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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

THE FSX PROJECT,
A CASE STUDY IN BURDEN SHARING
AND INTERNATIONAL ARMAMENTS COOPERATION

by

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December 1990

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UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a REPORT SECURITY CLASSIFICATION: UNCLASSIFIED	1b RESTRICTIVE MARKINGS
2a SECURITY CLASSIFICATION AUTHORITY	3 DISTRIBUTION/AVAILABILITY OF REPORT: Approved for public release: distribution is unlimited.
2b DECLASSIFICATION/DOWNGRADING SCHEDULE	
4 PERFORMING ORGANIZATION REPORT NUMBER(S)	5 MONITORING ORGANIZATION REPORT NUMBER(S)
6a NAME OF PERFORMING ORGANIZATION: Naval Postgraduate School; 6b OFFICE SYMBOL (If applicable): 36	7a NAME OF MONITORING ORGANIZATION: Naval Postgraduate School
6c ADDRESS (City, State, and ZIP Code): Monterey, CA 93943-5000	7b ADDRESS (City, State, and ZIP Code): Monterey, CA 93943-5000
8a NAME OF FUNDING/SPONSORING ORGANIZATION; 8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c ADDRESS (City, State, and ZIP Code)	10 SOURCE OF FUNDING NUMBERS: PROGRAM ELEMENT NO; PROJECT NO; TASK NO; WORK UNIT ACCESSION NO

11 TITLE (Include Security Classification): THE FSX PROJECT, A CASE STUDY IN BURDEN SHARING AND INTERNATIONAL ARMAMENTS COOPERATION (Unclassified)

12 PERSONAL AUTHOR(S): Bowen, George J. II

13a TYPE OF REPORT	13b TIME COVERED	14 DATE OF REPORT (Year, Month, Day)	15 PAGE COUNT
Master's Thesis	FROM ____ TO ____	December 1990	89

16 SUPPLEMENTARY NOTATION: The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	FSX, Fighter Support Experimental, Burden Sharing, International Armaments Cooperation

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

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The objective of this thesis is to examine both the benefits of burden sharing, and the objections raised concerning armaments cooperation in relation to the FSX project. The validity of the objections to the FSX agreement will be analyzed in addition to how they relate to future projects.

20 DISTRIBUTION/AVAILABILITY OF ABSTRACT	21 ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	Unclassified
22a NAME OF RESPONSIBLE INDIVIDUAL: William R. Gates	22b TELEPHONE (Include Area Code): (408) 646-2754; 22c OFFICE SYMBOL: AS/Gt

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

Approved for public release; distribution is unlimited.

The FSX Project,
A Case Study in Burden Sharing
and International Armaments Cooperation

by

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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN FINANCIAL MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1990

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ABSTRACT

This thesis examines the relationship between the benefits and the major objections expressed over burden sharing and international armaments cooperation. These concerns include: (1) protectionism, (2) transfer of technology and (3) bureaucratic problems. An analysis of these factors will be conducted through a case study of the Fighter Support Experimental (FSX) project. It will be conducted so as to determine the validity of these benefits and objections.

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I. INTRODUCTION

During the middle of this century the U.S. had a vibrant and growing economy. After World War II, the economies of most of the world were in shambles and the U.S. felt an obligation to help rebuild and rejuvenate these countries. In the 1970's and 1980's the American public was less willing to shoulder the burden of defense for an alliance and was looking for ways in which the burden could be shifted from the U.S. to other members of the alliance. One way of shifting this burden was to participate in, and encourage co-development projects. The Fighter Support Experimental was just such a project.

This thesis will be a case study of the Fighter Support Experimental (FSX) project. Using the case study framework, it will concentrate on burden sharing and international armaments cooperation and problems specific to the FSX project. It will provide an overview of burden sharing in general and the benefits to be derived from international armaments cooperation. The political and economic implications of burden sharing will be investigated and the major objections discussed.

A detailed review of the FSX program will be presented, beginning with the decision to replace the aging fleet of Japanese fighters and continuing through the approval of the

project by the President and Congress. Specific objections to this project will be examined for validity.

A. BACKGROUND

The FSX project began in the mid 1980's with the decision to replace the aging fleet of Japanese F-1 fighter aircraft. There were originally three options available to the Japanese for the replacement of these aircraft. The first option was to buy foreign made fighters off the shelf. The second option was to develop and produce the aircraft domestically. The third option was to co-develop the aircraft with a third country. The co-development option was chosen by the Japanese and the F-16 was chosen as the base aircraft to be modified to meet the needs of the Japanese.

