

GAO

Report to the Chairman, Subcommittee  
on National Security, Emerging  
Threats, and International Relations,  
Committee on Government Reform,  
House of Representatives

July 2003

# JOINT STRIKE FIGHTER ACQUISITION

## Cooperative Program Needs Greater Oversight to Ensure Goals Are Met



  
**GAO**  
 Accountability-Integrity-Reliability  
**Highlights**

Highlights of [GAO-03-775](#), a report to the Chairman, Subcommittee on National Security, Emerging Threats, and International Relations, Committee on Government Reform, House of Representatives

### Why GAO Did This Study

The Joint Strike Fighter (JSF) is a cooperative program between the Department of Defense (DOD) and U.S. allies for developing and producing next generation fighter aircraft to replace aging inventories. As currently planned, the JSF program is DOD's most expensive aircraft program to date, costing an estimated \$200 billion to procure about 2,600 aircraft and related support equipment. Many in DOD consider JSF to be a model for future cooperative programs.

To determine the implications of the JSF international program structure, GAO identified JSF program relationships and expected benefits and assessed how DOD is managing cost sharing, technology transfer, and partner expectations for industrial return.

### What GAO Recommends

Information on prime contractor activities is critical to balancing program schedule goals with partner expectations. Therefore, GAO is recommending that the Secretary of Defense direct the JSF Program Office to ensure that international supplier planning fully anticipates and mitigates risks associated with technology transfer and that information concerning the selection and management of suppliers is available, closely monitored, and used to improve program outcomes. In its comments on a draft of this report, DOD concurred with the recommendations.

[www.gao.gov/cgi-bin/getrpt?GAO-03-775](http://www.gao.gov/cgi-bin/getrpt?GAO-03-775).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Katherine V. Schinasi at (202) 512-4841 or [schinasi@gao.gov](mailto:schinasi@gao.gov).

## JOINT STRIKE FIGHTER ACQUISITION

### Cooperative Program Needs Greater Oversight to Ensure Goals Are Met

#### What GAO Found

The JSF international program structure is based on a complex set of relationships involving both government and industry from the United States and eight partner countries. The program is expected to benefit the United States by reducing its share of program costs, giving it access to foreign industrial capabilities, and improving interoperability with allied militaries. Partner governments expect to benefit from defined influence over aircraft requirements, improved relationships with U.S. aerospace companies, and access to JSF program data.

Yet international participation also presents a number of challenges. For example, while international partners can choose to share any future program cost increases, they are not required to do so under the terms of negotiated agreements. Therefore, the burden of any future increases may fall almost entirely on the United States. Technology transfer also presents challenges. The large number of export authorizations needed to share project information, solicit bids from partner suppliers, and execute contracts must be submitted and resolved in a timely manner to ensure that partner industry has the opportunity to compete for subcontracts and key contracts can be executed on schedule. Transfers of sensitive U.S. military technologies—which are needed to achieve aircraft commonality goals—will push the boundaries of U.S. disclosure policy. While actions have been taken in an attempt to address these challenges, additional actions are needed to control costs and manage technology transfer.

Finally, if partners' return-on-investment expectations are not met, support within their countries could deteriorate. To realize this return-on-investment, partners expect their industry to win JSF contracts through competition—a departure from other cooperative programs, which directly link contract awards to financial contributions. If the prime contractor's efforts to meet these expectations come into conflict with program cost, schedule, and performance goals, the program office will have to make decisions that balance these potentially competing interests.

Joint Strike Fighter



Source: JSF Program Office.

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## Abbreviations

AECA	Arms Export Control Act
ATPRG	Arms Transfer Policy Review Group
C4I	command, control, communications, computers, and intelligence
CTOL	conventional take-off and landing
DOD	Department of Defense
GPA	global project authorization
IPT	integrated product team
JSF	Joint Strike Fighter
MOU	memorandum of understanding
NATO	North Atlantic Treaty Organization
SDD	system development and demonstration
STOVL	short take-off and vertical landing

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G A O

Accountability \* Integrity \* Reliability

United States General Accounting Office  
Washington, DC 20548

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July 21, 2003

The Honorable Christopher Shays  
Chairman, Subcommittee on National Security,  
Emerging Threats, and International Relations  
Committee on Government Reform  
House of Representatives

Dear Mr. Chairman:

The Joint Strike Fighter (JSF) program is viewed by many within the Department of Defense (DOD) to be a model acquisition program, as well as a new model for cooperative development and production between DOD and U.S. allies. As a centerpiece for DOD acquisition, the program is intended to produce a next generation multirole fighter to replace aging U.S. aircraft inventories. As currently planned, the program is DOD's most expensive aircraft program, costing an estimated \$200 billion to develop and procure about 2,600 aircraft and related support equipment.

By structuring the JSF program to allow for participation by allied governments during development and production, DOD expects to defray some development costs and realize other benefits. To ensure that the challenges of international participation do not negatively affect overall development and production of the aircraft, you asked us to review how DOD is managing the integration of partner countries and suppliers into the program. Specifically, we identified international relationships and the benefits they are expected to provide and assessed how DOD is managing cost sharing, technology transfer, and partner expectations for industrial participation. (See app. I for an explanation of our scope and methodology.)

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## Results in Brief

The JSF international program structure is based on a complex set of relationships involving both government and industry from the United States and eight other countries. Through negotiated agreements with partner countries, which define specific roles and responsibilities for participants, the United States expects to benefit from sharing program costs, gaining access to foreign industrial capabilities, and improving interoperability with allied militaries once the aircraft is fielded. Partner governments expect to benefit through defined influence over aircraft requirements and improved industrial relationships with U.S. aerospace

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companies through access to JSF contractors and subcontracting competitions. Finally, a major benefit for partners is having their personnel physically located within the program office with access to program information and contractor data.

While the United States expects to realize benefits from partnering with allies, international participation also presents challenges for JSF program management. First, while international partners can choose to share any future program cost increases, they are not required to do so under the terms of the negotiated agreements. Further, they have not been required to contribute any additional funding despite changes to the scope of the program. To address unexpected cost increases, DOD and the international partners can request additional program funding through their budget processes; however, this funding may not be provided. DOD can also adjust schedule, procurement quantities, or aircraft requirements to meet program cost concerns, although these actions could negatively affect partners' procurement plans. Program management tools, provisions in agreements with partners, and contract incentives for Lockheed Martin Aeronautics Company (the JSF prime contractor) are being used to contain costs, but if costs still increase, the burden may fall almost entirely on the United States.

Technology transfer issues also present challenges for the JSF program. Due to the degree of international participation at both a government and an industry level, a large number of export authorizations are necessary to share project information with governments, solicit bids from partner suppliers, and execute contracts. Export authorizations must be submitted and resolved in a timely fashion, or the execution of key contracts and the ability of partner suppliers to bid for subcontracts could be negatively affected. Increased pressure to approve export authorizations to support program goals and schedules, however, could result in unintended consequences, such as inadequate reviews of license content or broad interpretations of disclosure authority. In addition, the extent of technology transfers necessary to achieve program goals related to aircraft commonality will push the boundaries of U.S. disclosure policy for some of the most sensitive U.S. military technology. The JSF Program Office and/or Lockheed Martin have attempted to address these challenges by adding resources to help prepare license applications, exploring ways to streamline the export authorization process, and attempting to make decisions on technology transfer earlier in the program. However, Lockheed Martin has not completed a long-term plan that provides information on JSF subcontracting. Such a plan could be used to identify export authorizations needed for international suppliers; anticipate

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problems suppliers could face because of licensing or releasability concerns; and develop strategies to overcome those problems, such as finding other qualified suppliers to do the work.

Finally, while the JSF Program Office is responsible for ensuring that program objectives are met for all participants, Lockheed Martin bears most of the responsibility for managing partner industrial expectations. Partners have identified industrial return as vital to their participation in the program. If return-on-investment expectations are not met, partners told us the program could lose political support domestically. To realize this return, partner industry must win JSF contracts through competition, which is a departure from other cooperative programs that have tied contract awards directly to partners' financial contributions. The program office and the prime contractor have a great deal of responsibility for providing a level playing field for JSF competitions, including opportunities for partner industries to bid on subcontracts and visibility into the subcontracting process. If Lockheed Martin's efforts to meet partner return-on-investment expectations come into conflict with program cost, schedule, and performance goals, the program office will ultimately have to make decisions to balance expectations and program execution. The award fee in Lockheed Martin's system development and demonstration contract provides the program office with a mechanism to focus contractor efforts to achieve both U.S. and international program goals.

