics systems sponsored by JSRC are developed and available when needed to meet candidate aircraft installation schedules, and

--establish a dedicated budget line item for joint avionics programs.

AGENCY COMMENTS

DOD agrees with the first two recommendations but does not agree with the last one. DOD officials believe a dedicated line item would reduce program flexibility and instead would like to see a provision for JSRC to make its budget submission directly to each service's avionics standardization sponsor. GAO believes dedicated program element numbers and budget line items constitute a more visible way to achieve funding stability.

DOD officials also point out that progress made by JSRC is significant considering that it was first chartered in 1981 and has only recently become part of the normal DOD funding/budgeting cycle.

GAO agrees that JSRC activities constitute a significant step forward in promoting triservice equipment standardization. However, GAO also knows that many similar efforts have in the past gotten off to good starts only to be hindered by (1) a lack of sustained high-level attention, (2) fluctuating operational requirements, and (3) unwillingness to budget funds up front for such initiatives. JSRC projects, though relatively small, have already been the subject of frequent budget cuts. Unless the services individually show greater commitment, DOD will have continued difficulty realizing the economic benefits of standardization.

Contents

ABBREVIATIONS

AHRS	Attitude Heading Reference System
DADS	Digital Audio Distribution System
DMSSO	Defense Materiel Specifications and Standards Office
DOD	Department of Defense
FDR	Flight Data Recorder
GAO	General Accounting Office
JSRC	Joint Services Review Committee
OSD	Office of the Secretary of Defense
SCADC	Standard Central Air Data Computer

CHAPTER 1

INTRODUCTION

The Congress, the Office of the Secretary of Defense (OSD), and the military services for a long time have been concerned with the proliferation and duplication of military equipment in general and avionics[1] equipment in particular. Standardization is seen as an economical alternative to duplication and proliferation and as a means to enhance readiness, interoperability, and reliability.

In response to the Defense Cataloging and Standardization Act of 1952, the Department of Defense (DOD) established the Defense Specification and Standardization Program. This program provided for the establishment of the Defense Materiel Specifications and Standards Office (DMSSO) and the Defense Materiel Standardization and Specifications Board.

DMSSO is responsible to the Under Secretary of Defense for Research and Engineering for establishing standardization policies, procedures, program guidance, and controls. Implementing and enforcing the policies and procedures are the responsibility of the services.

The Board, which is composed of senior representatives from the services, the Defense Logistics Agency, and OSD, was reactivated in 1981 after 5 years of inactivity. The prime reason for its revitalization was to facilitate standardization within the services. The Board is required to meet two times a year to study standardization and cataloging issues and advise OSD.

In recent years, the Congress has emphasized the need to standardize avionics equipment. In 1977, 1979, 1980, and 1983, the defense appropriations bills and hearings emphasized development and use of standard equipment. Further, the House Subcommittee on Legislation and National Security oversight reports for 1977 and 1982 emphasized the need to standardize military equipment, including avionics. Other committees have shown similar interest.

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[1]Avionics, as defined by the Air Force, include all the electronic and electromechanical systems and subsystems (hardware and software) installed in an aircraft or aircraft system in these functional areas: communications, navigation, weapons delivery, identification, instrumentation, electronic warfare, reconnaissance, flight controls, engine controls, power distribution, and support equipment.

As a result of this congressional emphasis, the Assistant Secretaries of the services responsible for research and development established in 1980 the Joint Services Review Committee (JSRC) for Avionics Components and Subsystems. JSRC was chartered to identify opportunities for and facilitate the standardization of avionics subsystems. JSRC consists of one member from each service and is chaired by one of those members on a rotating basis. The members perform JSRC functions on a part-time basis. Funding and implementing JSRC sponsored standard subsystem candidate programs is the responsibility of the services' agencies normally responsible for avionics engineering, development, production, and logistics support. Each JSRC member submits a budget request for standardization candidates to his or her own service where it competes with other programs contained in the total service budget.

Interest in standard avionics was further increased in 1981 when the Deputy Secretary of Defense established the Acquisition Improvement Program which included an initiative to develop and use standard operational and support systems. The services were asked to identify new subsystems and support equipment candidates to satisfy common requirements. They were also asked to justify buying peculiar rather than common equipment. As another initiative, DMSSO has placed new emphasis on its standardization program. The new emphasis is on standardizing equipment where prior emphasis was on such paper standards as military and federal specifications. DMSSO has selected avionics standardization to demonstrate this new emphasis and provides support to JSRC.