In the beginning, the U.S. was afraid that another country would be chosen and that the U.S. would be left out of this project. After the Japanese chose the F-16 as the base aircraft, the U.S. Congress began having second thoughts about the project. They raised concerns about "fair trade" and technology transfer. These concerns also introduced the problem of bureaucracy into the negotiations.

The project was approved, but only after months of infighting between executive agencies, and the executive and legislative branches of government. There were those who were concerned that the FSX project would, in the long run,

provide the Japanese with the expertise to compete against the U.S. in the world aerospace market and, in the short run, take jobs away from U.S. citizens.

This thesis will attempt to identify the main economic concerns of burden sharing and international armaments cooperation and how they were addressed in the FSX program. It will discuss the validity of these concerns and what can be done in the future to alleviate these problems.

B. ORGANIZATION OF STUDY

This thesis will begin by explaining the economics of burden sharing and international armament cooperation. It describes how the world economic community can benefit when each country produces items where they have a comparative advantage. The next section will discuss in general the problems that can arise from international cooperation. Then a detailed review of the Fighter Support Experimental (FSX) project will be presented. It will highlight some of the more important prospects of the agreement. A thorough discussion will be presented of the main problems and objectives encountered in the project and the validity of these objections. Finally, conclusions will be drawn about the FSX project and recommendations will be made on avoiding some of these problems in the future.

II. BURDEN SHARING FROM THE ECONOMIC VIEW POINT

Defense burden sharing is concerned with the contribution of each nation of an alliance to the common defense of that alliance. The basic premise is that, in a less hegemonic world, the financial and leadership responsibilities should be divided up so that the alliance may endure and is efficient. In other words: the most defense for the least cost, with a balance between a nation's costs and benefits. [Ref. 1:p. 1]

In recent years the U.S. has grown to believe that it is contributing more than its "fair share" in the area of burden sharing. After WWII the economies of our enemies and allies alike were in shambles. At that time, the U.S. produced about 50 percent of the world's gross national product (GNP). The U.S. felt an obligation to help rebuild the other countries. Now Western Europe and Japan have become strong economically and the U.S. is producing less than 25 percent of the world's GNP. With the relative decline in the U.S. GNP and the increase in the U.S. budget deficit, the U.S. public has become less willing to shoulder a large portion of alliance defense spending. As a comparison of defense spending, in 1987 the U.S. spent 6.4 percent of its gross domestic product on defense, the Japanese spent 1 percent of their gross domestic product on

defense and the average Western European country spent 3.3 percent of their gross domestic product on defense. In dollars, the U.S. contributed 170 billion dollars to NATO defense in 1987, while the combined contribution of all other NATO countries was 157 billion Because of the perceived inequities, the U.S. is putting pressure on Japan and NATO countries to increase their contributions to the mutual defense effort. [Ref. 1:p. 3]

A problem with requesting that a country contribute its fair share, is that a "fair share" is not easily defined. Everyone agrees that the burden should be divided efficiently and equitably. Efficiency, getting the best level of total defense for the lowest possible cost, is conceptually an easier concept to measure than true equity. Paradoxically, however, it often takes a back-seat in the burden sharing controversy. Instead, various equity measures are pushed to the forefront of the burden sharing discussion which advance and reflect each group's national interests. Some of the equity measures used by world powers include total contribution, per capita contribution, percent of gross national product and percent of gross domestic product. These measures of equity do not entirely gauge a country's contribution. [Ref. 1:p. 1] A further discussion of equity measures will appear later in this section.

A. DEFENSE AS A PUBLIC GOOD

Equity issues in defense expenditures arise largely because defense is considered a public good. A public good is one that provides non-rival and non-excludable benefits. Non-rival means that the use by one person does not exclude the use of the item by another person. In the case of defense, it is argued that if defense is provided for one person it does not mean that his neighbor will be any less protected. The non-excludable property of a public good makes it impossible, or prohibitively expensive, to exclude nonpayers from the benefits of a product. In the case of defense, in a cold war setting, if one man does not contribute to the common defense it is virtually impossible to exclude him from receiving the benefits of the protection which is provided to everyone else This non-excludability property may not be the case in a post cold war environment, as will be discussed later. [Ref. 2:p. 4]