Given these challenges, management attention on the program will need to be greater than that associated with traditional acquisition programs. Since DOD and the prime contractor must achieve program cost and schedule goals that are important to all participants, while managing potentially competing partner expectations for industrial and technological cooperation, DOD will need sufficient information about contractor activities to ensure that it can address these challenges. Accordingly, we are recommending that the Secretary of Defense direct the JSF Program Office to ensure that international supplier planning anticipates and mitigates risks associated with technology transfer and that information concerning the prime contractor's selection and management of suppliers is available, closely monitored, and used so that award fee decisions address potential conflicts between international and program goals. In its comments on a draft of this report, DOD concurred with our recommendations.

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## Background

According to DOD policy, the core objectives of armaments cooperation are to increase military effectiveness through standardization and interoperability and to reduce weapons acquisition costs by avoiding duplication of development efforts with U.S. allies.<sup>1</sup> According to DOD and the program office, through its cooperative agreements, the JSF program contributes to armaments cooperation policy in the following four areas:

- Political/military—expanded foreign relations.
- Economic—decreased JSF program costs from partner contributions.
- Technical—increased access to the best technologies of foreign partners.
- Operational—improved mission capabilities through interoperability with allied systems.

The Arms Export Control Act (AECA) provides DOD the authority to enter into cooperative programs with U.S. allies.<sup>2</sup> In March 1997, the Secretary of Defense directed that DOD engage allies in discussions as early as possible to determine the parameters of potential collaboration to meet coalition needs and ensure interoperability between allied systems. DOD guidance states that the department will give favorable consideration to transfers of defense articles, services, and technology consistent with national security interests to support these international programs.<sup>3</sup> Finally, the AECA further provides that when the United States enters into a cooperative agreement, there should be no requirement for industrial or commercial compensation that is not specifically stated in the agreement. The DOD Arms Transfer Policy Review Group (ATPRG) approved the JSF international plan and established guidelines for the JSF system development and demonstration negotiations based on the AECA requirement that participants contribute an equitable share of the costs and receive an equitable share of the results of a project.

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<sup>1</sup> Office of the Deputy Under Secretary of Defense (International and Commercial Programs), *International Armaments Cooperation Handbook* (Washington, D.C.: June 1996).

<sup>2</sup> Arms Export Control Act (22 U.S.C. sec. 2767).

<sup>3</sup> Even before the 1997 guidance, the JSF program and predecessors such as the AV-8B tactical aircraft and Joint Advanced Strike Technology programs had heavy involvement from the government of the United Kingdom and its defense suppliers.



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In October 2001, DOD awarded Lockheed Martin Aeronautics Company a contract for the system development and demonstration phase. Pratt and Whitney and General Electric were awarded contracts to develop engines for the JSF aircraft. Currently, this phase will last about 10 years; cost about \$33 billion; and involve large, fixed investments in human capital, facilities, and materials. The next significant program milestone will be the final critical design review, currently planned for July 2005. At that time, the final aircraft design should be mature and technical problems should be resolved so that the production of aircraft can begin with minimal changes expected.<sup>4</sup>

Unlike other cooperative programs, the JSF program will not guarantee foreign or domestic suppliers a predetermined level of work based on a country's financial contribution to the program. Instead, foreign and domestic suppliers will generally compete for JSF work. DOD and the JSF Program Office use the term "best value" to describe this competitive approach.<sup>5</sup> By doing this, the program moved away from the industrial policies of other cooperative programs that have used work share arrangements for participation in the development of military items. An example of a work share arrangement would be guaranteeing that contract awards for suppliers in a participant country are tied directly to that country's level of investment in the program. The recipient benefits not only from the value of the contracts placed in country but also the technology transferred as part of those contracts.<sup>6</sup> However, this approach does not always result in the most cost-effective program.

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<sup>4</sup> The design should include precision schematics of the aircraft and components, based on the results of testing and a description of material and manufacturing processes to be used.

<sup>5</sup> This is not necessarily the same as best value under the Federal Acquisition Regulation, which is an acquisition that provides the greatest overall benefit in response to the requirement and can be obtained by using one or a combination of multiple source selection approaches.

<sup>6</sup> U.S. General Accounting Office, *Defense Trade: U.S. Contractors Employ Diverse Activities to Meet Offset Obligations*, [GAO/NSIAD-99-35](#) (Washington, D.C.: Dec. 18, 1998).

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## International Participation Adds Complexity and Benefits to JSF Acquisition Program

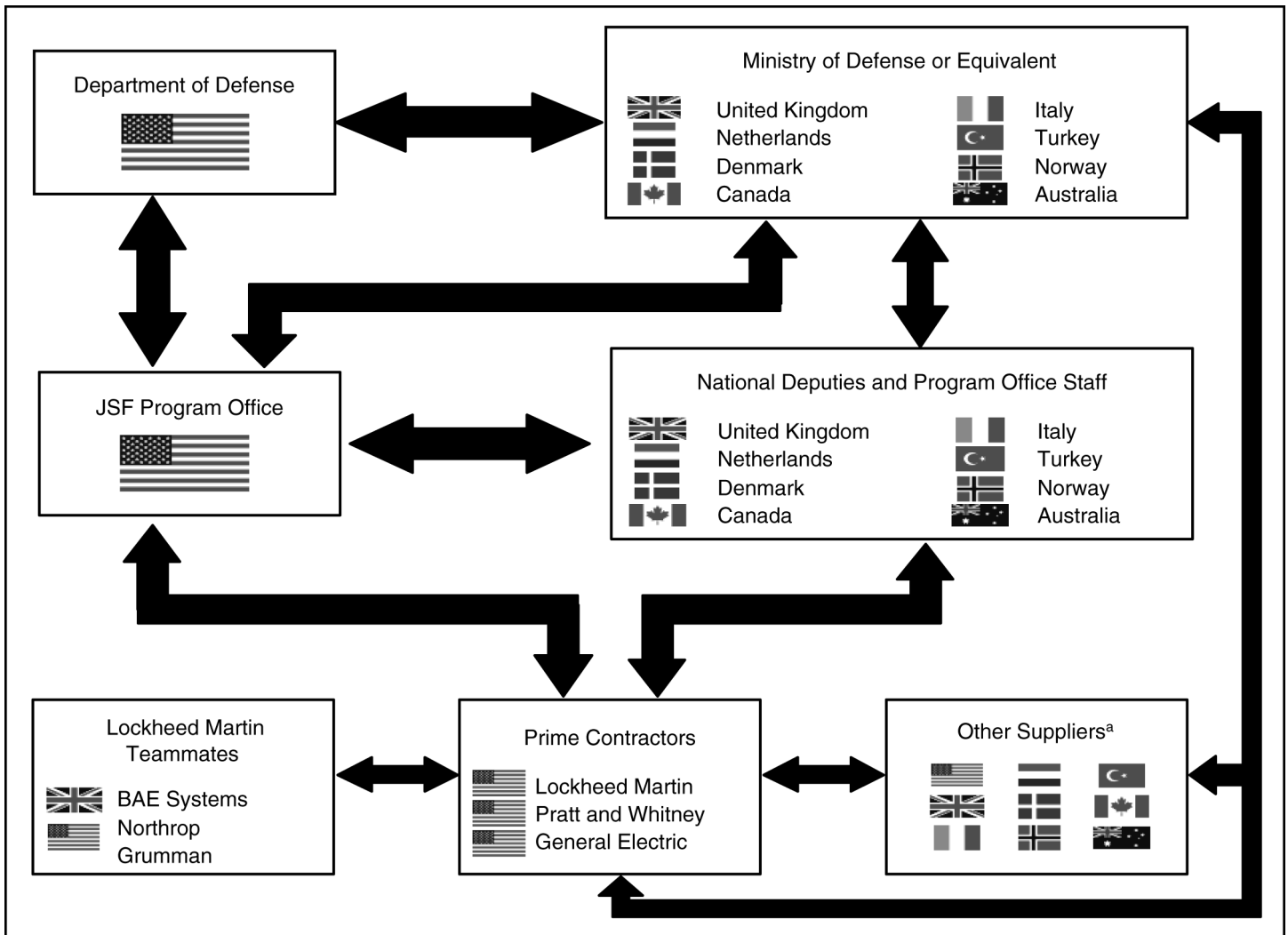
International participation in the JSF program adds complexity to an already challenging acquisition process. However, participation agreements negotiated between DOD and equivalent partner ministries or departments do provide potential benefits to all partners. The United States benefits from financial contributions, increased potential for international sales of JSF aircraft, and access to partner industry. Foreign partners benefit from participating in JSF Program Office activities, accessing JSF technical data, and receiving waivers of nonrecurring aircraft costs and levies from potential sales of JSF aircraft. JSF partners also enjoy greater access to program information than traditional cooperative programs because the JSF program allowed countries to participate at an earlier stage of the acquisition process.