OBJECTIVES, SCOPE, AND METHODOLOGY

We made this review to evaluate the services' efforts at standardizing avionics systems. Our objective was to look at progress made in standardizing core avionics subsystems by JSRC. We did not review other DOD standardization initiatives.

During our review, we discussed avionics standardization and reviewed program documents at numerous organizations in the Army, Air Force, Navy, and DOD. We also reviewed and discussed with representatives of JSRC, the services, and contractors, the methods used by JSRC in computing its cost avoidance estimates. Lastly, we examined numerous past reports on standardization issued by the Congress, DOD, and our agency. (See app. I.)

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

CHAPTER 2

AVIONICS STANDARDIZATION

OPPORTUNITIES ARE BEING MISSED

Based on JSRC's current estimates, $770 million could be saved if the first five avionics standardization candidates it sponsored were developed and installed on military aircraft. However, these five programs have slipped and cost avoidance opportunities have been missed. Others may be missed unless adequate funds are budgeted to develop and produce these items. In the first 3 years since JSRC was established, the services funded only $21 million of the $64 million required by JSRC. For the next 5 years, the services have budgeted little more than one-third of what JSRC believes is necessary to develop these items. Recently, service officials told us that about 60 percent of the required funds would be budgeted.

JSRC OBJECTIVES AND EFFORTS

JSRC was established in December 1980 by the Assistant Secretaries of the services for research and development to review, identify, and support joint avionics standardization projects that meet interservice requirements and reduce the overall life-cycle cost of DOD avionics.

JSRC designated avionics components and subsystems as either "mission" or "core" equipment. Mission avionics are defined as equipment designed and developed to satisfy a specific mission of a weapon system such as electronic warfare, fire control, and target acquisition. Core avionics are defined as equipment which fulfill some common aircraft requirement such as communications, enroute navigation, identification, radar altimeters, and attitude/heading reference systems.

To promote success and credibility in its initial efforts, JSRC opted to concentrate on "core avionics" which were not expected to be controversial items. Specifically, JSRC limited its scope to core avionics since these (1) are usually mature, stable, and low-risk technology and (2) would meet with less resistance from the services than would mission-oriented and aircraft peculiar avionics. Also, in recognition of its limited control and resources, JSRC concentrated on core avionics projects for which the research and development cost was not expected to exceed $25 to $30 million.

JSRC members independently proposed over 30 candidate core avionics subsystems for joint development. They found 18 acceptable as either biservice or triservice candidates and selected 5 low-risk items for initial sponsorship. In 1983 JSRC selected two additional subsystems for joint development. Additional potential candidates are available and will be considered as time, funds, and personnel resources permit.

POTENTIAL BENEFITS ARE MAJOR

Costs to develop, procure, and support avionics for modern high technology aircraft are large. According to industry sources, DOD will acquire over $50 billion worth of avionics in the next 5 years. Since avionics development and procurement funds are buried in major weapon systems program lines, it is difficult to confirm the accuracy of the total avionics investment in any one year.

Standardization is seen as a way to reduce life-cycle costs while simultaneously enhancing interchangeability, interoperability, supportability, and force readiness.

JSRC projected economies

JSRC's 1982 cost avoidance estimates for developing and producing the initial five standard versus separate unique subsystems were calculated at $488 million in 1980 dollars. In January 1984 this savings estimate was updated to $770 million in 1983 dollars.

While this cost avoidance estimate is impressive, we believe it is only an example of the total potential cost avoidance opportunities available by standardizing avionics. For instance:

--JSRC has agreed to sponsor two additional candidates as funding becomes available, increasing total potential cost avoidance by an additional $70 million.

--Other possible candidates have already been identified but not yet fully defined.

--JSRC has not addressed either mission-oriented avionics, which are generally greater in cost, or core avionics subsystems exceeding $25 million in development, test, and evaluation costs.

While we did not audit the validity of specific supporting data used by JSRC, we did review and discuss with JSRC and OSD officials the documents, computational methods, and procedures used in computing the original $488 million estimated cost avoidance. We found their logic and assumptions credible and predicted savings possible if the necessary management actions are completed.

The assumptions used by JSRC to determine its cost avoidance estimates are summarized below.

--JSRC used 5-year avionics procurement or modification program planning schedules, rather than less certain 15-year projected requirements in estimating economic order quantities.

--The lowest rather than highest estimate of aircraft applications was used.

--JSRC did not assume worst case proliferation in its cost comparison but assumed that the services would individually standardize their own avionics equipment to a greater extent than they have before.

--Cost estimates for the separate unique items were based on anticipated cost to provide comparable capabilities to those planned for the standard subsystems. (The exact nonstandard items that would be procured for each aircraft type cannot be determined. Most core avionics are procured through the aircraft prime contractor and the items are usually nonstandard.)