This leads to the problem of nonpayers with respect to a public good. Those who do not pay for a service, or pay less than they should, are called free riders. The free rider decreases the amount of the total good provided. Because consumers have free access to public goods provided by others, everyone will contribute less than he would if he could only consume the goods provided by his expenditures. This also shifts the burden to those who value the good most highly. [Ref. 3:p. 43] As an example: if a person values

public TV, but knows that it will be provided whether he contributes or not, then that person has the incentive to decrease his contribution or not pay at all. The person who places a higher value on public TV and is willing to pay for it will have to increase his contribution to keep public TV on the air. Public TV is an example of a public good, as its use by one person does not diminish its use by another person (non-rivalrous), as long as they both have TV sets and are within the reception area. This good also meets the non-exclusion requirement in that it is impossible to keep the nonpayers from tuning in to the public channel without the use of a scrambler, which in the case of public TV would be prohibitively expensive.

The contribution of the person who values public TV highly will not be enough to make up for the total amount lost due to the free rider, so less public TV will be provided. Similarly with defense, the country who values the defense alliance the most will not make up for the free riders, so less total defense will be provided for the alliance. The larger the number of individuals or countries, the higher the incentive not to contribute and the less of the good that will be provided. [Ref. 3:pp. 43-47]

Olson and Zeckhauser have shown that if one country values defense more than another country, all other characteristics being the same, then defense spending of the

two countries will be disproportionate. The country that values defense less will spend less because it is satisfied with less defense. Part of its defense requirement is being fulfilled by the country that requires more defense. Because of free riding, the total defense provided will be less than optimal. [Ref. 3:pp. 43-47]

While defense is a public good inside a country, it is not a pure public good among an alliance. To be a pure ublic good it must be non-excludable and non-rival, this is not the case in an alliance. In an alliance, conventional and nuclear forces could be withheld from the defense of a country that does not provide its share of the common defense. In addition, with a limited number of forces and with the logistic problems of moving troops, the use of forces in one area could prevent their use in another area. [Ref. 1:p. 4]

Nuclear protection is non-rival in that the threat of a retaliatory nuclear strike in defense of one country will not detract from the threat of a retaliatory strike in defense of another country. As nuclear protection is more non-rival than conventional forces, an alliance might be less inclined to exclude a member from its nuclear umbrella due to free riding. Since the cost of additional members in the nuclear umbrella protection, in the past, has been much smaller than the marginal gains due to the members' military, economic and political contribution to the cause

of the alliance. As the potential use of nuclear weapons decreases with nuclear disarmament treaties, the problems associated with free riders should also decrease as alliances become more dependent on conventional (more excludable and rival) forces. [Ref. 1:p. 4]

B. ALLIES, ADVERSARIES, AND COMMITMENT

Recent authors have put forth the idea that defense spending in an alliance is not a perfect public good. Thus, free riding is not the only determinant of defense expenditures. Defense expenditures also depend on each nation's commitment to the alliance, the actions of the adversaries of an alliance and the allies that make up an alliance. [Ref. 4:p. 1]

1. Commitment

The members of an alliance must have the military capability to inflict unacceptable losses on an aggressor and the commitment to use those forces. One of these elements without the other will not produce a deterrence. The aggressor must believe that the alliance members will use their nuclear and conventional forces in the face of aggression or these forces become worthless as a deterrent. It is not only the aggressor that must be convinced of the commitment of a nation, but also the nation's allies. If a nation's allies believe that the member is not totally committed to the alliance in a particular area, the allies

will increase their defense spending to make up part of the deterrence. This idea, along with threat perceptions (discussed later), will have serious implications with the arms treaties and other recent developments in Europe. [Ref. 4:p. 7]

2. Adversaries

The actions of expected adversaries will also affect the level of defense spending by alliance members. If the threat is perceived to diminish, such as the 1989-90 diminished threat from the Soviets in Europe, the defense spending of member nations will be expected to decrease, all else being equal. This was the expected reaction of the 1991 U.S. defense budget. Thus the actions and perceptions of potential adversaries will affect the defense spending of alliance members. [Ref. 4:p. 26]

3. Allies

The actions of allies in an alliance will affect the defense spending of each individual member of the alliance. As an example, if the U.S. begins to withdraw troops and short-medium range nuclear weapons from Europe, the defense spending of other NATO countries may not decrease by as much as it would otherwise. The withdrawing of missiles and troops could increase the threat perceived by the other members and cause them to adjust their defense budgets accordingly. [Ref. 4:p. 27]

The defense budgets of individual members of an alliance will depend on many forces outside of its control. As shown, it will depend on the commitments of its allies, the actions of potential adversaries and the actions of other members of the alliance.