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## JSF International Program Relationships Are Complex

The JSF program is made up of a complex set of relationships involving both government and industry from the United States and eight other countries—the United Kingdom, Italy, the Netherlands, Turkey, Denmark, Norway, Canada, and Australia (see fig. 1).

**Figure 1: JSF Program Relationships**



Source: GAO analysis of JSF program documents.

<sup>a</sup>Figure does not reflect relationships that the prime contractors may have with suppliers in nonpartner countries.

The JSF program structure was established through a framework memorandum of understanding (MOU) and individual supplemental MOUs between each of the partner country's defense department or ministry and DOD, negotiating on behalf of the U.S. government. These agreements identify the roles, responsibilities, and expected benefits for all participants and are negotiated for each acquisition phase (concept

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demonstration, system development and demonstration, and production). Only the concept demonstration phase and the system development and demonstration phase agreements have been negotiated to date, and participation in one phase does not guarantee participation in future phases. According to DOD officials, the department also contributes to the implementation of MOUs by acting as a “court of appeals” to address partner concerns, including industrial participation issues. Additional documents provide greater detail and clarity:

- Financial management procedures document—describes the financial management procedures for the MOU supplements, as well as funding streams, auditing procedures, and other topics.
- Program position description—describes the position title, duties, qualifications, and other information related to all foreign personnel located in the JSF Program Office.
- Exchange of letters—series of formal, signed letters, which emphasize issues of importance to the United States and JSF partners but are not specifically mentioned or described in the MOU agreements.

Representatives from partner ministries or departments of defense participate in senior-level management meetings, including chief executive officer meetings (chaired by the Under Secretary for Acquisition, Technology, and Logistics); system acquisition executive meetings; the senior warfighters group; and the configuration steering board with DOD, JSF Program Office, and contractor officials. These meetings offer opportunities for partner representatives to gain insight into and, in some cases, influence over the progress of the JSF program, in addition to that available from partner staff located in the program office, in areas such as program management, requirements, and aircraft configuration. Finally, the system development and demonstration framework MOU establishes the JSF executive committee, which includes one representative from the United States and each partner country. This committee provides executive level oversight for the program, such as reviewing progress toward program objectives, ensuring compliance with MOU financial provisions, and resolving program-related issues identified by the JSF international director.

National deputies act as partner representatives in the JSF Program Office. They serve as the principal interface between the program office and the ministries or departments of defense to ensure proper execution of the system development and demonstration phase MOU and provide support

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and guidance on all country-specific program execution and integration issues. They provide program information to their ministries or departments of defense and, in some cases, act as an advocate for industry in their respective countries. National deputies and other partner staff also serve functional roles on integrated product teams—multidisciplinary teams that represent a variety of areas, including systems engineering; logistics; and command, control, communications, computers, and intelligence.

At an industry level, the prime contractors interact with the JSF Program Office through activities in support of their system development and demonstration contracts and participation on both program office and contractor integrated product teams and work groups. In addition, the prime contractors interact with partner government ministries or departments (including defense, industry, and trade) and JSF partner personnel in the program office to discuss opportunities for industrial participation and the results of subcontracting competitions. For example, prior to the negotiation of the MOUs for the current phase, Lockheed Martin visited many of the partner countries to provide information on the aircraft and assess potential interest. In addition, for those countries expected to participate in the system development and demonstration phase, Lockheed conducted industry assessments and provided feedback on what areas suppliers might expect to compete for JSF contracts.

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### **JSF Program Relationships Expected to Benefit Both DOD and Allies**

The JSF program allows foreign countries to become program partners at one of three participation levels, based on financial contribution. As shown in table 1, the foreign partners have contributed over \$4.5 billion, or about 14 percent, for the system development and demonstration phase and are expected to purchase about 722 aircraft beginning in the 2012-2015 time frame. Israel and Singapore have recently indicated their intention to participate in the program as security cooperation participants, a nonpartner arrangement, which offers limited access to program information, without a program office presence. According to DOD, foreign military sales to these and other nonpartner countries could include an additional 1,500 to 3,000 aircraft.

**Table 1: JSF Partner Financial Contributions and Estimated Aircraft Purchases**

Partner country	System development and demonstration		Production		
	Partner level	Financial contributions (in millions) <sup>a</sup>	Percentage of total costs	Projected quantities	Percentage of total quantities
United Kingdom	Level I	\$2,056	6.2	150	4.7
Italy	Level II	\$1,028	3.1	131	4.1
Netherlands	Level II	\$800	2.4	85	2.7
Turkey	Level III	\$175	0.5	100	3.2
Australia	Level III	\$144	0.4	100	3.2
Norway	Level III	\$122	0.4	48	1.5
Denmark	Level III	\$110	0.3	48	1.5
Canada	Level III	\$100	0.3	60	1.9
Total partner		\$4,535	13.7 <sup>b</sup>	722	22.8
United States		\$28,565	86.3	2,443	77.2

Sources: DOD and JSF program documents and AECA project certifications to Congress.

<sup>a</sup>Chart values do not reflect any nonfinancial contributions from partners (see app. II).

<sup>b</sup>Percentages do not add due to rounding.

Contributions can be financial or nonfinancial. For example, Turkey’s system development and demonstration contribution was all cash, whereas \$15 million of Denmark’s \$125 million contribution represented the use of an F-16 aircraft and related support equipment for future JSF flight tests and the use of other North Atlantic Treaty Organization (NATO) command and control assets for a JSF interoperability study. (See app. II for details on partner contributions and benefits.)

For the agreements negotiated for the system development and demonstration phase, none of the partner country contribution levels met the financial targets established in the ATPRG guidelines. In the case of the United Kingdom, funding was not available to meet the expected 10 percent contribution. The Under Secretary of Defense for Acquisition, Technology, and Logistics determined that the lower contribution amount was justified and, in fact, the United States was able to negotiate concessions concerning rights for the disposal of project equipment and third-party transfer and sales. Since the United Kingdom was the first partner to sign, and the only Level I partner, contribution targets for other partner negotiations were revised proportionately.

Lockheed Martin’s contracts with aerospace suppliers from partner countries are expected to improve the program because of those

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companies' specific advanced design and manufacturing capabilities. For example, British industry has a significant presence in the program with BAE Systems as a teammate to Lockheed Martin and Rolls Royce as a major engine subcontractor. In addition, Fokker Aerostructures in the Netherlands is under contract to develop composite flight doors for the JSF airframe.

In return for their contributions, partner countries have representatives in the program office with access to program data and technology; membership on the management decision-making bodies; aircraft delivery priority over future foreign military sales participants; guaranteed or potential waiver of nonrecurring aircraft costs;<sup>7</sup> potential levies on future foreign military sales aircraft sold;<sup>8</sup> and improved relationships for their industry with U.S. aerospace companies through JSF subcontracting opportunities. For example, the United Kingdom – which is committed to contribute just over \$2 billion in the system development and demonstration phase – is a Level I full collaborative partner, with benefits such as

- 10 staff positions within the JSF Program Office, including senior positions on integrated product teams;
- participation in cost versus performance trade-off and requirement setting processes, resulting in British military needs being included in the JSF operational requirements document; and
- involvement in final source selection process for the system development and demonstration contract award.

Conversely, the five Level III partners, which are committed to contribute between \$125 million and \$175 million, each have one program office staff member and no direct vote with regard to requirement decisions.

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<sup>7</sup> The President of the United States may reduce or waive cooperative project nonrecurring costs in accordance with the AECA (22 U.S.C. 2761 and 2767). For the JSF program, the Level I and II partners have been granted a full waiver of these costs; Level III participants will receive consideration for this waiver.

<sup>8</sup> According to DOD, final disposition of levies and nonrecurring costs for partners will be decided in production phase MOU negotiations.