--Standard DOD estimating methods and models were used to project the impact of competition and economic order quantities on unit price.

We did not examine the current $770 million savings estimate. This new figure is based on 1983 dollars and includes some previously excluded operation and support costs for the four active JSRC projects. Savings for the Data Transfer Loader/Verifier, which was subsequently deferred, are included as they were originally estimated. A comparison of the original and current saving estimates by subsystem is shown in appendix III.

Cost avoidance savings cannot be quantified precisely because the savings depend on (1) the number of items that are standardized, (2) the nature of the nonstandard avionics and

associated ground support equipment, (3) research and development efforts that would be avoided, (4) the type and quantities eventually procured, (5) the procurement method, and (6) miscellaneous factors. However, numerous other studies project major economies through standardization which support the magnitude of savings projected by JSRC.

For instance, DOD sponsored a study in the mid-1970s which indicated that 13 to 26 percent of the life-cycle costs of avionics could be saved by standardizing. Also, our 1978 report[2] on avionics proliferation cited cases involving aircraft radios and navigation equipment where substantial savings were achieved by standardizing.

In addition to savings opportunities identified previously, new requirements continue to generate new savings opportunities. To illustrate, JSRC's most recent report, for the year ending June 1, 1983, lists eight additional candidate aircraft for a Standard Central Air Data Computer (SCADC) and five additional candidates for the Standard Digital Audio Distribution System (DADS). Such opportunities for avionics installations will understandably vary depending on the nature of new aircraft procurements and the need to replace worn out or difficult-to-maintain equipment in older aircraft.

Operational benefits

According to OSD officials, standard avionics contribute to the achievement of more interchangeable and supportable equipment which enhances force readiness. Specifically, standard subsystems would simplify logistics and enhance combat readiness by reducing requirements for different repair parts, test equipment, special tools, personnel, and training. For instance, since 1960 companies have sold more than 80 different air data computers to the services. Of these, 28 are now obsolete, difficult to maintain, and scheduled for replacement. SCADC, a JSRC candidate, will have 1 set of support requirements to replace the current 28 sets, alleviating traditional logistics burdens. Further, SCADCs could reasonably expect to receive emergency service at any United States military (and perhaps allied) air base worldwide.

[2]Letter report to the Secretary of Defense (May 12, 1978, PSAD-78-105).

STATUS OF STANDARD SUBSYSTEM FUNDING AND DEVELOPMENT

Although JSRC has made positive efforts to identify and develop standard avionics subsystems, none of its five candidates are currently available for use by aircraft program managers, and availability schedules continue to slip due to limited development and production funds. JSRC has received only one-third of the $64 million it originally estimated would be needed for the first 3 years, ending in fiscal year 1984. The funding picture for the next 5 years is also deficient. In its June 1983 annual report, JSRC stated that $100 million is needed for fiscal years 1985-89. Since then, the services have budgeted only $38 million for that 5-year period although we have been told that the services will provide about 60 percent of the funds required for development of JSRC projects. (See app. IV.)

A description and current status of the initial five JSRC candidates follows. Potential aircraft applications for each of the subsystems are listed in appendix II.

SCADC

SCADC processes data on air pressure, temperature, flight angle, and true air speed and relays this to displays, fire control, navigation, and other on board systems. JSRC's current cost avoidance estimate of $240 million is based on estimated cost to develop and procure the computer to replace 28 nonstandard items programmed for replacement or modification, and to meet requirements for an air data computer on multiple types of new aircraft in production.

SCADC received most of the limited development funds made available for JSRC projects. As of February 1984, it was still being tested and evaluated.

The Air Force planned to award a production contract in the fall of 1983 to meet initial Air Force and Navy SCADC requirements. The award has since been delayed until the summer of 1984 because of internal controversies over such things as support requirements and reliability specifications. As a result, Air Force funds programmed for SCADC production have been allocated to other programs. Both services continue with operational test and evaluation of preproduction SCADC models.

During this period, the Air Force did not make a commitment to use the SCADC in its KC-135R modification program and allowed its prime contractor to select a nonstandard air data computer even though the Air Force Deputy for Avionics Control continued to encourage use of the SCADC.

Current SCADC milestones are critical to achieving the expected cost avoidance. For instance, the Navy has fiscal year 1984 production requirements to procure SCADCs for the A-4M, A-6E, and C-2A refurbished aircraft, but Navy officials stated these plans could change if award of the joint SCADC production contract is further delayed by the Air Force.

