



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

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AAA

MISSION ANALYSIS AND
SYSTEMS ACQUISITION DIVISION

B-205807

FEBRUARY 26, 1982

The Honorable Caspar W. Weinberger
The Secretary of Defense



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Attention: Director, GAO Affairs

Dear Mr. Secretary:

Subject: Opportunities Exist to Achieve Greater Standardi-
zation of Aircraft and Helicopter Seats
(MASAD-82-22)

We reviewed the efforts of DOD and the services to standardize flight life-support equipment. While formal management structures and informal agreements have resulted in several standardized life-support items, we found a proliferation of tactical aircraft and helicopter seat systems, the most expensive items of life-support equipment. We believe the past methods of acquiring seats have been costly; that standardization opportunities have not been adequately defined; and that for the most part, standardization efforts undertaken have not been adequately organized, planned, and supported either by DOD or the services. Increased management emphasis by the Under Secretary of Defense (Research and Engineering) and the services could increase standardization of aircraft seats and lower acquisition and support costs. Implementation of the Deputy Secretary of Defense's April 30, 1981, initiatives, which recognized that increased standardization of subsystems and support systems cannot only reduce life-cycle costs but also increase reliability, should result in additional economies.

BACKGROUND

Standardization of subsystems and support systems requires definition of the opportunities, organization of programs to coordinate user needs, and support by the using services and the Office of the Secretary of Defense. Benefits of a successful program can include reduced acquisition costs through a reduced number of individual development programs; longer, more efficient production programs; and lower support costs through reduction of the number of items in inventory.

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Since the services often have similar requirements for flight life-support equipment, the joint logistics commanders began promoting standardization of that equipment in the early 1970s. In the mid-1970s, the Under Secretary of Defense (Research and Engineering) established a triservice approach for standardizing life-support equipment to foster standard procedures, decrease training costs, and save on maintenance and other costs. The Under Secretary directed each service to prepare an integrated, multiservice plan for standardization of life-support equipment in their functional environments; that is, Army--ground, Navy--sea, and Air Force--flight. Several years later, in July 1980, a steering committee and working groups were established and a formal agreement was completed by the Assistant Secretaries for Research of the services. As of early 1982, no integrated, multiservice standardization plans had been produced.

Despite the absence of such plans, several items of life-support equipment have been standardized within each service and occasionally across service lines. These items have normally been the somewhat less complex and less costly items, such as helmets, oxygen masks, fire retardant clothing, and rafts.

MINIMAL STANDARDIZATION OF TACTICAL AIRCRAFT SEATING SYSTEMS

Little has been accomplished across service lines in standardizing ejection seats for tactical, high performance aircraft or for helicopter crashworthy seats, the most expensive items of life-support equipment for aircraft. Ejection seat systems have proliferated and strategies have not been developed for triservice standardization.

High performance aircraft seat systems

Over a period of time, the Navy and the Air Force have developed a number of different ejection seats for attack and fighter aircraft so that the Navy now has 14 ejection seats and the Air Force has 7 ejection seats that are not interchangeable. (See enc. I.) Such proliferation points to a lack of concerted efforts extending over some time to define and capitalize on standardization opportunities for seats, particularly on an interservice basis. However, in a major development effort, the Air Force showed that intraservice standardization is feasible and cost effective when it developed and installed the same Advanced Concept Ejection Seat (ACES II) in three of its tactical aircraft, the A-10, F-15, and F-16. The Air Force estimated a savings of \$46 million in life-cycle costs by using the same basic seat in those three aircraft.

The fact that the Air Force Life Support System Program Office was responsible for developing the ACES II seat and that coordination between that office and the aircraft program offices was mandatory for life-support items undoubtedly was largely responsible for the ability of the Air Force to use the same seat on three different aircraft. In contrast, aircraft program offices in the Army and the Navy are not required to coordinate their life-support development activities with their respective life-support program offices, and further, nearly all Army and Navy seat systems have been acquired through the aircraft prime contractor rather than by the life-support offices.

We inquired but did not identify any concerted efforts to develop a common or standard ejection seat for high performance aircraft for use across service lines. The only ejection seats used by more than one service are found on aircraft common to both the Air Force and the Navy, the F-4, and A-7. Aircraft with similar performance capabilities like the Navy F-14 and Air Force F-15 have different ejection seats. (See enc. I.) Acquisition costs range from about \$42,000 per seat for the F-15 to about \$102,000 per seat for the F-14. No concerted effort was made to develop a seat for use in both the F-15 and the F-14; therefore, it is uncertain whether an interservice seat would have been feasible.

Helicopter seat systems

Crashworthy seating for helicopters substantially improves pilot survival in helicopter crashes and is a relatively new initiative in seat system design. The Army and Navy coordinated on an effort to develop a new common crashworthy helicopter seat to be used for several helicopter models. However, the seat developed will likely be used on only one helicopter because the program managers of other helicopters have decided to use seats developed through helicopter prime contractors.