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All partners have benefited from increased access to program and contractor information by virtue of their early involvement in the program.<sup>9</sup> Specifically, this participation provided partners with information on the development of aircraft requirements and program costs and schedules, as well as on design, manufacturing, and logistics. According to some partner personnel, access to program information often did not meet their expectations early in the program, but it has improved. During the concept demonstration phase, data were available to partner staff based on country-specific projects. In addition, data were only formally provided through a rigorous, paper-driven document release process and required authority from JSF senior management. For the system development and demonstration phase, partner representatives located in the program office now have access to the database of unclassified program information, referred to as the JSF Virtual Environment, which contains the majority of program documents. Partner program office personnel, regardless of participation level, have equal access to most information. Some information in the database is available only to U.S. personnel or through integrated product team participation. Partner staff can request information from integrated product teams on which they have no membership, as long as the information is not restricted from being released to their countries. Lockheed Martin has a separate document database called the Joint Data Library that includes information on contractor activities, but partner access is limited by existing technical assistance agreements and National Disclosure Policy.

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## International Participation Complicates JSF Program Efforts to Manage Costs

Along with the traditional functions of balancing the requirements for JSF performance against its established cost and schedule targets, the program office is tasked with integrating partner government and industry participants into the program. While initial partner contributions are beneficial, and critical for political support for the program, there is no guarantee that additional funding will be available to support future cost increases should they arise. In addition, even when cost sharing may be justified, funding may not be available through respective partner budgetary processes. DOD's typical response to increased program costs often results in requesting additional funding, delaying production schedules, and reducing procurement quantities or system capabilities, but such actions may negatively affect partner countries. DOD expects

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<sup>9</sup> Most partners have been involved in the JSF program since the concept development phase, which began in 1996.



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that specific provisions in partner MOUs will maximize partner cost sharing when appropriate and that the use of competitive contracting will minimize cost increases to the program.

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### JSF Partners May Not Provide Additional Funding for Program Cost Increases

Our past reviews have shown that weapons acquisition programs frequently encounter increased cost due to questionable requirements, unrealistic cost estimates, funding instability, and high-risk acquisition strategies. We reported in October 2001 that the JSF program entered the system development and demonstration phase with increased cost risk due to low maturity of critical technologies.<sup>10</sup> Future cost increases, should they arise in the program, may fall almost entirely on the United States because there are no provisions in the negotiated agreements requiring partners to share these increases. Once established, the contributions for the partners cannot be revised or increased by the United States without the consent of the partner government as stated in these agreements.

DOD and program office officials told us there could be instances where the partners would not be expected to share cost increases. For example, cost estimates for the system development and demonstration phase have increased on multiple occasions since the program started in 1996. During that time, the expected cost for this phase went from \$21.2 billion to \$33.1 billion as a result of scope changes and increased knowledge about cost. According to program officials and documents, partners have not been required to share any of these costs because the changes were DOD directed and unrelated to partner actions or requirements.

The MOU framework does require partners to pay for all development costs related to meeting unique national requirements. For example, some partners expect to use weapons that may not be included in the current JSF operational requirements document and fully expect to bear the cost associated with integrating them into the aircraft's design. In such a case, the United States and other partners are not required to share costs associated with meeting unique country requirements, unless they agree to make these requirements part of the baseline aircraft configuration and an adjustment is made to the baseline aircraft price.

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<sup>10</sup> U.S. General Accounting Office, *Joint Strike Fighter Acquisition: Mature Critical Technologies Needed to Reduce Risks*, GAO-02-39 (Washington, D.C.: Oct. 19, 2001). The JSF Program Office now tracks 23 program level risks—3 are low risks, 19 are moderate, and 1 is high. The high risk carried by the program is related to aircraft weight.

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Historically, DOD has responded to cost increases by requesting more funding, extending program schedules, reducing overall program quantities and aircraft capability, or some combination of these. While such actions can negatively affect the U.S. military services, the impact may be more substantial for partners because they have less control over program decisions and less ability to adjust to these changes. In the case of the United Kingdom, the Ministry of Defence is developing a new aircraft carrier, expected for delivery in 2012, which is planned to carry JSF aircraft. According to United Kingdom officials, if the aircraft are not delivered as expected, the carrier might not be able to support mission scenarios. Further, most of the remaining partners also expect to receive their JSF aircraft beginning in about the 2012 to 2015 time frame. Potential program delays would affect the availability of the aircraft for partner governments. Finally, if the unit cost increases as a result of DOD's actions, the sales price could be higher than expected, and all partners would be required to pay that additional amount. Current cost estimates for the program assume that the United States will purchase 2,443 and the United Kingdom 150 JSF aircraft.<sup>11</sup> DOD and Lockheed Martin are working with partner countries to determine aircraft needs for all participants, and they will incorporate this information into formal production phase planning.

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### Tools Available to Encourage Partner Sharing and Cost Control

To encourage partners to share costs where appropriate, the United States can consider past cost-sharing behavior when negotiating MOUs for future phases of the program. If a partner refuses to share legitimate costs during the system development and demonstration phase, the United States can use future phase negotiations to recoup all or part of those costs. In these instances, the United States could reduce levies from future sales, refuse to waive portions of the nonrecurring cost charges for Level III partners, or in a worst case, choose not to allow further participation in the program.

Partner representatives indicated that they intend to cooperate with the JSF Program Office and Lockheed Martin in terms of sharing increased program costs when justified. However, the continued affordability of the development program and the final purchase price are important for

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<sup>11</sup> United Kingdom officials told us that for planning purpose it assumes a JSF buy of up to 150 aircraft. This assumption has not been formalized in a production MOU with the United States.

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partners, and there is no guarantee that they would automatically contribute to cost overruns, especially if the increase is attributable to factors outside their control. Some partner representatives specifically expressed concern over the tendency of U.S. weapon system requirements to increase over time, which results in greater risk and higher costs. Several partner representatives also emphasized that it is important for the JSF Program Office to continue to use practices such as Cost as an Independent Variable<sup>12</sup> and iterative requirements definition to address these concerns. While some partners could fund portions of cost overruns from military budgets if requested, others told us that even if they were willing to support such increases, these decisions would have to be made through their parliamentary process, which could affect their overall support for the program.

DOD and the JSF Program Office expect that using a competitive contracting approach, without prescribed work share for partner countries, will also assist in controlling JSF costs. DOD officials stated, and our past work has shown, that cooperative programs, such as the Army's Medium Extended Air Defense System, have experienced cost and schedule problems because such programs focused on meeting industrial work share requirements rather than pursuing a cost-effective acquisition strategy. Coproduction programs, such as the F-16 Multinational Fighter Program, that employ traditional work share approaches often experience cost premiums to the program in terms of increased manufacturing costs associated with use of foreign suppliers.<sup>13</sup> In contrast, the JSF approach is expected to award contracts to the most competitive suppliers, and therefore Lockheed Martin does not believe there will be cost premiums. However, Lockheed Martin officials told us that due to limited aerospace capabilities in some of the partner countries, traditional industrial arrangements might be used in the JSF production phase.

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<sup>12</sup> A process by which performance requirements are considered in terms of the established cost targets so that trade-offs in performance capabilities can be made as necessary.

<sup>13</sup> U.S. General Accounting Office, *F-16 Program: Reasonably Competitive Premiums for European Coproduction*, [GAO/NSIAD-90-181](#) (Washington, D.C.: May 14, 1990) and U.S. General Accounting Office, *Defense Acquisition: Decision Nears on Medium Extended Air Defense System*, [GAO/NSIAD-98-145](#) (Washington, D.C.: June 9, 1998).

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## JSF Technology Transfer Presents Challenges for Program Execution, International Suppliers, and Disclosure Policy

The transfer of technology on the JSF program presents a number of challenges related to program execution, international suppliers, and disclosure policy. The volume of JSF export authorizations has taxed Lockheed Martin's licensing resources, and any delays in the disposition of future export authorizations could affect the execution of key contracts and the ability of partner suppliers to bid for subcontracts. Further, the transfer of technologies necessary to achieve aircraft commonality goals is expected to far exceed past transfers of advanced military technology and will push the boundaries of U.S. disclosure policy.<sup>14</sup> The JSF Program Office and the prime contractor have taken various steps to mitigate these challenges.