DADS

DADS is planned to be a triservice standard aircraft intercommunications system. All aircraft require such a system to provide a communications link between the pilot's headset/microphone, radio sets, secure voice devices, and other avionics equipment which provide audio inputs/outputs. In the past, intercoms were designed to meet specific aircraft requirements which led to proliferation.

Intercoms used in older aircraft types have operational and support problems. Operational deficiencies include cross-talk between audio channels, poor protection against radio frequency interference, no protection from interception and electromagnetic pulse, inability to interface with newer digital radios, poor voice quality, and vulnerability to central or single point damage. Supportability difficulties are due to proliferation, obsolescence, and unavailable replacement parts. JSRC proposes the standard DADS as the replacement intercom system in at least 28 different aircraft types and models. The total number of aircraft involved is more than 9,400.

Since the required funds for all JSRC projects were not made available in 1981, JSRC chose to fund SCADC as its first project. Contract awards for development and production of DADS have slipped accordingly. Consequently, the S-3A aircraft modification program, which was to use DADS, will now use another intercom system. Additional program delays could cause more cost avoidance opportunities to be lost since several aircraft are expected to use DADS over the next few years.

Attitude Heading Reference System

An Attitude Heading Reference System (AHRS) provides yaw, pitch, roll, angular rate, and heading information to cockpit instruments and associated avionics, including position/navigation, surveillance, reconnaissance, fire control, and flight control systems.

As of December 1983, the AHRS specifications had been drafted but the 3-year development effort may not begin until fiscal year 1985 because funds are not available. The Navy's

fiscal year 1984 avionics budget received a reduction of about $1.5 million in the appropriations process. Of this overall reduction, the Navy allocated $0.5 million to the AHRS program. Further, the Army budgeted the $1 million requested by JSRC in fiscal year 1984 but subsequently reprogrammed the money to other areas. Since the AHRS program has slipped, the planned installation of AHRS in three different aircraft types has been deferred. Any additional slippages will jeopardize other potential aircraft applications.

Data Transfer Loader/Verifier

The standard Data Transfer Loader/Verifier effort is to investigate current and future requirements for computer data transfer devices in many different aircraft applications and to determine where standardization can be applied. Thus, data transfer requirements will be integrated into a single system to limit equipment proliferation. Computers are central to the functions of most avionics subsystems. The many different aircraft types and associated interfaces with avionics subsystems on each aircraft, plus the many different operational requirements of the services for this Data Transfer Loader/Verifier, complicate completion of the specifications for the development contract.

This project has been deferred because, according to JSRC officials, "neither technology nor requirements are sufficiently mature for development to begin . . . ." Nevertheless, Navy and Air Force officials believe the expected benefits of the project are still valid, and industry sources maintain that technology is currently available to satisfy the requirement once the specification is written.

Flight Data Recorder

The Flight Data Recorder (FDR) integrates and records flight parameters and aircraft systems information which needs to be retrieved in the event of a crash or lesser incident. FDR monitors airframe fatigue for diagnosis during periodic maintenance. Most current tactical aircraft do not have FDRs. The Deputy Secretary of Defense estimated aircraft accidents may cost DOD $1 billion each year. Cost benefit studies have shown the use of FDRs can help reduce aircraft accidents and the associated loss of personnel and equipment.

Currently, the Air Force has a need for FDRs on many of its tactical and strategic aircraft, but the requirement has been unfunded. The actual implementation of FDRs in Air Force aircraft will be driven by such factors as funding priorities, loss rates of particular types of aircraft, and money availability.

JSRC's current savings estimate of $100 million is based on the difference between developing three separate recorders, one for each military service, versus one standard recorder for all the services.

Because JSRC funds are inadequate to develop FDR, the Air Force is developing a recorder using the JSRC triservice specification and F-16 program funds. Meanwhile, the Navy is developing an ejection and flotation device for use with the joint FDR to permit retrieval of the recorded flight data information at sea. This shows that positive efforts can be made even under JSRC's funding constraints.

CONCLUSIONS

In summary, standard avionics subsystems

--can save development and support funds,

--can be designed to be interchangeable in many different types of aircraft,

--will be easier to support, and

--can help increase force readiness.

Although JSRC selected what it believed were the five most feasible candidates for avionics standardization, and three are in development, none of the systems are in production. Opportunities for significant economies have been missed and additional cost avoidance opportunities are in jeopardy. Also, some future opportunities for operational benefits may be missed.

The five candidates represent only a few of the opportunities to achieve avionics standardization. Unless adequate funding is provided to develop and produce standard equipment, DOD will continue to forego major economies and needed interchangeability in different aircraft.

