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U.S.-JAPAN CODEVELOPMENT

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Update of the FS-X Program



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National Security and International Affairs Division

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The Honorable Thomas S. Foley
Speaker of the House of
Representatives

The Honorable Claiborne Pell
Chairman, Committee on Foreign
Relations
United States Senate

The Honorable Sam Nunn
Chairman, Committee on Armed
Services
United States Senate

The Honorable Ernest F. Hollings
Chairman, Committee on Commerce,
Science, and Transportation
United States Senate

The Honorable Donald W. Riegle, Jr.
Chairman, Committee on Banking,
Housing, and Urban Affairs
United States Senate

This is an unclassified version of a classified report dated January 7, 1992, on the progress made in implementing the U.S.-Japanese agreement on the FS-X program. We have updated information from the classified report concerning U.S. access to Japanese FS-X technology to reflect more current conditions. This report was prepared in response to the conference report on the fiscal year 1990 appropriations act for the Departments of Commerce, Justice, and State; the Judiciary; and related agencies.

We are sending copies of this report to other interested congressional committees and to the Secretaries of Defense, State, and Commerce.

This report was prepared under the direction of Joseph E. Kelley, Director, Security and International Relations Issues. He may be reached on (202) 275-4128 if you or your staff have any questions. Other major contributors are listed in appendix III.

A handwritten signature in cursive script that reads "Frank C. Conahan".

Frank C. Conahan
Assistant Comptroller General

Executive Summary

Purpose

Congress has been concerned about the transfer of U.S. technology to Japan through the FS-X codevelopment program. Consequently, the conference report on the fiscal year 1990 appropriations act for the Departments of Commerce, Justice, and State; the Judiciary; and related agencies required GAO to monitor and periodically report on the implementation of the FS-X program. For this report, GAO (1) reviewed the program's status, including cost issues and technology flow to the United States; (2) addressed U.S. government and contractor controls over the release of F-16 related technical data to Japan; and (3) examined the U.S. government's export licensing process for reviewing and approving the release of other FS-X related military items to Japan.

Background

The U.S.-Japan FS-X program, funded by Japan, involves the joint development of an F-16 derivative fighter aircraft and production of six prototypes. The FS-X is planned as the replacement for Japan's domestically developed F-1 fighter aircraft. Japan is obtaining U.S. design and development assistance based primarily on F-16 technical data. The program is not fully defined; as a result, the type and extent of U.S. technical data required are subject to change.

The United States will receive a 40-percent work share of Japan's FS-X development budget. The United States also has access to technologies derived from F-16 related technologies, at no cost, and access to Japanese-developed FS-X technologies (non-derived) at a cost to be determined. There are four non-derived technologies: the radar, mission computer, the inertial reference system, and the integrated electronic warfare system.

The government of Japan has overall program responsibility, and Mitsubishi Heavy Industries is the prime contractor. General Dynamics, the manufacturer of the F-16, is the principal U.S. airframe subcontractor. General Dynamics will manufacture two sets of composite wings for the FS-X prototypes, based on Japanese technology. The U.S. Air Force is responsible for monitoring day-to-day program activities for the U.S. government. Much of this responsibility has been assigned to the F-16 System Program Office.

Results in Brief

FS-X development costs have increased by about 70 percent from a preliminary 1987 estimate of about \$1.1 billion. Costs have escalated primarily because of design and configuration changes to the aircraft that were not included in the 1987 estimate. Estimates are likely to increase as the development program continues to evolve, according to U.S. government officials. Japanese government officials told GAO that General Dynamics was responsible for a significant portion of the increased costs and that Japanese industry costs had risen slightly. However, U.S. Air Force estimates prepared in late 1990 and early 1991 indicated that both U.S. and Japanese contractor cost estimates have increased significantly.

U.S. efforts to obtain Japanese FS-X technologies have produced mixed results. General Dynamics has had good access to Japan's composite wing technology, and its officials noted that Japanese production techniques are impressive. However, access to Japan's non-derived technologies has been limited primarily to data on the FS-X radar. The U.S. government continues to seek access to all the non-derived technologies, but information has been limited, in part because these technologies are in the early stages of development. Further, U.S. government officials noted that Japan has not always been readily forthcoming with information about its FS-X technologies.

The United States continues to adequately control the release of F-16 related technical data to Japan. In a few instances, General Dynamics released technical documents to Japan without prior Air Force approval, but no sensitive data was involved. These appear to be isolated cases. There was no further evidence that such releases were made without the appropriate Air Force review.

GAO identified 75 approved munitions licenses, as of March 15, 1991, that permitted U.S. firms to market military items to Japan for the FS-X program. The State Department is responsible for approving these licenses but relies on DOD for technical advice. The U.S. Air Force's F-16 System Program Office, which is responsible for controlling the release of F-16 technical data, was not consistently included in the review process. However, the Air Force took steps during GAO's review to systematically include the program office in the licensing review process.

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Principal Findings

FS-X Program Status

FS-X development costs have increased by about 70 percent, from about \$1.1 billion in 1987 to about \$1.9 billion in 1990. The 1987 estimate assumed that the aircraft would be built in the United States and that few changes would be made to the basic F-16 airframe. However, the aircraft will be built largely in Japan, and Japan has made significant changes to the aircraft's configuration during the design phase.

Japanese government officials declined to provide GAO with their FS-X cost estimates. They said that cost data was still being analyzed and had not been presented to the Diet (the national legislature of Japan). They did state that General Dynamics costs have escalated, but Mitsubishi cost increases have not been significant. According to U.S. Air Force estimates, both Japanese and U.S. contractor cost estimates had increased significantly. U.S. government officials said further cost increases are considered likely.

Technology Transfer From Japan

U.S. access to and transfer of Japanese technology is an integral part of the FS-X program. General Dynamics, for example, has already received significant data on Japan's composite wing. The U.S. government is also seeking access to Japan's four non-derived technologies. Overall the results have been limited. DOD has made two technical exchange visits to Japan and collected a significant amount of data on Japan's FS-X radar. It has, however, obtained limited information on Japan's other non-derived technologies. For example, in December 1991, a Department of Defense (DOD) team visited Japan and collected information on the FS-X mission computer. U.S. government officials said that only basic information was collected because the Japanese had not made basic design decisions. Although DOD trips are planned for the other non-derived technologies, access to data is uncertain, as these systems are also in the early stages of development. U.S. government officials noted that Japan has not always been forthcoming with information pertaining to its FS-X technologies. Procedures governing the transfer of technology continue to be clarified to improve opportunities for access.

U.S. industry has not been included in DOD technical visits to Japan. DOD provided a report to industry based on the first visit, but the data was sanitized and had limited distribution. Industry officials told GAO that they remain interested in learning more about Japan's radar developments and

believe that the U.S. government should sponsor an industry visit to ensure greater access. DOD and Commerce officials recognize that it would be beneficial for U.S. industry to participate in a government-sponsored radar visit. In response to these concerns, Commerce, in coordination with DOD, plans to sponsor a FS-X radar symposium in the United States for U.S. industry in June 1992. Japan's radar manufacturer will participate in the symposium.

**ontrols for F-16 Technical
ata Package**

The F-16 technical data package list, which consists of approximately 10,550 documents, serves as the baseline for the FS-X design. The F-16 System Program Office reviewed these documents and determined that approximately 95 percent, including about 7,900 routine production drawings, were releasable in some form. GAO found that sensitive F-16 software and design data were being withheld. Further, the U.S. government release policy has been stringently implemented to protect critical F-16 technologies. GAO also found that in a few instances General Dynamics had released supplemental F-16 data to Japan without the U.S. Air Force's approval. This data was not considered sensitive by either the Air Force or General Dynamics. According to General Dynamics officials, this practice was terminated and the Air Force's F-16 System Program Office developed procedures defining the types of contractor data that would require review and approval for release. Further, the System Program Office inadvertently authorized the release of some interface data, and General Dynamics released some composite data prior to receiving written approval. However, these also appeared to have been isolated cases.