C. EQUITY AND EFFICIENCY

A nation will increase its defense spending when incentives exist for them to do so. As circumstances change in Europe and in the Pacific Rim, countries will change their defense spending in response to the change in their perceived benefits from the alliance. As nations respond to changing conditions, equity and efficiency in international defense alliances are likely to remain controversial issues. At least three conditions will be important: the level of the perceived threat, the measures of equity and the mix of resources contributed by each country. [Ref 2:p. 8]

1. The Perceived Threat

A major issue in burden sharing is determining how much defense is enough. This issue stems from a perception of the threat. In general, the U.S. considers the threat to be larger than its allies do. This will cause the U.S. to require a larger defense force than would be required by our allies. Also, the U.S. tends to think in terms of a flexible defense effort. The U.S. wants the ability to react with both conventional forces and nuclear weapons.

The Europeans tend to think of nuclear retaliation for any Soviet aggression as the tactic of choice. Since nuclear weapons are cheaper than conventional forces, and primarily provided by the United States, the Europeans can justify their lower defense spending by advocating the use of nuclear weapons. The U.S. and European nations both have reason to try to overstate their case. The U.S. exaggerates its case to get other countries to provide more defense and the Europeans overstate their case to decrease their defense spending, hoping that the U.S. will make up the difference. [Ref. 1:p. 5]

As circumstances change in Europe, the perceived threat and the value of the alliance will change. For example, a Conventional Forces Europe treaty could lower the value of the NATO alliance and also provide a more concrete consensus on the nature of the threat. This is likely to be used by the allies as reason to decrease defense spending. "A number of Congressional Staffers familiar with the issue have pointed out that the question is now who gets to take the most cuts in a CFE agreement." [Ref. 2:p. 8] It has been observed that "...the issue (for Europeans) may be burden-shedding rather than burden sharing." [Ref. 2:p. 8]

The threat perception question is not only prevalent in NATO, but it is also an issue in Japan. Many Japanese tend to believe that the Soviet military in the area is pointed at China and not at Japan. [Ref. 5:p. 263] They

believe that a superpower nuclear war will never happen. This is due to the belief that a major nuclear war would be suicidal, and therefore no one would start it. There are, however, some young Japanese defense experts who perceive a greater threat and therefore believe that Japan should undertake a larger share of the defense burden. Some Japanese believe that the U.S. is oriented more towards Europe and point out that this is also a reason for Japan to increase its defense effort. [Ref. 5:p. 268]

Some past Soviet actions that may have changed Japan's threat perception are:

1. The Soviet invasion of Afghanistan.
2. The deployment of Soviet troops in the Northern Territories of Etoroty, Shikotan, and Kunashiri and the Habomai Islands.
3. The deployment of the SS-20 IRBM and Backfire bombers in eastern USSR.
4. The build-up of the Soviet Pacific Fleet, particularly the deployment of the Soviet carriers Minsk and Novorossijsk as well as the nuclear-powered guided missile cruiser Frunze to the Pacific.
5. Soviet expansionism moves in Ethiopia, Angola and Vietnam. [Ref. 6:p.4]

It remains to be seen how the changes in Europe will effect the Japanese threat perception.

2. Measures of Equity

Another problem connected with defining a "fair share" in burden sharing is defining a fair distribution. A fair distribution of burden should match a nation's

proportional contribution with the proportional benefits it receives. However, this is not easy to achieve. Everyone agrees that the distribution should be fair, but a measure of fairness has not been found. [Ref. 1:p. 6] U.S. Deputy Secretary of State William Taft wrote:

> Critics of our alliance system contend that the U.S. bears far more than its fair share of the cost of the alliance. The key evidence they cite in support of their claim in most cases is statistical; the fact that, measured in terms of the percent of gross domestic product, the U.S. spends almost twice as much on defense as its average NATO ally.... For the critics, this fact clinches the argument, and all that remains is to decide whether we will insist on our allies spending more on defense or we'll simply do less ourselves. [Ref. 7:p. 16]

While the U.S. tries to tie burden sharing to hard numbers, such as gross national product (GNP) or per capita spending, our allies point out that other factors must be considered in describing what is "fair". For instance, the Europeans point out that they may spend less on defense, but everything they do spend goes for the protection of Europe. In contrast, the total U.S. defense spending is spread throughout the world. [Ref. 6:p. 15] The U.S. could counter this argument by pointing out that the Soviet threat in Europe may be decreased by the possibility of allied retaliation in other parts of the world. For instance, a Soviet attack in Europe could be countered by a U.S. attack on Soviet positions in the Pacific Rim, thereby increasing the scope of the war. The Europeans also point out that the

cost of economic assistance provided to less developed NATO countries is not considered when looking only at these statistics.