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## Timing and Volume of Export Authorizations Could Affect Program Execution and International Suppliers

The JSF Program Office and Lockheed Martin told us that there were over 400 export authorizations and amendments granted during the JSF concept demonstration phase, and they expect that the number of export authorizations required for the current phase could exceed 1,000. Lockheed Martin licensing officials have indicated that this volume has strained its JSF program resources. Export authorizations for critical suppliers need to be planned for, prepared, and resolved in a timely fashion, to help avoid schedule delays in the program. Without proper planning, there could be pressure to expedite reviews and approvals of export authorizations to support program goals and schedules. This could lead to unintended consequences, such as inadequate reviews of license content or broad interpretations of disclosure authority. Lockheed Martin's ability to forecast its export authorization workload extends out only 3 months because most licensing resources are already devoted to keeping up with time critical authorizations. Further, JSF Program Office officials told us that Lockheed Martin has not yet fulfilled a requirement to complete a long-term plan that could anticipate the export authorizations and technology release reviews that will be necessary to execute the program using international suppliers to design and manufacture key parts of the aircraft. This plan could also be used to identify problems suppliers face in executing contracts as a result of licensing or releasability concerns and develop strategies to overcome those problems, such as finding other qualified suppliers to do the work.

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<sup>14</sup> National Disclosure Policy establishes procedures and criteria for releasing classified or controlled unclassified military information to other countries. In addition, there are special release processes for technology, such as stealth. U.S. policy on the release of stealth-related data and technology is contained in DOD Instruction S5230.28.

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Timely export authorizations are also necessary to avoid excluding partner industries from competitions. While Lockheed Martin has stated that no foreign supplier has been excluded from any of its competitions or denied a contract because of fear of export authorization processing times or the conditions that might be placed on an authorization, the company is concerned this could happen. Further, one partner told us that export license delays have had a negative effect on the participation of its companies because some U.S. companies have been reluctant to undertake the bureaucratic burden to allow the participation of a foreign company and some partner companies have been unable to bid due to the time constraints involved in securing an export license.

DOD, the JSF Program Office, and Lockheed Martin have taken several actions to mitigate the challenges presented by export authorization delays:

- The JSF Program Office and Lockheed Martin have established a process to coordinate export authorization applications before they are submitted to the Department of State for review. This process is intended to reduce review times by ensuring that the export request clearly describes the data or technology that would be transferred and by addressing potentially contentious issues related to sensitive transfers. In addition, Lockheed Martin has added resources to its licensing organization to respond to the volume and schedule demands of JSF export authorizations.
- Lockheed Martin received a global project authorization (GPA)—an “umbrella” export authorization that allows Lockheed Martin and other U.S. suppliers on the program to enter into agreements with over 200 partner suppliers to transfer certain unclassified technical data—from the Department of State.<sup>15</sup> The GPA is expected to lessen the administrative burden and improve the consistency of and processing times for routine export authorizations. The Departments of State and Defense and Lockheed Martin agreed to the scope of the information that could be exported using this authorization and the conditions for those exports up front. The Department of State expects to process GPA implementing agreements in 5 days, provided there is no need to refer them to other agencies or offices for review.

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<sup>15</sup> The JSF global project authorization does not cover the transfer of any classified information or certain unclassified, export-controlled information in sensitive technology areas such as stealth, radar, and propulsion.

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Approved in October 2002, implementation of the GPA was delayed until March 2003 because of supplier concerns related to liability and compliance requirements. In March 2003, the first implementing agreement between Lockheed Martin and a company in a partner country was reviewed and approved in 4 business days.

- Prior to the GPA, Lockheed Martin and 13 other U.S. suppliers were granted an exemption by the U.S. Air Force from the export authorization requirements that govern the release of unclassified technical data to suppliers from NATO and certain other countries, including Australia, for bid and proposal purposes. This exemption expires in March 2004. Lockheed Martin also uses a country-specific exemption to transfer technical data to Canada.<sup>16</sup>
- Finally, as a NATO Defense Capabilities Initiative program, partner countries and companies participating in the program, including Australia, can take advantage of expedited review processes for certain types of export licenses. Under these expedited procedures, the Department of State promises to complete its reviews of license applications in 10 days, and if it requests comments on a license from DOD or other government agencies, those reviews should be completed in 10 days as well.

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## Degree of Technology Transfer Will Stretch Current Disclosure Boundaries

The United States has committed to design, develop, and qualify aircraft for partners that fulfill the JSF operational requirements document and are as common to the U.S. JSF configuration as possible within National Disclosure Policy.<sup>17</sup> In some cases, according to DOD, the program has requested exceptions from National Disclosure Policy to achieve interoperability and aircraft commonality goals and to avoid additional development costs. Some DOD officials confirmed that technology transfer decisions have been influenced by JSF program goals, rather than adjusting program goals to meet current disclosure policy.

DOD, JSF Program Office, and Lockheed Martin officials agreed that technology transfer issues should be resolved as early as possible in order

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<sup>16</sup> U.S. General Accounting Office, *Defense Trade: Lessons to Be Learned from the Country Export Exemption*, GAO-02-63 (Washington, D.C.: Mar. 29, 2002).

<sup>17</sup> Releasability reviews, such as the low observable/counter low observable review process for stealth technology, are necessary to transfer certain sensitive technologies and related design and manufacturing data to foreign countries and suppliers.

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to meet program schedules without placing undue pressure on the release process. However, there have been some initial problems executing this strategy. An official at the Defense Technology Security Administration, one of the offices responsible for technical assessments of disclosure and export authorization requests, stated that even though the JSF program has a plan to manage releasability issues and the National Disclosure Policy process, the office does not always receive information related to these issues in a timely manner. In addition, one partner has expressed concern about the pace of information sharing and decision making related to the JSF support concept. According to several partners, access to technical data is needed so that they can plan for and develop a sovereign support infrastructure as expressed in their formal exchange of letters with the United States. The program office anticipates that in-country support of JSF aircraft will be an issue for all partners and will involve both technology transfer and industrial considerations. The JSF support concept is currently being developed, with input from the U.S. military services and international partners.

DOD, the JSF Program Office, and Lockheed Martin have taken a number of actions designed to mitigate the challenges presented by the transfer of technologies on the program.

- In February 2002, the program office modified Lockheed Martin's system development and demonstration contract to include a study on the expected commonality between U.S. and partner JSF aircraft. The objective of this study is to develop a partner JSF aircraft specification that is as common to the U.S. specification as possible under National Disclosure Policy. This effort allows the program to pursue early releasability decisions, which mitigates the risk of putting undue schedule pressure on the process. Lockheed Martin did not deliver the partner specification to the program office as planned in March 2003, and it now expects to deliver the specification in August 2003.
- To identify and resolve expected technical, security, and policy issues for the overseas sale and cooperative development of JSF aircraft, the program chartered an international development work group. The core of this group consists of program office and contractor personnel, as well as individuals from the Air Force's Office of International Affairs and Special Programs, Marine Corps Requirements, and Navy International Programs. The group was chartered to review how past export decisions apply to the JSF program; identify contentious items in advance; and provide workable resolutions that minimize the impact to the program cost, schedule, or performance.

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- In February 2003, the JSF Program Office received direction from the Low Observables/Counter Low Observables Executive Committee to appoint a JSF export compliance officer. The purpose of this position is to ensure that releasability decisions and export licensing provisos or conditions are fully implemented and adhered to by the program and applied to JSF configurations as required.
  - As required by DOD acquisition regulations, the JSF program has identified critical program information, and Lockheed Martin is developing a plan to prevent unauthorized disclosure or inadvertent transfer of leading-edge technologies and sensitive data or systems. To reduce cost and integrate appropriate measures into the JSF design, this effort is being undertaken as a systems engineering activity. During this phase of the program, technology protection measures have to be demonstrated, operationally tested, and made ready for production. DOD officials have stated that the program's progress on this plan has been slow. Given that releasability decisions should consider the measures mentioned above, timely completion of this plan is important for long-term program planning.
  - Finally, the JSF Program Office established an exchange of letters work group with participation from selected program office and Lockheed Martin integrated product teams, and partner representatives when appropriate. The current focus of this group is to address partner goals related to in-country support of the aircraft. In addition, the JSF autonomic logistics integrated product team is conducting trade studies to further define a global support solution for worldwide support to start to address these issues. According to program officials, this strategy will identify the best approach for maintaining JSF aircraft, and may include logistics centers in partner countries. Follow-on trade studies would determine the cost of developing additional maintenance locations. The implementation of the global support solution and the options identified in follow-on trade studies will have to be in full compliance with the National Disclosure Policy, or the program will need to request exceptions.