In that regard, between 1972 and 1979 the Navy managed a \$305,000 effort (with funding supplied by Army) to develop a standard crashworthy armored seat for the Army's UH-60A, the Navy's SH-60B and the Army's AH-64 helicopters. The Army will use the jointly developed seat on the UH-60A at a unit cost of about \$5,700 for the fifth production buy. Army officials estimated that selection of the jointly developed seat for the UH-60A resulted in savings of \$7.2 million compared with the cost that would have been charged by the contractor to develop a seat peculiar to the UH-60A. The Navy SH-60B program manager decided that the helicopter should have an unarmored seat which was acquired through the prime contractor at a unit cost of about \$25,200. The Army's AH-64 program manager has not seriously considered use of the jointly developed seat. The cost of the AH-64 seat is estimated at \$22,300 each.

Resistance to standardization

The Deputy Secretary of Defense, in recent initiatives to improve acquisition practices, recognized that development and use of standard support systems can reduce life-cycle costs. Progress in implementing that initiative is evident, but there are impediments that must be overcome. These include

- vested interests of the services and resistance to use of standard equipment by project managers,
- a lack of project offices assigned to develop standard equipment, and
- low funding priorities for development of standard equipment.

Resistance to standardization by the services may, in part, be a result of perceived undesirable consequences of standardizing equipment. These include loss of competition, too heavy reliance on a single product, lost opportunities to advance technology, and necessity to design the aircraft around the seat. We recognize that the important advantages of standardizing ejection seats, such as reduced acquisition and life-cycle costs, must be balanced against these potential consequences. However, we also believe the undesired consequences can often be minimized or eliminated by appropriately managing the standardization effort and developing a sound acquisition strategy.

Although each of the services has established an office to coordinate development and acquisition of flight life-support equipment, the emphasis and control varies. The Air Force's Life Support System Program Office has the authority to require that aircraft program managers coordinate their plans for development and acquisition of life-support equipment with that office. That process aids in defining standardization opportunities and controlling proliferation of life-support systems. Army and Navy aircraft program managers are not required to coordinate life-support equipment needs with the life-support offices established in those services.

By funding and supporting a development program for a standard seat, opportunities are available to avoid multiple seat development programs for individual aircraft; concentrate on the most advanced technology; and obtain the benefit of longer, more efficient seat production programs.

CONCLUSIONS

The success that has been achieved in standardizing some items of life-support equipment is encouraging, but the most expensive items of life-support equipment, aircraft seating systems, have proliferated. We recognize, as pointed out by the Deputy

Secretary of Defense, that there are barriers to achieving increased standardization. Nevertheless, greater standardization of aircraft seating systems could substantially lower acquisition and support costs of modern aircraft. To accomplish greater standardization and realize the savings, increased emphasis by the Under Secretary of Defense, the Tri-Service Life Support Equipment Steering Committee, and the services is required. This includes defining opportunities and developing master plans, insisting that life-support equipment plans for each aircraft be coordinated with the service life-support program office, assigning responsibility for development and acquisition of standard equipment, and supporting funding when development of standard items is determined appropriate. Further, a current assessment of planned ejection and crashworthy seat use in ongoing or emerging aircraft or helicopter programs may surface opportunities to achieve near-term standardization or use of existing seats.

RECOMMENDATIONS

To effectively achieve standardization of life-support equipment, we are recommending that the Secretary of Defense

- require that the Tri-Service Committee define the opportunities and prepare plans for standardization of tactical aircraft seats, to be approved by the Under Secretary for Research and Engineering, before submission of the fiscal year 1984 budget to the Congress;
- review aircraft programs near the completion of development, or in early production, to determine if existing or standard seats have been or could be incorporated;
- determine if use of an existing or standard seat design would be cost effective on a life-cycle basis for those aircraft in which the service is planning to develop or procure a peculiar seat;
- emphasize the need for service support of development programs that may be initiated for standard items; and
- require that the Secretaries of the Navy and the Army provide for mandatory coordination of life-support equipment plans with the services' life-support program office.

We are sending copies of this report to the Director, Office of Management and Budget, and to the Secretaries of the Army, Navy, and Air Force. We are also sending copies 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.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a

written statement on the 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 would appreciate receiving a copy of your statement when it is provided to the congressional committees.

Sincerely yours,



W. H. Sheley, Jr.
Director

Enclosure

EJECTION SEATS ON FIGHTER/ATTACK AIRCRAFT

<u>Air Force</u>		<u>Navy</u>	
<u>Aircraft</u>	<u>Seat type (note a)</u>	<u>Aircraft</u>	<u>Seat type (note a)</u>
A-7	Escapac I-C-2	A-4 F, M, after aircraft 489	Escapac I-F-3
A-10, F-15, & F-16	ACES II	A-4 F, M, after aircraft 256	Escapac I-G-3
A-37	Weber	A-4 E, L	Escapac I-A-1
F-4	Martin-Baker MK-H7	A-6, prior to aircraft 119	Martin-Baker MK-GRU-5
F-5	Northrop	A-6 A, E, and F-14 A	Martin-Baker MK- GRU-7 & 7A
F-105	Republic	A-7 B, E	Escapac I-G-2
F-106	Weber	AV-8A, prior to Mod 613	Martin-Baker MK1 Type 9A
		AV-8A, after Mod 613	Stencil SEU-3/A
		AV-8B	Stencil SJU-4/A
		F-4, prior to aircraft 307	Martin-Baker MK-H5
		F-4, N, J, S	Martin-Baker MK-H7
		F-8	Martin-Baker MK-F7
		F-11A	Martin-Baker MK-X5
		F-18A	Martin-Baker MK-US10

a/Seat types are not interchangeable except as shown.