**ata Released Through Other
S-X Export Licenses**

In addition to General Dynamics, other U.S. firms seeking to participate in the FS-X program have obtained military export licenses to provide items to Japan. Most of the licenses have been for technical data to support marketing presentations. As of March 15, 1991, GAO identified 75 licenses that had been approved. FS-X licenses are approved by the State Department, in consultation with DOD.

Within DOD, the U.S. Air Force plays a key role in the review of FS-X license applications, along with the Defense Technology Security Administration and the Defense Security Assistance Agency. The F-16 System Program Office, which is responsible for approving the release of most of General Dynamics' F-16 technical data to Japan, had not been participating fully in the Air Force's review process.

In response to concerns raised by the System Program Office and GAO's review, Air Force headquarters has systematically increased the program office's participation in the review process. GAO plans to continue to monitor this issue over the course of the development program.

Recommendations

GAO makes no recommendations in this report.

Agency Comments

GAO obtained written comments on a draft of the classified version of this report from DOD and Commerce, and they concurred with GAO's findings (see app. I and II). The Department of State had no comments. Commerce noted that it would continue working closely with DOD and U.S. industry to obtain access to Japan's FS-X related technologies. GAO included certain updated information in this report that the agencies did not provide written comments on, but GAO reviewed these additional facts with cognizant DOD and Commerce officials to ensure accuracy.

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Abbreviations

DOD	Department of Defense
GAO	General Accounting Office
JAE	Japan Aviation Electronics Industry, Ltd.

Introduction

The United States and Japan are codeveloping the FS-X, a fighter aircraft designed to support and improve Japan's defensive capabilities. Six prototypes will be built during the development stage, and technologies from both countries will be incorporated into the aircraft. The program (1) supports U.S.-Japan foreign policy and defense objectives, (2) promotes the concept of technology flow from Japan to the United States, and (3) provides substantial U.S. industrial participation. FS-X implementation was delayed due to a protracted U.S. government review and debate over the equity of the program and subsequent disagreements between the contractors and governments over the transfer of Japanese technology. Industry design activities are under way, and the two governments have established a management structure to oversee program issues.

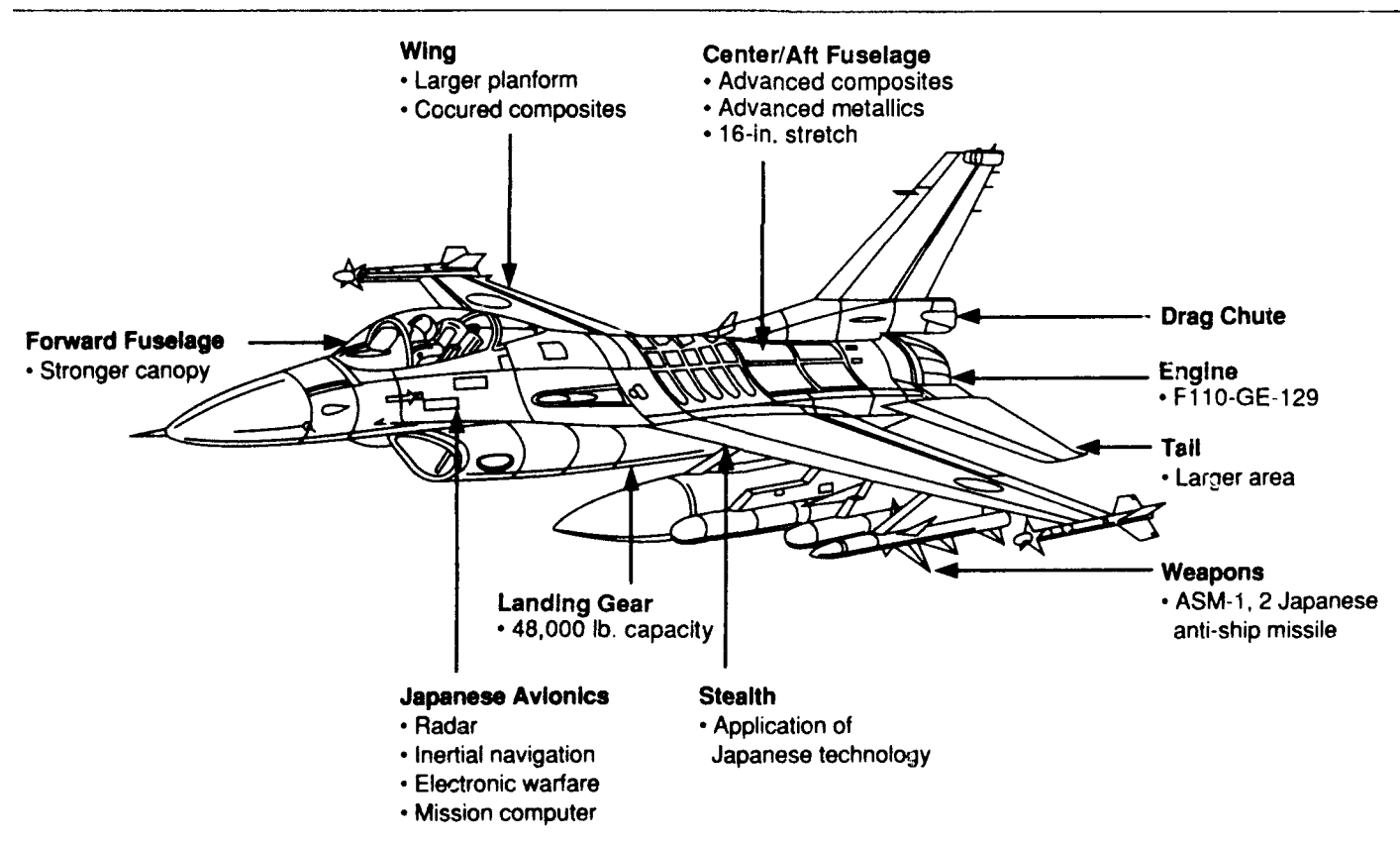
Program Overview

In November 1988, the U.S. and Japanese governments signed a Memorandum of Understanding establishing the FS-X codevelopment program. The memorandum was the culmination of about 3 years of discussions and negotiations between the two countries. Japan had seriously explored the possibility of developing its own aircraft to replace its fleet of domestically produced F-1 fighter support aircraft. Beginning in the mid-1980s, the Department of Defense (DOD), with the State Department's assistance, took steps to dissuade Japan from developing its own aircraft because of cost, scheduling delays, risk, and other operational factors. The United States encouraged Japan to buy an existing U.S. aircraft, but DOD never considered this option very likely. The idea of codevelopment, or merging both countries' technologies into a "hybrid" aircraft based on an existing U.S. aircraft, was agreed to in August 1987. In October 1987, the Japan Defense Agency selected General Dynamics' F-16 as the baseline aircraft for FS-X.

During our review, U.S. and Japanese government officials told us that it is important for the FS-X program to succeed. In their opinion, FS-X remains a highly visible symbol of mutual defense cooperation between the two countries and supports security objectives in the Pacific region. Japanese officials said that the success of the FS-X depends on continued U.S. support. Japanese Defense Agency officials rejected the idea that FS-X promotes Japan's commercial aviation industry. They noted that FS-X supports legitimate Japanese military requirements. A senior-level Japanese FS-X industry official acknowledged, however, that FS-X should enhance the development and growth of Japan's aerospace engineering and design capabilities.