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## Managing Industrial Participation Expectations

In the JSF program, the prime contractor is responsible for managing industrial participation. Lockheed Martin provides partners with return-on-investment expectations, opportunities for qualified bidders to compete for JSF contracts, and visibility into the subcontracting process for the program. Partners have identified industrial return as one of the primary reasons for their participation in the program. If partners do not realize their expectations, they can choose to leave the program and/or not



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purchase the aircraft—both negative consequences for DOD. But, if Lockheed Martin’s efforts to meet partner return-on-investment expectations come into conflict with program cost, schedule, and performance goals, this could have a negative effect as well. Therefore, the JSF Program Office will ultimately have to make decisions to balance partner expectations and program execution.

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### Management of Partner Expectations Is Critical for Program Success

Partner representatives generally agreed with the JSF competitive approach to contracting, but cautioned that while it is too early to assess results, their industries’ ability to win JSF contracts and participate in design and development is vital to their continued involvement in the program. In addition, some partners stated that retaining political support for the program in their countries will depend, in large part, on winning contracts whose total value approaches or exceeds their financial contributions for the JSF system development and demonstration phase. In addition to the amount of work placed in a partner country, partners have expectations about the timing of contracts and/or which companies in their countries win contracts. If return-on-investment and other expectations are not met, partners could decide to leave the program and not purchase the aircraft.<sup>18</sup> If a partner decided to leave the program, DOD would be deprived of anticipated development funding and an opportunity to improve interoperability among U.S. allies, while Lockheed Martin could be faced with lower than projected international sales.

Other cooperative programs provide for industrial participation commensurate with the financial contributions of the partners. In contrast, the JSF MOU provides that, to achieve “best value for money,” DOD will require contractors to select subcontractors on a competitive basis to the maximum practical extent. To support this approach, Lockheed Martin has taken the following steps to manage partner return-on-investment expectations, identify opportunities for qualified bidders to compete for JSF contracts, and provide visibility into the subcontracting process for the program:

- To manage partner return-on-investment expectations, Lockheed Martin sent teams of engineers and business development personnel to partner countries and assessed suppliers’ ability to compete for JSF

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<sup>18</sup> Most partners have a clause in their supplement MOUs that allows for withdrawal from this phase of the program if industrial participation is not satisfactory.

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contracts. In some cases, Lockheed Martin signed agreements with partner governments and suppliers to document the opportunities they would have to bid for JSF contracts, as well as the potential value of those contracts. DOD and program office officials told us that these agreements were necessary to secure political support in certain countries because the U.S. government does not guarantee that the partners will recoup their investment in the program through contracts with their industry. In at least one case, Lockheed Martin has promised an international contractor predetermined work that satisfies a major portion of that country's expected return-on-investment. While disavowing knowledge of the specific contents of these agreements, DOD was supportive of their use during partner negotiations. DOD officials conceded that the agreements contained in these documents departed from the competitive approach, but expressed the hope that the use of these agreements would not be widespread.

- In response to partner concerns about the slow pace of contract awards, Lockheed Martin has stated that the bulk of the remaining subcontracting with partner industry will come later in the current phase or during the production phase, especially in countries where the aerospace industry is less developed and contracts are more likely to be awarded for build-to-print or second-source manufacturing.
- To provide visibility into the subcontracting process, Lockheed Martin, the JSF program manager, DOD, or a combination of the three have provided explanations of how sourcing decisions were made after partner governments raised concerns on behalf of suppliers about the results of competitions. These governments were told that suppliers submitted bids far above the competitive range and thus were not selected. In addition, DOD, JSF Program Office, and Lockheed Martin personnel provided feedback to the partners concerning how to approach future competitions.
- The award fee structure of Lockheed Martin's contract permits the JSF Program Office to establish focus criteria applicable to specific evaluation periods. To help ensure partner industries are provided opportunities to compete for JSF subcontracts, the program office established focus criteria concerning subcontract competition for the evaluation period between November 1, 2002, and April 30, 2003. Lockheed Martin was judged on its ability to (1) provide partners regular insight into subcontracting opportunities, (2) encourage its major suppliers to consider partner suppliers on a competitive basis, and (3) acquire needed export authorizations in a timely manner to support competitions. In response, Lockheed Martin has developed a

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database to track contract opportunities, especially for international suppliers and U.S. small businesses, and provides monthly summaries of industrial participation to partner personnel in the program office. These summaries include the names of suppliers, contracts for which they will be eligible to bid, bid and proposal dates, status of contracts awarded, and the status of supplier export authorizations. This database will assist DOD in meeting MOU requirements to provide visibility into JSF subcontracting efforts.

Further, some partners have concerns about some aspects of the competition, including delays in getting U.S. export licenses and reluctance by a major supplier to provide opportunities to industry in a partner country. If competition for contracts is not implemented in a manner consistent with partner expectations, partners' continued support for the program could be jeopardized.

JSF industrial relationships are solely developed between U.S. contractors and partner country industry. After deciding to award work to foreign and domestic companies based on competition, instead of the share of program costs contributed, DOD and the JSF Program Office have left implementation of this competitive approach to Lockheed Martin under the standard Federal Acquisition Regulation clause related to competition in subcontracting.<sup>19</sup> Lockheed Martin officials told us their approach for supplier selection is based on factors such as a supplier's ability to incorporate a management approach that is responsive to maintaining JSF schedules, reducing design and production cost within acceptable risk levels, developing a solid technical approach with opportunities for technology improvements, reducing aircraft size and weight, and increasing aircraft performance. They further told us that this approach is being implemented without regard to a supplier's country of origin, with U.S. and international suppliers competing equally.<sup>20</sup> Lockheed Martin concluded that awarding subcontracts in this manner would help achieve program affordability goals and avoid pressure from partners to guarantee contract awards consistent with their monetary contributions to the program.

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<sup>19</sup> Federal Acquisition Regulation 52.244-5, Competition in Subcontracting. This clause requires contractors to select subcontractors on a competitive basis to the maximum practical extent consistent with the objectives and requirements of the contract.

<sup>20</sup> Lockheed Martin officials told us that in some cases competitions would be waived for "heritage" suppliers—suppliers with whom Lockheed Martin has had a long-standing industrial relationship.

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Program officials told us that since the award fee emphasizes overall affordability, program management, technical progress, and development cost control, it should incentivize Lockheed Martin to perform subcontracting activities on a competitive basis. If, during its regular monitoring of contract execution, the program office identifies the need for more emphasis in a certain area—such as reducing aircraft weight or providing opportunities to international suppliers—it can address this concern through the contract’s award fee process.<sup>21</sup> While the program office has used an award fee focus letter to encourage Lockheed Martin to provide a competitive environment, it has not evaluated whether competitive results have been achieved.

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## Conclusions

The JSF program is not immune to unpredictable cost growth, schedule delays, and other management challenges that have historically plagued DOD’s systems acquisition programs. International participation in the program, while providing benefits, makes managing these challenges more difficult and places additional risk on DOD and the prime contractor. While DOD expects international cooperation in systems acquisition to benefit future military coalition engagements, this may come at the expense of U.S. technological and industrial advantages or the overall affordability of the JSF aircraft. Over the next 2 years, DOD will make decisions that will critically affect the cost, schedule, and performance of the program. Because Lockheed Martin bears the responsibility for managing partner industrial expectations, it will be forced to balance its ability to meet program milestones and collect program award fees against meeting these expectations, which could be the key in securing future sales of the JSF for the company. In turn, DOD must be prepared to assess and mitigate any risks resulting from these contractor decisions as it fulfills national obligations set forth in agreements with partner governments. While steps have been taken to position the program for success, given the size and importance of the program, additional attention on the part of DOD and the program office would help minimize the risks associated with implementing the international program. Toward this end, DOD and the JSF Program Office need to maintain a significant knowledge base to enable adequate oversight and control over an acquisition strategy

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<sup>21</sup> Lockheed Martin’s contract for the current JSF phase provides no base fee; instead, it calls for a potential award fee of almost \$2.5 billion, or 15 percent of the total contract value. The exact amount of the fee is determined by the program office, based on subjective criteria related to Lockheed Martin’s ability to achieve development and unit cost control, program management, and technical development goals and milestones.

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that effectively designs, develops, and produces the aircraft while ensuring that the strategy is carried out to the satisfaction of the U.S. services and the international partners. Tools are in place to provide this oversight and management, but they must be fully utilized to achieve program goals.

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## Recommendations for Executive Action

To provide greater knowledge, which anticipates decisions needed as the JSF program matures, we recommend that the Secretary of Defense direct the JSF Program Office to ensure that the Lockheed Martin international industrial plan

- identifies current and potential contracts involving the transfer of sensitive data and technology to partner suppliers;
- evaluates the risks that unfavorable export decisions could pose for the program; and
- develops alternatives to mitigate those risks, such as using U.S. suppliers.