CHAPTER 3

AVIONICS SUBSYSTEMS STANDARDIZATION OBSTACLES

Based on our evaluation of JSRC efforts, avionics standardization is not occurring as rapidly as it could, primarily because of funding deficiencies, coupled with insufficient high-level management commitment to implement stated policies. These factors are the same that have adversely influenced similar efforts for at least the past 10 years based on the findings of numerous studies. As a result, only modest progress has been made in light of the many opportunities available. Unless high-level management attention is given within the services to resolve funding deficiencies and to see standardization policies implemented, JSRC avionics standardization may fare no better than past standardization attempts.

FUNDING DIFFICULTIES JUSTIFY NEW MEASURES

A key obstacle to the JSRC's success in standardizing avionics is funding deficiencies which prevent timely development and production of avionics subsystems. Their development must be completed and production contracts awarded so that aircraft program managers know the standard items will be available when they are needed for aircraft installation. Delays in the program can cause aircraft program managers to opt for procuring a nonstandard item through the prime contractor. It seems incongruent that there are usually funds within a major aircraft program to develop and procure nonstandard avionics equipment but inadequate funds in the standard avionics programs.

As stated in chapter 2, only about one-third of the funds needed for the first five core avionics standard subsystem candidates was initially provided by the services. In discussing the causes of the funding difficulties with the service, JSRC, DMSSO, and OSD representatives, we found the funding deficiencies result from the following factors.

--JSRC candidates are viewed as small dollar, lower priority avionics subsystems, especially in the budget process where they compete against well-sponsored major weapon systems and more costly mission critical avionics programs. Top management support for the avionics standardization program is not sufficient to prevent it from being overpowered by the large, well-sponsored

programs. For example, the multibillion dollar F-16 aircraft program has sponsors to defend it through the budget process, but there is no comparable sponsor for a low-dollar standard intercom system which could provide a lower cost item to meet an essential core avionics requirement. In the absence of a standard item, the F-16 program manager will procure a nonstandard item through the prime contractor.

--JSRC programs are jointly funded and the funds are frequently reduced or deleted by one of the three services due to a mismatch in service priorities, aircraft installation schedules, or requirements. For example, the Army deleted funds programmed to the JSRC's standard AHRS in fiscal years 1984-86. The JSRC sponsors are making an effort to have Navy funds reprogrammed to begin a development contract during the third or fourth quarter of 1984.

--The JSRC candidates characteristically require 3 or more years to develop. When this lead time is coupled with low visibility and lack of strong proponents, the result is that such projects, which yield substantial benefits in the long run, lose out when competing for funds with projects that satisfy more immediate needs of service commanders.

JSRC members informed us that when it comes to setting priorities on budget allocations, standard subsystem development comes out second best to specific weapon systems which usually contain nonstandard avionic subsystems. Due to the uncertainty about standard items being available, aircraft program managers are reluctant to use them or share the cost of their development. This occurred in the case of the SCADC. Because the award of a government-furnished equipment production contract for SCADC has slipped, program managers of the Air Force C-5B and Navy C-2A aircraft are now buying contractor-furnished computers which will likely be different and less economical than the standard computer supported by JSRC.

Several ways were suggested by various DOD representatives for enhancing the standard core avionics program's ability to compete for scarce funds. One approach is to use a separate budget line item for JSRC candidates. Currently, each service places its JSRC core avionics projects in a program element which also contains other equipment. On several occasions, the Congress made reductions in the overall program element with no expressed intent to cut standardization items, but the services subsequently allocated some or all of the reductions to the JSRC

proposed core avionics items. Navy representatives said this occurred in fiscal years 1980, 1982, and 1984. In one case, the reductions resulted from congressional controversy over the AN/AYK-14 computer (a non-JSRC project).

Navy representatives believe that a proposal to establish a separate line item in each of the services' budgets for truly standard avionics would be helpful and readily accepted by the services. In addition to giving the Congress greater visibility on standard equipment items, the separate line item would allow more emphasis and attention to be given during the DOD budget process. Furthermore, this approach would minimize the risks of standard systems being overpowered by well-sponsored, large dollar, and highly visible service programs.

Another idea is to reserve or dedicate a block of funds to finance the development of joint service projects at either the OSD or service level. OSD representatives believe this approach would be an improvement over the current situation. The services, on the other hand, believe that funds set aside by the services or controlled by OSD will in one way or another result in a net reduction in the overall budget ceiling remaining under their control.