The FS-X design will be based on the F-16, with significant modifications. While similar in appearance, the FS-X will be larger than the F-16. For example, the FS-X design calls for a 25-percent larger composite wing, based on Japanese technology, longer fuselage, and larger horizontal and vertical tails. The FS-X will also have a U.S.-supplied "increased performance engine" and will incorporate four Japanese-developed technologies: radar, inertial reference system, integrated electronic warfare system, and mission computer. Figure 1.1 shows the major differences between the FS-X and the F-16.

Figure 1.1: Differences Between the FS-X Configuration and Block 40 F-16



Japan Is Responsible for Program Leadership

Key aspects of the FS-X program are established by a series of government-to-government and commercial agreements. Under these agreements, Japan will fund the development program and will be responsible for program leadership. Japan has final authority over the aircraft's configuration, scheduling, and cost. Six prototype aircraft are planned—two for ground testing and four for flight testing. The United States is guaranteed 40 percent of the development work share budget and approximately 40 percent of the production budget if the program proceeds into that phase. If Japan decides that the program should enter into production, approximately 130 aircraft are expected to be built. The FS-X program agreements provide the United States access to Japanese technology introduced into the program. Under the agreements, the Japan Defense Agency will transfer to the United States, at no cost, technology derived from U.S.-provided F-16 data. The United States will also have access to Japan's non-derived FS-X technology at a cost to be agreed on at the time of transfer.

U.S. and Japanese contractors are responsible for designing and manufacturing the FS-X. Mitsubishi Heavy Industries, a Japanese company, is the prime contractor and is responsible for portions of the airframe, avionics, digital flight controls, and support equipment. Mitsubishi is also responsible for overall FS-X systems integration. Systems integration is critical to a successful advanced aircraft program and refers to all the various aircraft components working together to perform mission-related functions. U.S. government officials have noted that Japan has limited experience in advanced aircraft systems integration.

Other prominent Japanese industry participants include Fuji Heavy Industries and Kawasaki Heavy Industries. Fuji is responsible for developing the aircraft's nose, composite wing upper skin, and tail assembly; Kawasaki is responsible for the center fuselage. Ishikawajima Harima Industries, another participant, will perform engine maintenance during the development stage and is expected to manufacture portions of the engine during production. However, certain engine manufacturing tasks will not be authorized by the U.S. government.

General Dynamics is the major U.S. industry participant. Its work share is guaranteed to be at least 30 percent, but no more than 31 percent, of FS-X development costs. Although General Dynamics is a subcontractor, it plays a significant role. It is responsible for providing technical assistance to Japan and will design and produce certain parts of the FS-X. General Dynamics will participate in the development and production of the FS-X

composite wing box (the stationary portion of the wing) and is responsible for manufacturing two sets of wings for the FS-X prototypes. General Dynamics will also manufacture the aft fuselage and wing leading edge flaps. It also has lead responsibility for designing and fabricating certain avionics test equipment and the stores management system.¹

Other U.S. companies are involved in the program. In December 1990, General Electric was selected to supply FS-X prototype engines. Many other U.S. firms are seeking to sell components, such as fuel tanks, avionics equipment, and ground support equipment, to Japan during the development stage of the program.

FS-X Implementation Started Slowly

The FS-X program was initially delayed because of congressional and executive branch scrutiny of the proposed arrangement in early 1989. Concerns were raised about (1) protecting sensitive U.S. technology, (2) minimizing Japan's opportunities to use the technology to advance its commercial aerospace industry, (3) guaranteeing U.S. industrial participation beyond the development stage, and (4) ensuring U.S. access to and transfer of Japanese technology. In response to these concerns, the President ordered an interagency review of the program in February 1989, and clarifications to the basic agreement were sought and obtained from Japan that

- ensured a production work share of approximately 40 percent for the United States,
- increased safeguards for U.S. technology, and
- confirmed access rights to Japanese FS-X technologies.

Following an extensive debate, the Senate failed to block the FS-X arrangement. However, Congress approved a joint resolution, the Byrd Amendment, which attached several conditions to the FS-X program.² The President vetoed the resolution in late July 1989, and the Senate failed to override the veto by one vote in September.

¹The stores management system is a computer system that contains weapons delivery software. This system interacts and communicates with all weapon systems on the aircraft.

²The joint resolution expressed the sense of Congress that any future Japanese-U.S. Memorandum of Understanding on FS-X coproduction should specify that the United States would receive not less than 40 percent of the total value of coproduction. It also stipulated that the United States would forbid the transfer of critical engine technologies to Japan and required GAO to provide FS-X implementation reports.

General Dynamics and Mitsubishi planned to begin the first phase of the program in October 1989. However, contract negotiations deadlocked in August 1989 due to fundamental differences over the transfer, use, and payment for Japanese technology. During that time, the Air Force suspended transfers of F-16 technical data to Japan. These highly complex issues were finally resolved in February 1990 when the two governments signed a clarifying agreement that cleared FS-X technology for transfer to the United States.

In March 1990, General Dynamics sent a small number of engineers to Japan to begin joint design and development work. The General Dynamics engineers, collocated with Japanese industry engineers, formed the FS-X engineering team. As of late April 1991, about 260 personnel, including 38 General Dynamics engineers, were assigned to the team. The team is located at Mitsubishi's Aerospace Systems Works facility, Nagoya, Japan. A small General Dynamics program office is located in downtown Nagoya. General Dynamics has its main FS-X program office at Fort Worth, Texas, about 7 miles from the F-16 plant.

General Dynamics engineers are participating in several design tasks, including aircraft aerodynamics, structures (including composite wing), and avionics. As of April 1991, team members were developing preliminary engineering and manufacturing drawings for their respective design tasks. Over the next year, as the program moves toward more advanced design stages, the team will produce a series of more complete drawings.

As of late 1991, General Dynamics had 69 employees working in Japan on the FS-X program. By mid-1992, General Dynamics plans to transfer a significant part of its team back to the United States. However, a core of senior-level engineers and program officials are expected to remain in Japan for the life of the codevelopment program.

Upon returning to the United States, General Dynamics engineers will begin preparing production drawings to support structural tasks and developing computer programs to perform testing and avionics integration responsibilities. In the next stage, parts will be fabricated and shipped to Japan for integration and assembly into the prototype aircraft. General Dynamics plans to assign over 1,000 technical personnel to the program in Fort Worth during 1993. The first prototype flight is expected in 1995, a delay of about 2 years from earlier estimates.

FS-X Program Management

An FS-X Technical Steering Committee, comprised of military officials from the United States and Japan, is responsible for general management and oversight of the program for the two governments. The Committee, which is cochaired by representatives from DOD and the Japan Defense Agency, meets semiannually or more frequently if necessary. The Department of Commerce is an adviser to the Committee. Four subcommittees are responsible for managing specific areas of the program, including work share, budget, technology flow, interoperability, and technical support.

In 1990 we reported that the Committee, as part of its responsibilities, would monitor the transfer of technical data to Japan.³ The Committee has played a limited role in these matters. Controls are being exercised, however, through existing disclosure channels. This matter is discussed in more detail in chapter 3.

The Air Force's F-16 System Program Office, located at Wright-Patterson Air Force Base, Dayton, Ohio, is responsible for monitoring the day-to-day activities of the FS-X program for the U.S. government. The program office also (1) approves the release of most of General Dynamics' F-16 technical data, (2) monitors and helps coordinate the U.S. government's position on work share issues, and (3) coordinates DOD's evaluation of Japanese technology. Two program office liaison officers are in Japan to facilitate program management and exercise oversight.

Objectives, Scope, and Methodology

In response to the conference report on the fiscal year 1990 appropriations act for the Departments of Commerce, Justice, and State; the Judiciary; and related agencies, we have continued to monitor implementation of the FS-X program. Specifically, we

- reviewed the program's status, including cost issues and technology flow to the United States;
- addressed U.S. government and contractor controls over the release of F-16 related technical data to Japan; and
- examined the U.S. government's export licensing process for reviewing and approving the release of other FS-X related military items to Japan.