There are many non-quantifiable costs that are born by our allies in defense of the alliance. These costs would include the presence of foreign troops in a country, military equipment in the streets and military aircraft overhead. Estimates indicate that in 1989 West Germany had nine soldiers per square mile, this compares with .4 in the U.S. There is also the cost of land provided for troops in the allied countries. [Ref. 7:p. 15]

General John W. Vassey Jr. made the following comparison with regard to West Germany:

> If you multiply the population of Oregon by 20, give each person a car, arm one million of them, bring in another half-million armed foreigners, put 50,000 armored vehicles and 100,000 wheeled vehicles on the roads and put a couple thousand jets in the air, then at least the Oregonians would know what the Germans put up with. [Ref. 7:p. 26]

President Reagan, when dealing with the Japanese, decided not to emphasize GNP as a measure of "fair share", but to use the roles and missions approach. This approach would assign each country a mission and let them decide what resources were needed to accomplish that mission, instead of trying to place a monetary value on their contribution. His administration advocated that the Japanese provide for the defense of the Japanese island and for the defense of the sea lanes out to 1000 miles. This idea of roles and

missions may be a much more equitable approach to the sharing of defense. However, this approach still leaves open the question of who gets what role and the adequacy of expenditures to complete their role. [Ref 7:p. 50]

There is no generally accepted index for measuring a "fair share" and different indexes give different results. Because of these problems, the index to be used is likely to be a source of contention in the foreseeable future.

3. The Mix of Resources Contributed by Each Country

Another major stumbling block in burden sharing is the choice of the optimal mix of resources. This mix includes troops, supplies, munitions, aircraft, ships, support personnel etc. "If the mix of resources is inefficient, either the level of defense capability could be increased without increasing total expenditures, or expenditures could be reduced without reducing the level of defense capacity." [Ref 1:p. 12] This perfect efficiency would require complete cooperation among allies on the defense strategy, the materials needed to carry out that strategy and perfect ination about the type of strategy needed. Due to these obstacles, perfect efficiency will never be achieved. [Ref 1:p. 13]

The issue of efficiency is a question of not only what is the proper mix, but also who should contribute what resource. To achieve efficiency, each member should contribute the resource where they have a comparative

advantage. For equity, each member should contribute items that balance their benefits and contributions. [Ref. 1:p. 13]

The principle of comparative advantage states that a country should produce and export those products that it produces most efficiently (relative to other products) and import those items that another country produces more efficiently. When the principle is adhered to, then all trading countries gain. This gain results because world output is larger when each country produces what it can produce best. [Ref. 8:p. 371]

To illustrate the idea of comparative advantage, suppose that the U.S. can produce 200 bushels of corn or 100 TV sets, while Japan can only produce 5 bushels of corn or 20 TV sets with the same resources (reference Table 1). Although the U.S. can produce more of each, it is possible to increase the world's production of both by having the U.S. produce more corn and Japan produce more TV sets. This is because the margin of advantage that each country has for a particular product is different. The U.S. can produce 20 times as much corn as Japan with the same resources, but it can produce only 5 times as many TV sets. This gives Japan a comparative advantage in TV sets but a comparative disadvantage in corn. [Ref. 9:p. 777]

TABLE 1. COMPARATIVE ADVANTAGE

TABLE 1		
	corn (bushels)	TV sets
U.S.	200	100
Japan	5	20

If the U.S. moves one tenth of a unit of resource from TV sets to corn and Japan moves one unit of resource from corn production to TV sets then the total production of corn will go up by 15 units and the total production of TV sets will go up 10 units. This change is indicated in Table 2 below. [Ref. 9:p. 777]

TABLE 2. TOTAL PRODUCTION

TABLE 2		
	corn (bushels)	TV sets
U.S.	+20	-10
Japan	- 5	+20
Total world production	+15	+10

As long as there is a margin of advantage in one area over another, the total world production will go up when one area specializes in the product where it has a comparative advantage. [Ref. 9:p. 777]