A third suggestion is to enhance sponsorship of the JSRC program at top echelons of OSD and the services. Since core avionics subsystems are small and lack visibility, they do not attract high-level management support and attention. Further, JSRC is a low level, ad hoc management committee without full-time or permanent staff. It does not have the authority or clout to resolve requirements disputes and strongly defend the program in higher level budget reviews. In 1983 the Defense Science Board found this to be a problem with joint service standardization efforts. The Board concluded that an ad hoc style is not consistent with sound, stable programs, and recommended a more formal process to ensure service involvement and to resolve problems.

Because of the lack of visibility, ad hoc management, and small size of the JSRC projects, attempts to get management attention can be difficult. Individuals responsible for communicating the needs and problems are reluctant to bring issues on small items to the attention of top management occupied with major budget issues on multibillion dollar systems. The feeling expressed was that top echelon officials have, on a daily basis, "fires to put out" on the higher priority items such as the B-1 bomber and the MX missile.

To illustrate the problem, in September 1983 DMSSO attempted to have OSD restore $5 million for the Army's JSRC budget share during the OSD major systems acquisition budget review. DMSSO's request was returned without consideration since OSD procedures only allow programs costing at least $50 million or more to be considered in that review. Thus, the potential for $50 million or more in savings offered by a JSRC candidate is not accorded the same priority as a program costing $50 million.

In another case, OSD requested the three services to immediately reprogram 1982 funds for the JSRC candidates and provide the JSRC with long-term support. However, only the Navy complied with the request. Army and Air Force officials were unaware of the request until we brought it to their attention. According to OSD, it did not followup the reprogramming requests because the staff was busy with larger programs.

We believe that a strong sponsor at top echelons of the services with a vested interest in standardization efforts could help achieve JSRC program objectives. JSRC, DMSSO, and OSD representatives concur with this. One reason for the Navy's relative success in funding JSRC projects has been the support provided to the JSRC by the Assistant Secretary of the Navy for Research, Engineering and Systems.

HISTORY OF UNSUCCESSFUL STANDARDIZATION ATTEMPTS

During our review of JSRC, we came across numerous past attempts to standardize military equipment, including avionics. They indicate a broad consensus as to the benefits of standardization, but they also show that progress has been slow. The limited success so far with JSRC programs is one example of standardization attempts.

--In 1974 the Defense Advanced Research Projects Agency identified and recommended to OSD 22 candidates for avionics standardization. Two of the candidate systems subsequently showed up on the JSRC list of candidates 7 years later.

--A 1977 Defense Science Board report on specifications and standards concluded that until senior management became more actively involved with program details rather than general direction, little improvement could be expected. It recommended strengthening DOD management of the Defense Standardization Program. Since then, OSD has started various initiatives and standardization policies but has not enforced them.

--A 1978 Defense Science Board Task Force report on command and control systems management recommended a central organization to manage joint service systems to ensure compatibility and operational effectiveness. The recommendation received much discussion but was not implemented.

--In a 1978 report, we recommended that the Secretary of Defense accelerate efforts to develop, issue, and fully implement a standardization policy for avionics and other electronics and then monitor the development and procurement of these items to ensure that the policy is implemented. DOD has not followed through on these recommendations.

--In a 1980 report, we stated that substantial savings could be realized if military aircraft ground support equipment were standard so that the same equipment could service more than one aircraft. A joint service panel was formed to study this problem and made recommendations that were approved for implementation by the Joint Logistics Commanders in June 1983. As of January 1984, the OSD action officer requested but had not received information from either OSD or the services that implementation actions have started.

--The 1981 Acquisition Improvement Program included an initiative to standardize similar equipment. The program's Steering group reported in May 1983 that service implementation of the standardization initiatives is moving slowly.

CONCLUSIONS

This standardization of core avionics systems through JSRC efforts is not occurring as rapidly as it could because of funding deficiencies and insufficient high-level management commitment. Consequently, the JSRC program seems likely to follow the same path as its many predecessors unless something is done.

To simply issue policies and set objectives are not enough. We believe top management commitment to avionics standardization must be enhanced. At a minimum this should include high-level sponsors in the services to support JSRC programs through the budget process and increase the chances that they are adequately funded. We also believe each of the services should establish specific budget elements for joint

standard projects so that decisionmakers are more aware of joint programs when they make their funding decisions. Whatever is done, the key is that accountability for standardization programs must be placed at the highest levels and be reinforced on a continuing basis.