We reviewed pertinent cost data from various U.S. government and industry sources. We did not evaluate the reasonableness or accuracy of

³U.S.-Japan Codevelopment: Review of the FS-X Program (GAO/NSIAD-90-77BR, Feb. 6, 1990).

the estimates. Japanese government officials declined to provide specific information about FS-X program costs.

We converted FS-X development cost estimates from yen to U.S. dollars at an exchange rate of 145 yen to \$1. We chose this rate of exchange because it most closely reflected the exchange rates in both 1987 and 1990 when the FS-X cost estimates were prepared.

To address technology flow from Japan to the United States, we reviewed relevant government-to-government agreements and held discussions with DOD, the U.S. Air Force, Commerce, and U.S. Embassy, Japan, officials as well as numerous U.S. industry representatives in Japan and the United States. We discussed or met with representatives from General Dynamics International Corporation (Nagoya, Japan) and General Dynamics' Fort Worth Division. We also met with or had discussions with industry representatives from Westinghouse Electric Corporation, Hughes Aircraft Corporation, Texas Instruments, E-Systems, Loral Defense Systems, McDonnell Douglas Aircraft Corporation, Rockwell International Corporation, and Grumman Corporation. We also met with officials from the Air Force's Wright Laboratory, Dayton, Ohio, to discuss specific technical aspects of Japan's FS-X radar development and other technology issues.

We met with representatives from the Japan Defense Agency and the Ministry of International Trade and Industry to address technology flowback issues. We also discussed these issues with officials from Mitsubishi Heavy Industries, Ltd./Nagoya Aerospace Systems, Mitsubishi Electric Corporation/Communication Equipment Works, and Kamakura Works.

To assess the adequacy of U.S. controls over the release of F-16 technical data to Japan, we reviewed pertinent data release policies and procedures established by the U.S. Air Force, the Defense Technology Security Administration, and General Dynamics Corporation. We also reviewed technical data that had been released or authorized for release, determined if the release was consistent with established U.S. guidelines, and discussed the release philosophy with appropriate U.S. government and industry officials. Given the amount of data that has been transferred to Japan, we did not review every release decision. Rather, we made spot checks of certain types of data, such as supplemental F-16 technical data, to ensure compliance with releasability procedures. In those instances where Japan asked the United States to reconsider a previous denial for specific data,

however, we examined individual cases and discussed changes in the release status with Air Force and General Dynamics officials. We also reviewed supporting documentation used by both organizations to develop recommended positions.

To evaluate the U.S. government's export licensing process for other FS-X related military data transferred to Japan, we obtained data lists from DOD and State. We met with officials from various DOD, Air Force, and State organizations responsible for reviewing and approving the licenses. We also met with a representative of the consulting firm that develops recommendations for the Air Force. We had extensive discussions with F-16 System Program Office officials, Wright-Patterson Air Force Base, Dayton, Ohio, about their role in the review and approval process.

We were unable to determine the exact number of FS-X licenses approved by the State Department because State's data base does not identify specific FS-X related munitions license cases. Further, we were unable to examine the documentation for all the FS-X license cases we identified because State could not locate the files for about 12 percent of the license cases. The list of FS-X license cases that we obtained from DOD may not be complete because some cases may not have been clearly identified as FS-X related in DOD's data base.

We conducted our primary review from August 1990 through June 1991. For this report, we updated information pertaining to U.S. government access to Japanese FS-X technologies to reflect more current activities as of March 1992. Our review was performed in accordance with generally accepted government auditing standards.

Status of the FS-X Program

The estimates of FS-X development costs have increased by about 70 percent. In 1987 the Japan Defense Agency estimated the cost at about \$1.1 billion. U.S. Air Force estimates prepared in late 1990 and early 1991 showed the cost to be approximately \$1.9 billion. Major cost growth factors include changes in FS-X design and unanticipated delays in program implementation. Future cost increases are considered likely, according to U.S. government officials.

U.S. access to and transfer of Japanese FS-X technology are important issues in the FS-X program. Overall, U.S. access to these technologies has been mixed. General Dynamics is obtaining Japanese composite wing technology and is satisfied, to date, with the quality and quantity of data provided. DOD and Commerce are seeking to ensure that the United States obtains access to Japan's non-derived technologies as well. Although DOD has obtained a significant amount of FS-X radar data from Japan, access to the remaining non-derived technologies is uncertain. For example, in December 1991, a DOD team visited Japan and was able to obtain only some preliminary data about the mission computer because the system is in the early stages of development. The extent to which the United States obtains access to the other non-derived technologies remains to be fully determined as well because these systems are also in early stages of development. Implementing procedures governing technology transfer have been further clarified in an attempt to promote better access to Japanese technology in the future.

Several U.S. companies told us that they would like the U.S. government to sponsor an industry radar visit to Japan to promote increased access. Commerce plans to host an FS-X radar symposium in the United States in June 1992 for both U.S. and Japanese industry.

FS-X Development Costs Have Increased

FS-X development cost estimates have increased significantly. In 1987, Japan estimated that the development program would cost about 165 billion yen, or \$1.1 billion. Estimates of FS-X costs compiled by the U.S. Air Force in late 1990 and early 1991 concluded that FS-X costs had risen to about 280 billion yen, or about \$1.9 billion. Both Mitsubishi's and General Dynamics' cost estimates have risen markedly. The U.S. Air Force estimates show that further cost increases were likely.

Japanese government officials declined to provide us with specific FS-X cost data. They noted that this information was being reviewed and that it would be inappropriate to discuss specifics. They further noted that

revised program cost data has not been provided to the Japanese Diet or the Japanese public. These officials did confirm that overall program costs had risen and said that General Dynamics was primarily responsible for the increase. While acknowledging that Mitsubishi costs had also risen, Japanese government officials said these increases were not significant.

Comparison of Cost Estimates

According to Air Force records, the 1987 estimate was derived primarily from a General Dynamics marketing proposal. The estimate contained various assumptions about such matters as work-share arrangements and future exchange rate levels. Several of the assumptions and data incorporated into the 1987 estimate did not remain valid as the program progressed. For example, the General Dynamics proposal, which was not meant to be used for budgeting purposes or as a firm contract proposal, assumed that

- development would take place in the United States and would occur over 3-1/2 years;
- two prototype aircraft would be built; and
- the airframe would have few changes and all FS-X systems, subsystems, and support equipment would be the same as the F-16 except for the four Japanese-developed technologies.

In the fall of 1990, more detailed cost estimates were prepared by U.S. and Japanese contractors. These estimates reflected better program definition and recognized significant design and configuration changes not factored into the original estimate. These changes include newly developed and/or extensively modified avionics test systems, a longer fuselage, and significant integration efforts by General Dynamics. Additionally, due to releasability constraints imposed by the United States, Japan will develop its own computer software for the aircraft's digital flight control computer. Japanese government officials said that the cost to develop the software will not be significant compared to the total FS-X development budget.

Flow of Japanese Technology to the United States

The United States has been interested in acquiring Japanese technology for a number of years, but the results, according to DOD and Commerce officials, have been disappointing. In the mid-1980s, both countries established procedures through the Joint Military Technology Commission agreement to facilitate the transfer of Japanese military technology to the United States. This agreement limits exchanges to a few broadly defined

military-specific categories and has not succeeded in promoting a significant number of transfers of Japanese military technology.

According to DOD and Commerce officials, the FS-X program offers an opportunity to improve the flow of Japanese technology to the United States. FS-X represents the first program between the two countries where the United States may be provided such access. These officials noted that it is critical for the U.S. government to continuously monitor technology flowback through the Technical Steering Committee. In their opinion, if the FS-X program is vigorously implemented, the United States should obtain access to Japanese design and manufacturing process technologies. Additionally, by exercising U.S. rights established through the program, U.S. firms other than General Dynamics may have opportunities to evaluate and acquire Japanese technology.