We also recommend that the Secretary direct the JSF Program Office to ensure that information concerning the prime contractor's selection and management of suppliers be collected, closely monitored, and used for program oversight. This oversight should include identifying potential conflicts between partner expectations and program goals, developing focus letters that encourage Lockheed Martin to resolve these conflicts, and making award fee determinations accordingly.

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## Agency Comments and Our Evaluation

DOD provided us with written comments on a draft of this report. These comments are reprinted in appendix III. DOD provided separate technical comments, which we incorporated as appropriate.

DOD concurred with our recommendation that the Secretary of Defense direct the JSF Program Office to ensure that the Lockheed Martin international industrial plan identifies current and potential contracts involving the transfer of sensitive data and technology to partner suppliers, evaluates the risks that unfavorable export decisions could pose for the program, and develops alternatives to mitigate those risks. DOD did raise a concern about our suggestion that using U.S. suppliers was one way to avoid the risks that unfavorable export decisions could pose for the program. In particular, DOD stated it could undermine the program's affordability goals. However, we believe that due to the level of advanced

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technology on the JSF program, affordability goals must be considered in the context of protecting some of the most sensitive U.S. technologies—those vital to maintaining U.S. technical superiority. This means that technology transfer considerations must be part of the sourcing process. If contracts are awarded without identifying and addressing technology transfer issues, the protection of sensitive technology or the execution of those contracts could be compromised. For example, if a contract is awarded to a partner supplier, an export decision that subsequently prohibits or places conditions on the transfer of controlled data or technology to that company could adversely affect its ability to execute the contract. If mitigation options have not been identified, the likely outcome is pressure on the export control system to approve broader export authorizations in support of program goals. In other cases where technology transfer concerns have not been anticipated or addressed, JSF contractors could be forced to re-source work, which could also undermine not only affordability but other goals, such as meeting program schedule.

The international industrial plan referenced in our recommendation can help alleviate these potential pressures by identifying alternatives, one of which would be identifying potential U.S. suppliers in cases where technology transfer is a concern. In its comments, DOD states that mitigating risk in this manner could require the dual sourcing of specific JSF contracts. This is not necessarily the case. Again, ideally, these technology transfer issues would be anticipated before a development or production contract is competed or awarded. With this knowledge, the JSF Program Office and Lockheed Martin could suggest adjustments to work packages or bidders' lists if the technology or companies in question are likely to raise export control concerns. Regardless, the end result could still be the selection of a single source—one that advances affordability and protects sensitive U.S. technology.

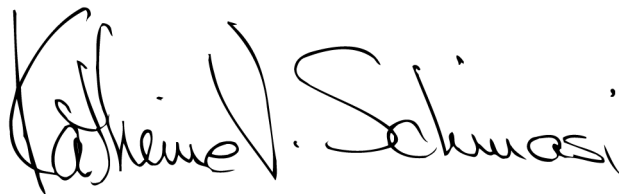
DOD also concurred with our recommendation that the Secretary of Defense direct the JSF Program Office to ensure that information concerning the prime contractors' selection and management of suppliers is collected, closely monitored, and used for program oversight. In its comments, DOD stated that the JSF Program Office would work closely with Lockheed Martin to achieve effective program oversight with regard to partner expectations and program goals. However, DOD did not specify how it plans to collect and monitor this information or elaborate on other steps the JSF Program Office would take to identify and resolve potential conflicts between partner expectations and program goals.

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We are sending copies of this report to interested congressional committees; the Secretary of Defense; the Secretaries of the Navy and the Air Force; the Commandant of the Marine Corps; and the Director, Office of Management and Budget. We will also make copies available to others upon request. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions regarding this report, please contact me at (202) 512-4841. Key contributors to this report are listed in appendix IV.

Sincerely yours,

A handwritten signature in black ink that reads "Katherine V. Schinasi". The signature is written in a cursive style with a large initial "K" and a distinct "V" for the middle name.

Katherine V. Schinasi, Director  
Acquisition and Sourcing Management

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# Appendix I: Scope and Methodology

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Our objective was to review how the Department of Defense (DOD) is managing the integration of partner countries and suppliers into the Joint Strike Fighter (JSF) program. Specifically, we identified international relationships and the benefits they are expected to provide and assessed how DOD is managing cost sharing, technology transfer, and partner expectations for industrial return. To conduct our work, we reviewed various guidance and agreements related to the JSF program. We also interviewed cognizant government officials and industry experts, including those in several JSF partner countries.

To determine what relationships are necessary to integrate international partners into the program, we identified and examined documents related to JSF international arrangements and agreements, including information from DOD; the JSF Program Office in Arlington, Virginia; and the Lockheed Martin Aeronautics Company in Fort Worth, Texas. Specifically, we obtained documents from the Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics), the Department of State (Office of Defense Trade Controls), the Secretary of the Air Force (International Affairs), the Navy International Programs Office, and the Department of Commerce (Bureau of Industry and Security). We discussed the guidance and processes for developing and negotiating agreements for international participation with officials from each of these offices. We also obtained and reviewed signed copies of the memoranda of understanding (MOU) and other documents that outline the agreed upon conditions between the United States and each partner nation. To understand the JSF international program structure in the context of other DOD cooperative development programs, we reviewed reports and documentation on programs such as the F-16 Multinational Fighter Program, the Medium Extended Air Defense System, and the Multiple Launch Rocket System and discussed this information with DOD, contractor, and international personnel with experience on those programs.

For specific information on cost sharing within the program, we reviewed MOUs and related documents and discussed this issue with the Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics) – International Cooperation, JSF Program Office international directorate and contracts; and Lockheed Martin international program officials.

To determine how the program is responding to technology transfer concerns, we reviewed documentation on U.S. National Disclosure Policy and related guidance. In addition, we spoke to officials in DOD, the Departments of State and Commerce, the JSF Program Office, and Lockheed Martin. Within DOD, we collected data on sensitive technology



areas and spoke to representatives from the Defense Technology Security Administration, the Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics) Directorate of Special Programs, and the Office of the Air Force Under Secretary for International Affairs (Foreign Disclosure and Technology Transfer Division) to determine the extent to which the JSF program considered these concerns in its approach. We reviewed the JSF program protection plan and spoke with Lockheed Martin and program office security personnel to determine how the program implements this plan and other mechanisms related to foreign disclosure and technology transfer.

To assess the JSF approach to managing international partner expectations, we reviewed various sources of information on other U.S. cooperative development programs, including our past reports, to determine potential challenges for the international program and discussed these challenges with officials from the Office of the Secretary of Defense, the JSF Program Office, Lockheed Martin, and other personnel as necessary. We reviewed program documentation and procedures for addressing these challenges and spoke with key staff from the Office of the Secretary of Defense, the JSF Program Office International Directorate, and Lockheed Martin JSF International Programs on issues regarding implementation of their management approach.

To determine and assess the position of international participants in the program, we obtained the direct views of officials from the partner countries. First, we conducted structured interviews with the National Deputies from the partner countries represented in the JSF Program Office. These officials were both civilian and military personnel and provided information in areas related to their countries' involvement in the program, including expected benefits, experience with other cooperative programs, presence in the JSF Program Office and contractor locations, industry participation in the program, cost sharing, experience with the U.S. export licensing process, and technology transfer. The results of interviews were documented and verified with each of the national deputies and their respective governments for accuracy. One country elected to provide written responses to the interview questions we submitted. In addition, we visited government and industry representatives in London and Bristol, United Kingdom; Rome, Italy; and The Hague, Netherlands. We discussed JSF program participation with senior defense officials in each of these three countries to assess their views on the overall progress and success of the program to date. Finally, we visited and discussed our review objectives with officials from BAE Systems and

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Rolls Royce in the United Kingdom, who are major suppliers to the JSF prime contractors.

We performed our work from February 2002 to May 2003 in accordance with generally accepted government auditing standards.