RECOMMENDATIONS

We recommend that the Secretary of Defense direct each of the service secretaries to

--establish a management structure for standardization that includes a high-level sponsor accountable for supporting the JSRC programs through the budget process,

--determine whether funds for fiscal year 1984 and subsequent years should be reprogrammed to ensure that joint standard avionics systems sponsored by JSRC are developed and available when needed to meet candidate aircraft installation schedules, and

--establish a dedicated budget line item for joint standard avionics programs.

AGENCY COMMENTS AND OUR EVALUATION

DOD provided official oral comments on a draft of this report in April 1984. DOD agrees with our first two recommendations but does not agree wih the third one concerning a separate budget line item for standard avionics programs. DOD officials believe a dedicated line item would reduce program flexibility. They instead suggested a recommendation to allow JSRC to make its own budget submission directly to each service's program element monitor for these avionics standardization programs. While we agree that this proposal may help JRC projects compete more successfully for service funds at higher management levels, it may not promote funding support at lower levels. We believe dedicated program element numbers and budget line items for these JSRC projects are a more visible way to achieve funding stability. In this way, organizations responsible for making single service cuts of JSRC projects are more visible for review and oversight actions.

DOD also does not believe we gave proper credit for the progress achieved so far by the JSRC. Officials stated the JSRC was first chartered in 1981 and only recently has been able

to insert its projects into the normal DOD funding/budgeting cycle. They also do not believe that delays in developing and producing the standard subsystems occurred as a result of limited development and production funds.

We agree that JSRC activities constitute a significant step forward in triservice equipment standardization. However, we also point out that many similar DOD efforts have been started in the past, only to be hindered by (1) lack of sustained management attention, (2) fluctuating operational requirements, and (3) the services' unwillingness to place adequate budget authority on triservice standardization programs. JSRC projects have already been the subject of frequent budget cuts. There are numerous issues to be resolved before these standard subsystems can be procured and installed in targeted aircraft. Only at this point will DOD begin to realize the economic and operational benefits of standardization. Thus, our concern is that unless the services show greater commitment, JSRC projects will fare no better than previous standardization attempts.

Another aspect of the report with which DOD differed is the funding profile for the five JSRC projects. DOD claimed we used old data and in April 1984 indicated the services have provided roughly 60 percent, or $60 million, of the required $100 million for JSRC projects in the fiscal years 1985-89 time frame. We did not receive confirmation of the increased funding in time to include it in this report. However, we changed the report to reflect DOD's claim.

Lastly, DOD raised some concern about the $770 million cost avoidance estimate used throughout our report. While officials agree that this figure is probably conservative because it does not include all savings from operations and maintenance of standard systems, they point out that one of the projects included in this figure--the data loader/verifier--has been deferred. We think the figure is still a reasonable estimate since service officials have stated the need for this standard device is still valid and cost avoidance savings could be achieved when it is developed and produced.

SELECTED REPORTS ON STANDARDIZATION AND JOINT DEVELOPMENT ISSUES

Executive Office of the President:

Task Force Report on OSD, President's Private Sector Survey of Cost Control, July 13, 1983, appendix C.

DOD:

Current Initiatives in the DOD Standardization and Specification Program to Improve the Acquisition Process, November 3, 4, and 5, 1981, DMSSO, 5203 Leesburg Pike Suite 1403, Falls Church, Virginia 22041.

Acquisition Improvement Program (AIP) Second Year-End Report, May 18, 1983, Deputy Secretary of Defense, AIP Steering Group, Washington, D.C. 20301.

Report of the Task Force on Specifications and Standards, April 14, 1977, Defense Science Board, Office of the Director of Defense for Research and Engineering, Washington, D.C. 20301.

Summer Study Briefing Report for Joint Service Acquisition Programs, August 1 to 12, 1983, Defense Science Board, Office of the Under Secretary of Defense for Research and Engineering, Washington, D.C. 20301.

Command and Control Systems Management, July 19, 1978, Defense Science Board, Office of the Under Secretary of Defense for Research and Engineering, Washington, D.C. 20301.

McDonnell Aircraft Company, Future Avionics Standardization Study, July 1974, Defense Advanced Research Projects Agency, 1400 Wilson Blvd., Arlington, Virginia 22209.

GAO:

Management of the Development and Procurement of Airborne Electronics (Avionics) by the DOD (PSAD-78-105, May 12, 1978).

Increased Standardization Would Reduce Costs of Ground Support Equipment for Military Aircraft (LCD-80-30, Feb. 7, 1980).

DOD's Standardization Program for Military Computers--A More Unified Effort Is Needed (LCD-80-69, June 18, 1980).

Redirection of Air Forces' Tactical Radio Program Is Needed (C-MASAD-82-1, Oct. 29, 1981).