Various detailed and complex government-to-government agreements establish the basic framework for U.S. access to Japanese FS-X technology. These agreements comprise the 1988 Memorandum of Understanding and a 1990 Memorandum of Implementation and Agreement. Technology transfer procedures are further detailed in a January 1991 document that specifies the administrative arrangements required to facilitate exchanges of information. In addition, separate government and industry agreements outline General Dynamics' participation in FS-X wing development.

U.S. government officials noted that Japan has not always been forthcoming about permitting access to its FS-X technologies. A System Program Office official noted that Japan does not routinely initiate actions to facilitate access to its technologies. Rather, the United States is continuously placed in the position of requesting information from Japan, sometimes encountering delays.

To improve the process for obtaining access to Japan's FS-X technologies, DOD, in coordination with Commerce, has been reviewing and clarifying existing implementing procedures governing the transfer of technology. These procedures were finalized in February 1992. It is uncertain, however, whether these procedures will significantly improve access in the future.

Composite Wing Technology Is Being Transferred to General Dynamics

General Dynamics has received a significant level of Japanese composite wing design and manufacturing data. General Dynamics needs this data to manufacture two sets of composite wing boxes during the development phase of the program. According to General Dynamics and DOD officials, Japan recognizes that it needs to provide the necessary data to General Dynamics because the program cannot afford more delays.

General Dynamics officials said that a wing data transfer began in April 1990 and that they were satisfied with the quantity and quality of data provided. This data consisted primarily of background test data produced by Mitsubishi in 1987 to demonstrate/validate the basic composite wing technology. This data was translated and shipped to General Dynamics' Ft. Worth, Texas, facility in September 1990. Additional composite wing data, owned by the Japan Defense Agency, was provided to General Dynamics through the F-16 System Program Office as part of the government-to-government technology transfer process.

In mid-February 1991, Mitsubishi began transferring production and design data to General Dynamics for building and testing composite wing production equipment and wing specimens. General Dynamics officials in Japan said that they had already received drawings, material lists, process and test specifications, and photographs of production tools.

Senior-level General Dynamics officials in Japan said they were impressed with Japan's production and manufacturing techniques for the composite wing. One official was particularly impressed with Japan's production drawings and production tools.

Access to Non-derived Japanese Technology

The U.S. government is pursuing access to Japan's non-derived FS-X technologies, most notably the airborne radar. DOD teams have made two visits to Japanese radar production facilities and are interested in learning more about Japan's radar manufacturing processes, particularly for components known as transmitter receiver modules. U.S. industry is developing similar modules for the Air Force's Advanced Tactical Fighter,

but the modules remain very expensive to produce.¹ Although Japan's approval of the first DOD trip took considerable time, the team had good access at both Japanese government and contractor radar facilities during its visit in March 1990 and concluded that (1) Japan's technology was far more competitive with similar U.S. radar technology than was previously believed, although no technological breakthroughs were observed, and (2) the design and manufacturing process Japan used to produce radar modules appeared to be very similar to that used by U.S. industry.

DOD made a follow-up trip to Japan in May 1991. A key Air Force participant noted that the team received excellent cooperation during a visit to a Japanese facility that fabricates the gallium arsenide semiconductor chips used for the modules and during a follow-up visit to a module production/assembly facility. However, Japanese officials declined to answer many technical questions about radar test data.

In November 1991, Japan Defense Agency officials provided a limited amount of test data to the United States and described the types of information Japan would be willing to provide to respond to DOD questions. The U.S. Air Force was studying the test data and the information offered for release by Japan to determine if it would satisfy access requirements under the Memorandum of Understanding. DOD has also been exploring the possibility of purchasing or leasing Japanese radar modules for test and evaluation purposes.

In December 1991, A DOD team visited Japan and obtained basic information on the FS-X mission computer. The team saw a preliminary test model of the mission computer. A member of the DOD team stated that the information obtained on the visit was limited because the Japanese had not made design decisions for the flight model of the mission computer. He expected that more information would be made available to the United States once the Japanese had made these basic design decisions.

Japan has agreed to DOD visits for the other two non-derived technologies. Technology exchange visits to Japan are planned for the electronic warfare

¹U.S. industry's goal is to reduce the cost to about \$400 per module. Mitsubishi Electric Corporation officials said their module cost goal is about \$1,000 per unit for the FS-X program, assuming production of about 130 aircraft. They believe that module costs could be further reduced with increased production through other commercial ventures. Mitsubishi would like to find commercial markets for the modules, but information on these plans was sketchy. U.S. Air Force officials expressed continued interest in Japan's radar manufacturing capabilities.

system in August 1992 and the inertial reference system at a date still to be determined. Japan had initially attached various restrictions on DOD access to one of the systems but modified its position after DOD raised concerns about this matter. A program office official said that access to these technologies is uncertain because they were also in the early stages of development.²

.S. Industry Access

While the radar trips have provided baseline production and performance data, DOD, Commerce, and U.S. industry officials said that the most meaningful transfer and utilization of Japanese radar technology would have to be on an industry-to-industry basis. The U.S. government is attempting to facilitate access to Japan's non-derived technologies. This would enable U.S. industry to evaluate the technology and determine whether it would be interested in purchasing the technology through licensing arrangements.

In early 1991, the F-16 System Program Office provided copies of the first DOD radar trip report to 10 U.S. defense firms. Several industry representatives who obtained the report said it had limited value.

The Air Force did little follow-up with U.S. industry. For example, one company on the distribution list had no record of receiving the report. A company employee surmised that the report, mailed to a small suboffice in Dayton, Ohio, was probably sent back to the program office because the addressee had retired several months earlier. This was significant because the company had been discussing a possible commercial venture for radar modules with the Japanese contractor. We spoke to the industry official who was involved in these discussions, and he did not have a copy of the report. We were informed that the company received the report from the program office after we inquired about this matter.

²The development schedule of the inertial reference system may be affected due to a controversy surrounding the Japanese contractor developing the system, Japan Aviation Electronics Industry, Ltd. (JAE). In September 1991, JAE was charged in a U.S. court with illegally transferring U.S.-designed aircraft navigation components to Iran in the 1980s. The State Department, among other things, suspended all existing defense-related licenses for the company. The Japan Defense Agency stated that it would not in principle award new contracts to JAE. In March 1992, the company pleaded guilty, and the State Department lifted the suspension on existing licenses, but JAE remains subject to sanctions on new licenses.

DOD officials recognize that more follow-up would have been appropriate. They plan to ensure that the next report has wider distribution, including companies that may have commercial uses for Japan's radar technology.

Industry and the U.S. Government's Role

U.S. industry has periodically discussed possible commercial ventures with Japanese industry for radar technology. In several instances, U.S. industry representatives had visited Japanese radar manufacturing facilities and in one case had discussed the possibility of purchasing a type of transmitter receiver module. In two cases, U.S. companies with long-standing commercial relationships with the Japanese contractor had seen production facilities and had preliminary commercial discussions. In May 1991, representatives from one of the U.S. companies toured a module manufacturing facility. This was significant, according to an industry official, because for the last 10 years the company had been requesting such a visit, which routinely had been denied. The official surmised that the Japanese contractor had approved the visit because it was trying to expand its module production base to reduce unit costs.

Several industry officials expressed interest in a U.S. government-sponsored radar visit for U.S. companies. Industry officials noted that efforts to pursue commercial ventures had generally been frustrated and at times blocked by Japanese government officials. They believe that the U.S. government has the necessary leverage to promote greater access and ensure a "level playing field" for U.S. industry.