# Appendix II: JSF International Participant Contributions and Benefits

	Value of contributions	National deputy	JSF Program Office staff	Data use rights	Benefits during production
<b>Level I partner</b>					
United Kingdom	<ul style="list-style-type: none"> <li>U.S. target: approximately 10 percent or \$2.5 billion</li> <li>Negotiated contribution: \$2.056 billion</li> </ul>	At the director level reports to the JSF program manager	Ten fully integrated staff, including the deputy director of the systems engineering integrated product team	JSF purposes: includes use for the performance of project activities under SDD MOUs and future efforts by the United Kingdom (either collaboratively, nationally, or under U.S. foreign military sales arrangements) for the design, development, manufacture, operation, and support of any JSF aircraft	<ul style="list-style-type: none"> <li>Delivery priority based on level of SDD contributions</li> <li>Waiver of all non-recurring research and development costs</li> <li>Levies from sales to nonpartners based on level of SDD contributions</li> </ul>
<b>Level II partner</b>					
Italy	<ul style="list-style-type: none"> <li>U.S. target: approximately 5 percent or \$1.25 billion</li> <li>Negotiated contribution: \$1.028 billion</li> </ul>	Reports to the JSF international director	Five integrated staff, including a logistics manager on the autonomic logistics integrated product team	Italian Ministry of Defense JSF purposes: includes use for the performance of project activities under SDD MOUs and future efforts by the Italian Ministry of Defense (either collaboratively, nationally, or under U.S. foreign military sales arrangements) for the design, development, manufacture, operation, and support of the JSF CTOL and STOVL variants	<ul style="list-style-type: none"> <li>Delivery priority based on level of SDD contributions</li> <li>Waiver of all non-recurring research and development costs</li> <li>Levies from sales to nonpartners based on level of SDD contributions</li> </ul>
Netherlands	<ul style="list-style-type: none"> <li>U.S. target: approximately 5 percent or \$1.25 billion</li> <li>Negotiated contribution: \$800 million</li> </ul>	Reports to the JSF international director	Three integrated staff	CTOL purposes: includes use for the performance of project activities under SDD MOUs and future efforts by the Netherlands (either collaboratively, nationally, or under U.S. foreign military sales arrangements) for the design, development, manufacture, operation, and support of the JSF CTOL and F-16 aircraft	<ul style="list-style-type: none"> <li>Delivery priority based on level of SDD contributions</li> <li>Waiver of all non-recurring research and development costs</li> <li>Levies from sales to nonpartners based on level of SDD contributions</li> </ul>

**Appendix II: JSF International Participant Contributions and Benefits**

	<b>Value of contributions</b>	<b>National deputy</b>	<b>JSF Program Office staff</b>	<b>Data use rights</b>	<b>Benefits during production</b>
<b>Level III Partner</b>					
Turkey	<ul style="list-style-type: none"> <li>U.S. target: approximately 1-2 percent or \$250-500 million</li> <li>Negotiated contribution: \$175 million</li> </ul>	Reports to the JSF international director	One integrated staff, who performs both national deputy duties and participates on the C4I IPT	Project purposes: includes use for the performance of project activities under SDD MOUs	<ul style="list-style-type: none"> <li>Delivery priority based on level of SDD contributions</li> <li>Consideration for waiver of all non-recurring research and development costs</li> <li>Levies from sales to nonpartners based on level of SDD contributions</li> </ul>
Australia	<ul style="list-style-type: none"> <li>U.S. target: approximately 1-2 percent or \$250-500 million</li> <li>Negotiated contribution: \$150 million</li> </ul>	Same as above	One integrated staff, who performs both national deputy duties and participates on the C4I IPT	Same as above	Same as above
Canada	<ul style="list-style-type: none"> <li>U.S. target: approximately 1-2 percent or \$250-500 million</li> <li>Negotiated contribution: \$150 million</li> </ul>	Same as above	One integrated staff, who performs both national deputy duties and participates on the C4I IPT	Same as above	Same as above
Denmark	<ul style="list-style-type: none"> <li>U.S. target: approximately 1-2 percent or \$250-500 million</li> <li>Negotiated contribution: \$125 million</li> </ul>	Same as above	One integrated staff, who performs both national deputy duties and participates on the C4I IPT	Same as above	Same as above
Norway	<ul style="list-style-type: none"> <li>U.S. target: approximately 1-2 percent or \$250-500 million</li> <li>Negotiated contribution: \$125 million</li> </ul>	Same as above	One integrated staff, who performs both national deputy duties and participates on the C4I IPT	Same as above	Same as above

**Appendix II: JSF International Participant Contributions and Benefits**

	<b>Value of contributions</b>	<b>National deputy</b>	<b>JSF Program Office staff</b>	<b>Data use rights</b>	<b>Benefits during production</b>
<b>Security Cooperation Participant</b>					
Israel	Approximately \$50 million spread over two phases	None	None	<ul style="list-style-type: none"> <li>Assessment of JSF's ability to meet Israeli Ministry of Defense requirements</li> <li>Studies on incorporation of unique Israeli systems</li> <li>Program updates on the design, development, and qualification of the JSF aircraft</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to request purchase of a version of the JSF aircraft</li> <li>Delivery priority based on level of SDD contributions</li> </ul>
Singapore	Approximately \$50 million spread over two phases	None	None	<ul style="list-style-type: none"> <li>Assessment of JSF's ability to meet the requirements of the Singapore Ministry of Defense</li> <li>Studies on incorporation of unique requirements of the Singapore Ministry of Defense</li> <li>Program updates on the design, development, and qualification of the JSF aircraft</li> </ul>	<ul style="list-style-type: none"> <li>Opportunity to request purchase of a version of the JSF aircraft</li> <li>Delivery priority based on level of SDD contributions</li> </ul>

Legend

C4I IPT = command, control, communications, computers, and intelligence integrated product team

CTOL = conventional take-off and landing

JSF = Joint Strike Fighter

LOA = letter of offer and acceptance

MOU= memorandum of understanding

SDD = system development and demonstration

STOVL = short take-off and vertical landing

Source: GAO's summary of JSF MOUs and letters of intent.

# Appendix III: Comments from the Department of Defense



ACQUISITION,  
TECHNOLOGY,  
AND LOGISTICS

## OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3000

JUN 30 2003

Ms. Katherine V. Schinasi  
Director, Acquisition and Sourcing Management  
U.S. General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Ms. Schinasi:

This is the Department of Defense (DoD) response to the GAO Draft Report GAO-03-775, "JOINT STRIKE FIGHTER ACQUISITION: Cooperative Program Needs Greater Oversight to Ensure Goals Are Met," dated June 9, 2003 (GAO Code 120120).

The Department concurs with the GAO report. DoD Comments to the GAO Recommendations are provided as an enclosure. Additionally, proposed corrections for technical accuracy have been provided separately.

Sincerely,

Alfred G. Volkman  
Director  
International Cooperation

Enclosure



GAO DRAFT REPORT – DATED JUNE 9, 2003  
GAO CODE 120120/GAO-03-775

“JOINT STRIKE FIGHTER ACQUISITION: Cooperative Program Needs  
Greater Oversight to Ensure Goals Are Met”

DEPARTMENT OF DEFENSE COMMENTS  
TO THE RECOMMENDATIONS

**RECOMMENDATION 1:** To provide greater knowledge, which anticipates decisions needed as the JSF program matures, the GAO recommended that the Secretary of Defense direct the JSF program office to ensure that the Lockheed Martin international industrial plan:

- identifies current and potential contracts involving the transfer of sensitive data and technology to partner suppliers;
- evaluates the risks that unfavorable export decisions could pose for the program; and
- develops alternatives to mitigate those risks, such as using U.S. suppliers. (p. 25/GAO Draft Report)

**DOD RESPONSE:** Concur. The report states the need for risk mitigation plans that might include more use of U.S. suppliers. While this is one possible course of action to mitigate risk, such an approach could also undermine the JSF program’s “best value” affordability precepts. Dual sourcing is often not the best way to mitigate risk. The JSF program office will ensure that Lockheed Martin’s international industrial plan is continually reviewed for technology transfer, export control, and risk mitigation issues.

**RECOMMENDATION 2:** The GAO recommended that the Secretary of Defense direct the JSF program office to ensure that information concerning the prime contractors’ selection and management of suppliers be collected, closely monitored, and used for program oversight. This oversight should include identifying potential conflicts between partner expectations and program goals, developing focus letters that encourage Lockheed Martin to resolve these conflicts, and making award fee determinations accordingly. (p. 25/GAO Draft Report)

**DOD RESPONSE:** Concur. The JSF program office will work closely with Lockheed Martin to achieve effective program oversight when it comes to partner expectations and program goals.

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# Appendix IV: Staff Acknowledgments

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## Acknowledgments

Tom Denomme, Brian Mullins, Ron Schwenn, Anne Howe, Delores Cohen, Karen Sloan, and Robert Ackley made key contributions to this report.



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