DOD Instruction 5000.5X, Standard Instruction Set Architectures for Embedded Computers (MASAD-82-16. Jan. 27, 1982).

Need to Reexamine JTIDS Requirements and Architecture (MASAD-82-28, Apr. 2, 1982).

Issues Concerning DOD's Global Positioning System as It Enters Production (MASAD-83-9, Jan. 26, 1983). (Note: Includes appendix of nine of our related navigation reports.)

Joint Major System Acquisition: An Elusive Strategy (NSIAD-84-22, Dec. 23, 1983).

POTENTIAL AIRCRAFT APPLICATIONS[a]

1. SCADC

	Air Force	Navy
	TA-7C/A-7D/A-7E FB-111A C-5A/B KC-135R C-141A F-4E/G/J EF-111A F-111F	A-4M EA-6A/B KA-6D A-6E TA-7C/A-7E C-2A E-2C F-4S
Potential aircraft	2,217	1,410
Total	3,627	

2. Standard DADS

	Air Force	Navy	Army
	A-7 A-10 C-130 B-52 C-135 C-141 E-3 E-4 F-4 F-5 F-15 F-16 F-105 F-111 H-1 H-53	E-2C A-6E KA-6D SH-2F F-14 P-3C CH-46 S-3A SH-60B	H-64 CH-47D UH-60
Potential aircraft	6,000	1,400	2,036 + new helicopters
Total	9,436		

[a]JSRC identified these aircraft applications in 1981 which were used to determine its $488 million cost avoidance estimate.

3. Standard AHRS

	Army	Navy
	AH-64 AH-1 EH-60 OH-58 UH-60 UH-1 CH-47D RU-21H OV/RV-1 RC-12D EH-60A	S-3A E-2C RH-53D SH-2F SH-3H SH-60B C-2A CH-53E SH-3D P3B EP-3E AH-1 CH-46 UH-1
Potential aircraft	2,000 to 4,300	550 to 1,620
Total	2,550 to 5,920	

4. Standard Data Transfer Loader/Verifier

	Air Force	Navy	Army
	A-7 A-10 B-52 F-111 F-4 F-15 F-16 F-105 C-135 OV-10 C-130	P-3 A-6 A-7 F-18 F-14	AH-64 AH-1 EH-60 OH-58 UH-60 UH-1 CH-47D EH-60A
Potential aircraft	5,000	2,500	4,000
Total	11,500		

5. Standard FDR

	Air Force	Army	Navy
	F-16 F-15 A-10 FB-111	UH-60 AH-64 CH-47D OV-1/RV-1 C-12 AH-1	C-2 EC-130 VTX SH-60 P-3C VHXM S-3A F-14 EA-6B AV-8B F-18
Potential aircraft	3,200	1,000	1,700
Total		5,900	

SEPARATE VERSUS STANDARD DEVELOPMENT AND PROCUREMENT COST AND SAVINGS FOR SELECTED CORE AVIONICS SUBSYSTEMS

Selected avionics subsystems	Estimated procurement quantities	Original estimate 1980 dollars Cost			Current estimated savings 1983 dollars[a]
		Separate	Standard	Savings	
		(millions)			
SCADC	3,627	$308	$159	$149	$240
DADS	9,436	208	227	53	200
AHRS	2,250	207	139	68	40
Data Transfer/ Loader Verifier	11,500	360	170	190	190[b]
FDR	5,900	125	97	28	100
Total		$1,208	$792	$488	$770

[a]Does not include additional programs identified by JSRC but not sponsored due to the unavailability of funds.

[b]Current JSRC estimate does not include the Data Transfer/Loader Verifier. Savings estimate of $190 million represents original estimate in 1980 dollars.

FUNDING STATUS OF JSRC

CANDIDATES AS OF NOVEMBER 1983

Selected avionics subsystems	Actual funds provided[a] for FY 1981-84	Funds budgeted for FY 1985-89
	(millions)	
SCADC	$12.648	(c)
DADS	5.912	$25.054
AHRS	2.220[b]	3.300
Data Transfer/ Loader Verifier	0.100	-
FDR	0.600	9.300
Total	$21.480	$37.654[d]

Source: JSRC

[a]Includes funds budgeted for FY in which status information was provided (i.e. FY 1984).

[b]Revised to reflect $0.5 million reduction due to Navy reprogramming action after status information provided.

[c]No development funds are programmed for SCADC during FY 1985-89; however, production funds have been programmed for these years.

[d]DOD officials told us in April 1984 that total funds budgeted for JSRC projects had increased to about $60 million. Documentation for this increase was requested but not received in time to include in this report.

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