Commerce Seeks to Promote U.S. Industry Access

Commerce has been identifying ways to promote U.S. industry access to Japan's FS-X technologies. At a January 1991 Technical Steering Committee meeting, a Commerce official indicated the Department's interest in sponsoring a U.S. industry visit to Japan. He noted that there was no clear path for U.S. companies to follow. In the spring of 1991, Commerce made preliminary plans to meet with Japanese government officials to discuss access to Japanese technologies, including radar. The visit was postponed due to personnel changes at Commerce.

Plans for an industry visit to Japan were subsequently changed in favor of a radar technology symposium in the United States. Commerce, in coordination with DOD, plans to host the symposium in June 1992 for U.S. industry with Mitsubishi Electric Corporation representatives. According to Commerce officials, the symposium will also provide U.S. industry representatives with information about (1) the FS-X program and related

provisions of the agreement and (2) Japanese export controls procedures and general technology cooperation issues.

In addition to the high visibility technology areas, the U.S. government is also seeking to ensure that other potential U.S. suppliers are aware of technology flowback provisions of the FS-X agreements. In May 1991, DOD, Commerce, and the Air Force issued a "white paper," which detailed provisions of the FS-X agreements that dealt with key technology transfer issues and provided an overview of the program's basic objectives. The document has been distributed to various U.S. industry associations and individual companies.

Status of F-16 Technical Data Transferred to Japan

The United States has adequately controlled the release of F-16 related data to Japan. The F-16 System Program Office has reviewed over 10,500 technical documents and drawings as well as hundreds of supplemental documents in accordance with established procedures. About 95 percent of these documents have been approved for release to Japan in complete or modified form; however, sensitive software and certain design data are being withheld. Mitsubishi requested that the program office release about 250 documents that had been previously denied. The reevaluation, which is now largely completed, authorized the release of 51 of these documents. The release appears to be well justified and supports FS-X design requirements.

In a few instances, General Dynamics released some data without prior Air Force approval. The System Program Office had also inadvertently authorized the release of some interface data. In both instances the data released were not sensitive, and steps have been taken to correct these largely procedural or administrative errors.

Review of F-16 Technical Data Package Is Virtually Complete

The Air Force's F-16 System Program Office is responsible for reviewing the F-16 technical data package to determine what documents can be transferred to support Japan's FS-X design activities. Review of the package, which contains over 10,500 documents and drawings, is virtually complete. Data authorized for release must comply with disclosure guidelines and be applicable to the FS-X baseline aircraft, which is modeled on a F-16 Block 40 aircraft. The block number refers to a specific stage of the F-16's development. Table 3.1 shows the status of the review as of May 1991.

Table 3.1: F-16 Technical Data Package Review

Document status	Number of documents	Percent
Releasable	9,752 ^a	92
Not releasable	540	5
Modified for FS-X	251	2
Not reviewed	7	^b
Total	10,550	100^c

^aIncludes approximately 7,900 technical drawings that are not considered sensitive by the Air Force or General Dynamics.

^bLess than 1 percent.

^cTotal does not equal 100 percent due to rounding.

Japan Requested Reevaluation of Previously Denied Data

In September 1990, Mitsubishi requested that the System Program Office release about 250 F-16 documents that were previously denied. The program office worked with General Dynamics to evaluate the request. It intended to give Mitsubishi the maximum amount of data allowed by the existing guidelines, but in many instances, final decisions would have to be based on individual judgments.

We reviewed the process used to reevaluate the document requests and found it satisfactory. Technical comments were obtained and evaluated in a well structured format.

The reevaluation was completed in late May 1991. Table 3.2 shows the results of the review.

**Table 3.2: Reevaluation of Previously
Denied F-16 Technical Data Package
Documents**

Document status	Number	Percent
Not releasable	196	78
Modified for FS-X	26	10
Releasable	25	10
Further review	4	2
Total	251	100

The types of data authorized for release in complete or modified form include certain engine test reports, pre-Block 40 test data, canopy test reports, and wing test data. The engine reports are now releasable because the engine contractor, General Electric, has been selected and the information is now applicable. Pre-Block 40 information was approved for release when (1) there was no similar Block 40 test data and (2) the information was considered necessary for Japanese design and test procedures. For example, certain F-16 wing data was approved for release because it will enable Japan to determine how best to develop hardware to attach the wing to the fuselage.

The System Program Office did not determine the status of four documents related to the Air Force's Advanced Fighter Technology Integrator Program.¹ These documents were included in the original F-16 data package and had to be reviewed. The office recommended in February 1991, based on a review performed by Air Force technical officials, that several of the documents relating to the Advanced Fighter canards be released. The office stated that the data would not compromise national security or provide Japan with a technology advantage.

The advanced fighter documents were forwarded to Air Force headquarters for review. Subsequently, the program office forwarded three additional advanced fighter documents that were not part of Japan's reevaluation but were part of the small number of F-16 technical documents that had not been yet been reviewed. At the time of our review, the Air Force had not completed its review of these documents.

Supplemental F-16 Data

In addition to F-16 technical data package documentation, supplemental technical data is generated by General Dynamics in response to specific requests from Mitsubishi. The two companies established a process to satisfy these inquiries primarily through technical assistance requests. The data is used by Mitsubishi engineers to clarify, complete, or complement the body of F-16 technical data already received. General Dynamics also generates supplemental technical data, known as engineering interface memorandums, that its engineers use to support ongoing design activities. Additionally, General Dynamics sends missing or illegible pages of previously approved F-16 data to Mitsubishi through technical data requests. Mitsubishi also requests data referenced in a previously released F-16 document through this process.

When these types of requests generate technical data not previously approved for release, the Air Force is required to review the information in accordance with the State Department's June 1989 approval of General Dynamics' commercial agreements with Mitsubishi. Table 3.3 shows the status of these types of documents, cumulatively, as of May 1991.

¹The Advanced Fighter is an experimental aircraft based on the F-16A. It incorporates a unique flight control system and distinct flight instrumentation package. Externally, the Advanced Fighter has vertical twin canards on the bottom of the aircraft that are designed to enhance maneuverability. The FS-X design originally called for vertical canards.

Table 3.3: F-16 Supplemental Data
Review

Document status	Number	Percent
Releasable	465	74
Not releasable	111	18
Modified for FS-X	55	9
Total	631	100^a

^aTotal does not equal 100 percent due to rounding.

We found that General Dynamics engineers in Japan had answered 20 technical assistance requests without submitting the responses to the System Program Office for approval. According to program office records, as of May 1991, General Dynamics had submitted 196 technical assistance requests to the Air Force for review.

The 20 technical assistance request responses (1) were released between July and October 1990, (2) were issued by a small number of General Dynamics engineers in Japan, and (3) provided some references to third country F-16 aircraft or mentioned other aircraft not authorized for release. These references were not considered sensitive by program office officials, who reviewed this matter after we brought it to their attention.

General Dynamics officials stated that they no longer respond to technical assistance requests without Air Force review and approval. Based on our review of General Dynamics and Air Force records, we found no further evidence that such responses were being issued without the appropriate review. General Dynamics officials noted that their technical assistance request process was not fully developed when the disclosures were made (between July 1990 and October 1990). This made it possible for the engineers in Japan to respond directly to these requests. General Dynamics officials said their engineers are expected to exercise good judgment and comply with applicable disclosure guidance when responding to requests from Japanese industry officials. General Dynamics engineers are expected to continue to respond to requests for information.

General Dynamics engineers are encouraged to seek advice from senior-level engineers when they are uncertain about how much information to disclose. General Dynamics officials said the new engineers frequently seek clarification and guidance about how much information they can provide. They noted that although the Japanese engineers ask a lot of questions, they do not seem to be trying to extract restricted information. In their opinion, the Japanese engineers focus their requests

on specific design tasks and are validating General Dynamics' design decisions.

Other Releases Noted

We identified two additional cases where data was released without proper authorization. In one case, the System Program Office inadvertently authorized the release of four documents after a control form was mistakenly signed by an approving official. The data released was not considered sensitive by the Air Force. When we brought this matter to its attention, the program office changed the administrative procedure for approving final document release. We believe this corrective action will reduce the chances of additional inadvertent releases.

In another case, the Air Force questioned General Dynamics' release of some composite test data that was outside the scope of the FS-X program.² According to General Dynamics, Mitsubishi was aware of the test because it had been discussed in a marketing presentation in 1987. The General Dynamics employee who released the data believed that the information provided to Japan was already approved. In March 1991, the Air Force briefed this individual, as well as other General Dynamics employees, on this matter to reduce the chances for future inadvertent disclosures.

According to Air Force and General Dynamics officials, continued security awareness training is essential to reduce the possibility of inadvertent disclosures. We found a high degree of security awareness among the General Dynamics engineers in Japan. In mid-1991, the Air Force placed a liaison official at Mitsubishi. This official, who has demonstrated program and technical expertise and Japanese language skills, should help minimize disclosure problems.

In February 1991, the System Program Office issued a data transfer control plan that (1) defines the procedures used to control the release of technical data to Japan; (2) defines the categories of data to be transferred, including F-16 supplementary data generated by General Dynamics; and (3) reaffirms the Office's policy that supplementary data is to be reviewed prior to transfer.

²General Dynamics proposed using an advanced composite material on the aft fuselage and leading edge flap of the FS-X. In March 1991, Japan rejected the proposal because of cost and schedule risk factors and U.S. restrictions on composite data release. General Dynamics will use metallic materials for these parts of the aircraft.

Conflicting Responsibilities

Complying with data releasability constraints while performing FS-X functions poses major challenges for General Dynamics engineers in Japan. The engineers are expected to transfer certain skills and know-how to the Japanese design team within the existing disclosure guidelines. However, the guidelines do not address all situations and circumstances. The Air Force recognizes this conflict in responsibilities. In April 1991, the Air Force's F-16 Program Director noted that General Dynamics personnel faced the challenge of developing the FS-X while staying within the releasability constraints levied by the U.S. government. The Director noted that sometimes engineers' responsibilities for codevelopment and the protection of U.S. interests would be in direct conflict. When such cases occurred, however, personnel were instructed to comply with existing policy and raise issues of concern to the appropriate officials for resolution.

General Dynamics program and technical officials in Japan expressed concern about the overly restrictive nature of the U.S. government's data release policy. They noted that their ability to provide timely technical assistance to Japan was impaired by the data review process.

Steps are being taken to address this concern. For example, pre-Block 40 data has been approved for release as part of the reevaluation process for previously denied data. Further, the System Program Office is reviewing the release of manufacturing planning data. Air Force officials emphasized that the FS-X program continues to evolve and data release issues are reevaluated because of changing or unanticipated design requirements.

Technical Steering Committee Is Not the Focal Point for Data Release

In our February 1990 report, we noted that the FS-X Technical Steering Committee would, as part of its responsibilities, monitor the transfer of technical data from the United States to Japan. According to DOD, the Committee was expected to be the forum for Japan's requests for release of technical data during the development program. These requests would then be channeled to technical officials at the Air Force's System Program Office and Foreign Disclosure Policy Office. Requests falling outside the established releasability guidelines would be staffed through Air Force headquarters disclosure entities and reviewed by DOD and Commerce officials. This process would elevate releasability issues to ensure full and complete review and reduce the opportunities for imprudent disclosures.

The Committee has not served in the capacity that DOD described to us a few years ago. For example, it has not been the primary focal point for

reviewing routine General Dynamics' technical data provided to Mitsubishi. During Committee meetings, however, U.S. officials brief their Japanese counterparts on the status of data transfers from General Dynamics to Mitsubishi. U.S. and Japanese officials also discuss and review data release policy and procedures through Committee auspices.

FS-X releasability issues have been handled, for the most part, through existing disclosure channels, including reviews by the Air Force and other DOD organizations, including the Defense Technology Security Administration. The existing data release process has been rigorously applied to the FS-X program, and certain release decisions have received increased attention and consideration. For example, in February 1991, DOD, the Air Force, and Commerce jointly reviewed and coordinated a U.S. government position on General Dynamics' proposed use of composite materials for the FS-X aircraft. The U.S. Committee Cochairman informed his Japanese counterpart of the U.S. government's releasability position on the composite issue.

DOD officials noted that it would be impractical for the Committee to handle all routine release matters since it meets so infrequently. They further pointed out that the FS-X program receives a great deal of attention within existing disclosure release channels because of the program's high visibility and the level of oversight exercised over it. In May 1991, 32 representatives from DOD, the Air Force, Commerce, and General Dynamics met in Washington, D.C., to address several FS-X technology transfer issues. DOD officials viewed the level of attention as an indication of the FS-X program's importance.

The Committee's role in monitoring technology matters has continued to evolve. For example, Japan's request to produce various F-16 subsystems under license was channeled through the Committee in July 1991. The U.S. government's position regarding the licensed production of these items was communicated to Japan by the Committee during the latter stages of 1991.

Review of FS-X Related Military Export Licenses

In addition to General Dynamics, other U.S. firms seeking to participate in the FS-X program have obtained military export licenses primarily to provide technical data to Japan for marketing purposes. As of March 15, 1991, 75 such licenses had been issued. The licenses were reviewed by DOD and approved by the State Department in accordance with established defense-related licensing procedures. The F-16 System Program Office, which is responsible for approving most of General Dynamics' F-16 technical data transfers to Japan, was not consistently involved in reviewing other U.S. firms' export licenses, nor was it systematically informed of licensing decisions. In response to concerns raised by the program office and reinforced by our review, the Air Force has taken steps to include the program office in the process and improve the flow of licensing information.

FS-X Licenses Are Issued Through Established Procedures

As the FS-X program has evolved, increasing numbers of U.S. firms have obtained military export licenses to provide items to Japan in support of the FS-X program. We identified 75 licenses that had been approved as of March 15, 1991. Most of the licenses permit U.S. firms to export technical data needed to support marketing presentations. During the program's development phase, the U.S. government prefers that licenses be approved only for end item sales. However, the U.S. government has authorized Japan to manufacture certain F-16 subsystems on a "build-to-print" licensing basis. According to DOD officials, U.S. companies that participate in these arrangements are not authorized to release the details of the design, development, and production of these items during the development phase of the program. The Japan Defense Agency was advised that should Japan wish to negotiate a production Memorandum of Understanding, many of these restrictions would not be applicable.

FS-X licenses are processed according to established defense-related licensing procedures. The State Department is responsible for approving applications for the export of military items and services. Within State, that function is assigned to the Office of Defense Trade Controls. To help ensure that technical, national security, and foreign policy concerns are fully considered, Defense Trade Controls sends license applications that require additional scrutiny to bureaus within the State Department and other federal agencies, principally DOD.

Of the 141 FS-X license applications we identified for January 1, 1988, to March 15, 1991, State had sent all but one to DOD for review. This figure is much higher than normal, as State typically sends only about 20 percent of

its license applications to DOD. State Department officials said that almost all FS-X cases, which, to date, primarily involve the proposed transfer of technical data, are forwarded to DOD for review. The officials said that although State is not legally required to do so, it refers such cases to DOD because of the technical data. Of the cases we examined, we found that the State Department usually adopted DOD's recommendations.

Several DOD Entities Review FS-X Export Applications

Consistent with established review procedures, three units within DOD routinely review FS-X related license applications—the Defense Technology Security Administration, the Air Force, and the Defense Security Assistance Agency. The Defense Technology Security Administration is responsible for coordinating DOD's reviews of military export license applications and establishes the DOD position based on consultations with other DOD reviewing entities. It conducts a technical and policy review and ensures that each FS-X license is forwarded to the Defense Security Assistance Agency and the Air Force.

Within the Air Force, FS-X export license applications are routinely reviewed within the Secretary of the Air Force's Office by three units—the Disclosure Implementation Division, the Directorate of Tactical Programs, and the Disclosure Policy Division. The Disclosure Implementation Division formulates and coordinates the Air Force position on export applications and determines which Air Force entities should review license applications. The Directorate of Tactical Programs is responsible for conducting the Air Force's technical review of applications. The Disclosure Policy Division reviews applications for policy implications and compliance with disclosure guidelines.

Consulting Firm Assists Air Force Headquarters Review of License Applications

The Directorate of Tactical Programs sends most FS-X applications to a U.S. government consultant for review. The consulting firm is a nonprofit organization that performs work solely for the U.S. government. The consultant began reviewing military export license applications for the Air Force in 1984 and has been examining F-16 and FS-X license applications since mid-1990. Air Force headquarters employed the consultant for FS-X reviews because of staff shortages and the consultant's experience in performing similar munitions case reviews for other Air Force programs. The consultant's recommendations are reviewed by the Directorate of Tactical Programs and if judged appropriate are incorporated into the Directorate's recommendations.

The consultant, in developing positions on FS-X license applications, did not possess the Delegation of Disclosure Authority Letter, the key releasability guidance document. After we brought this matter to the Air Force's attention, the Air Force provided a copy of the document to the consulting firm.

System Program Office Not Consistently Involved in Review

The F-16 System Program Office is the DOD entity most familiar with the FS-X program. This office uses the FS-X disclosure guidelines in its review of the F-16 technical data package and monitors the program daily. When we began reviewing the licensing review process, the program office was not participating consistently in the review of FS-X license applications. The program office would become involved only if DOD or the Air Force solicited its input. Air Force headquarters officials characterized this office's involvement under this arrangement as sporadic and infrequent.

Air Force headquarters officials said that the program office was not consistently included in the review process due primarily to time constraints. According to Defense Technology Security Administration officials, cognizant DOD components are generally expected to provide recommendations on license applications within 12 calendar days. Although the Air Force stated that it would take more time on cases that required an in-depth review, this practice is avoided as much as possible. Furthermore, an Air Force headquarters official said it is difficult to forward all the supporting documentation that normally accompanies a license application from Washington, D.C., to the program office in a timely fashion.

Air Force Has Increased System Program Office Participation

In late 1990, prompted by concerns raised by System Program Office officials, Air Force headquarters started to provide that office more opportunities to comment on FS-X related export license applications. Since early 1990, program office officials had expressed their concerns to Air Force officials about being excluded from the formal Air Force review of FS-X license applications. They stated that their engineers would not have the opportunity to provide appropriate comments on license applications and would not have full knowledge of contractor-proposed technology transfers. As a result, the Air Force's Disclosure Implementation Division began sending some FS-X license applications to the program office for review in November 1990. Prior to this time, DOD had received 115 FS-X license applications from the State Department, dating back to January 1988.

In late January 1990, a Disclosure Implementation Division official directed his staff to send FS-X cases to the program office for review. According to an office official, between November 1990 and February 1991, his office received two cases from Disclosure Implementation. However, these two cases represented only 14 percent of the FS-X cases reviewed by DOD during that period. When we provided this information to a Disclosure Implementation Division official in early April, he stated that his office would intensify its efforts to send all FS-X cases to the program office. We found that from mid-March 1991 through June 1991, Disclosure Implementation sent 23 FS-X cases to the program office. This represents about 72 percent of the FS-X cases received by DOD during this period.

The consulting firm that is assisting Air Force headquarters has also improved its efforts to include the System Program Office in the review process. In late November 1990, the consultant required all staff to notify the office of license applications for coordination. Program office officials said that the consultant was notifying them and soliciting their input on certain cases.

F-16 System Program Office Wants Consistent Role in Licensing Process

F-16 System Program Office officials said that their organization needs to be consistently included in the Air Force review of FS-X related export license applications. In their opinion, the office's detailed knowledge of the F-16, the FS-X prototype, and the FS-X disclosure guidelines improves the quality and comprehensiveness of the Air Force's review. The FS-X program manager, who is a program office official, noted that his organization is reviewing a significant number of licenses as a result of Air Force headquarters' recent efforts. He was satisfied with the improvements made in the review process.

According to office officials, their systematic involvement in the review process improves their ability to monitor work share issues. This office plays a key role in monitoring the work share to ensure that U.S. industry obtains its share of FS-X development phase contracts. By gaining insight into emerging U.S.-Japan industry relationships, which would be revealed through the licensing process, the program office believes it can better exercise work share oversight.

**Management Information
System Should Improve Flow
of Licensing Data**

Air Force officials said the program office's insight into the licensing process should further improve when a terminal with access to DOD's computerized Foreign Disclosure and Technical Information System is installed at a nearby office. The system contains a data base that lists the status of DOD's review of all military export license cases referred to it by the State Department. Program office officials said that while the system's terminal will list useful information, such as the DOD position on applications, it will not provide sufficient information to enable their office to provide useful comments on license applications. As of January 1992, the terminal was not operational.

Conclusions

The FS-X program involves the transfer of sensitive U.S. technology to Japan. Protecting this data is critical for ensuring that U.S. interests are protected. The F-16 System Program Office, which plays a key U.S. government role in approving the release of F-16 technical data for the program, was not consistently included in the review of FS-X related military export licenses. The Air Force has taken steps, however, to systematically increase that organization's participation in the review process. We believe this is a positive step that will help ensure that sensitive F-16 technology is adequately protected. We plan to continue to monitor the extent to which the Air Force includes the program office in the review process.

Comments From the Department of Defense



DEFENSE SECURITY ASSISTANCE AGENCY

WASHINGTON, DC 20301-2800

04 OCT 1991
In reply refer to:
I-041068/91

Mr. Frank C. Conahan
Assistant Comptroller General
National Security and International
Affairs Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the GAO Draft Report, "U.S. JAPAN CODEVELOPMENT: Update of the FS-X Program," dated August 29, 1991 (GAO Code Case 8560-A).

The DoD has reviewed the report and concurs without further comment. The opportunity to comment on the draft report is appreciated.

Sincerely,

A handwritten signature in dark ink, appearing to read "Glenn A. Rudd".

GLENN A. RUDD
DEPUTY DIRECTOR

Comments From the Department of Commerce



UNITED STATES DEPARTMENT OF COMMERCE
The Under Secretary for Export Administration
Washington, D.C. 20230

October 9, 1991

Mr. Frank Conahan
Assistant Comptroller General
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Conahan:

Thank you for the opportunity to comment on your draft report entitled "U.S./Japan Codevelopment: Update of the FS-X Program" (GAO Codes 463804/463792).

The Department of Commerce has been a full participant in the FS-X program through participation in the Technical Steering Committee (TSC) and has developed a very cooperative working relationship with the Department of Defense. This full-time participation in the program has provided for a well-coordinated U.S. Government position on FS-X program developments.

As your report notes, the Department of Commerce can play a significant role in assisting U.S. industry, and has been working with the Department of Defense to develop procedures to ensure technology flow-back to the United States. In fact, I have just returned from leading a joint DOC/DOD delegation to Tokyo to stress the importance of the issue of technology flowback, the continued interest of the U.S. Government in achieving FS-X technology flowback to U.S. industries, and the importance of establishing a framework to provide U.S. industries access to this technology. During the meetings, representatives of the Japan Defense Agency described their proposal of a framework for U.S. access to FS-X technology. The Japanese also agreed with the DOC/DOD representatives that these issues are important factors in the defense relationship between our two countries.

The Department of Commerce will continue to closely monitor the progress of the FS-X program.

Sincerely,

A handwritten signature in cursive script, reading "Joan McEntee".
Joan McEntee
Acting Under Secretary

Major Contributors to This Report

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