In an alliance where members are free to determine the content of their contributions, efficiency is frequently compromised because of national objectives. In particular, expenditures on different resources hold different benefits for a country. The presence of a military base and the use of local labor may help the local economy in the area around the base. However, development and production of a high technology weapons system may help not only the immediate local economy, but also provide spinoff technology that can be used in other defense and civilian industries. This high tech item could impact the country's international trade relations and balance of payments. It could also increase a country's international prestige. The high tech production could do all of this without the problems associated with having foreign troops stationed in the country. Thus, countries may attempt to make contributions to the alliance in areas that they do not have a comparative advantage, but which will satisfy other national objectives. This reduces efficiency. [Ref. 1:p. 13]

D. INTERNATIONAL ARMAMENTS COOPERATION

One way of increasing efficiency and equity, while lowering the defense budget of each individual nation, is international armaments agreements. These agreements could reduce research and development costs, promote standardization and interoperability among the alliance and

open new international markets for the cooperating nations. In times of U.S defense cuts, these new markets would be extremely important to the U.S. defense industry. [Ref. 2:p. 13]

International armaments agreements were advocated by the Reagan Administration. In the Fiscal Year 1990 Office of the Secretary of Defense (OSD) Report on Allied Contributions, Secretary of Defense Carlucci stated a U.S. goal of increasing cooperative program investments from the current 3 percent to 25 percent by the year 2000. "OSD estimated that signed agreements presented an opportunity to save over 70 percent on the costs associated with pursuing such projects unilaterally." [Ref. 2:p. 13] Carlucci noted the following benefits of increased cooperation:

1. reducing duplication among allied weapons systems
2. producing better products by sharing technologies
3. improving interoperability
4. achieving economies of scale more quickly
5. bolstering U.S. industrial competitiveness. [Ref. 2:p.13]

In addition to the benefits listed above, increased cooperation will also increase the high tech industries of our allies, create larger markets for them and help European leaders defend their military budgets. It will also cut down on the free rider problem as cooperative agreements are excludable by their nature. [Ref. 2:p. 30]

International trade in general is considered important in order for countries to achieve and maintain a high standard of living. With trade there will be specialization, each person or country doing what it does best and purchasing from others those goods and services that it can not efficiently produce. Without trade, the world will have an extremely low standard of living, with each country, or person, having to produce everything it needs. There are still many obstacles to these international armaments agreements, some of which will be discussed in the next section, but politicians may be becoming more willing to adopt policies that economists have advocated for years.

III. THE POLITICAL IMPLICATIONS OF BURDEN SHARING AND INTERNATIONAL ARMAMENTS COOPERATION

After WWII, when we produced 50 percent of the world's GNP and held a technological advantage, independence worked well for the United States. However, our share of world GNP has dropped to 20-25 percent. The U.S. is competing against nations with a highly skilled, yet sometimes less costly, labor force and in some areas U.S. technology may no longer be superior. [Ref. 10:p. 12] "The economic success of our competitors makes it virtually impossible, and prohibitively expensive to retain self-sufficiency as a national security goal." [Ref. 10:p. 12] But, while International Armaments Agreements would provide benefits as shown in section two, not everyone is convinced that cooperation with other nations would be beneficial. This section will provide an overview of four objections to this cooperation. The major objections expressed about burden sharing and international armaments cooperation are:

1. the issue of foreign dependence
2. protectionism
3. the transfer of U.S technology
4. bureaucratic problems

A. FOREIGN DEPENDENCE

A major concern to many is the extent to which the U.S. is becoming increasingly dependent on foreign nations for

its weapons systems, components and sub-systems. This dependency includes items produced both by foreign companies and U.S. companies in factories overseas. As examples the following have been identified as foreign sole-source suppliers to the U.S.: the United Kingdom for the TR-41 engines in the A-7 aircraft; West Germany for precision optical glass; France and Spain for hexachlorethane for smoke bombs; and Switzerland for self-illuminating light sources. Many U.S. companies produce the bulk of their products in other countries, due in part to foreign labor becoming more technologically proficient while remaining lower paid than domestic labor. Many U.S. factories are having a hard time remaining competitive in the face of proficient low paid foreign labor. Motorola, for example, produces all of its microelectronics in Mexico. [Ref. 10:p. 6]

To understand how dependent the U.S. is on foreign countries for its weapons systems, a Mobilization Concept Development Center report found that of 13 weapons systems studied, the U.S. would be unable to produce 8 of these systems if foreign supplies were cut off. Included in these systems are the Sparrow Missile, the M-1 tank, sonobuoys, the F/A-18 and the F-16; some of our newest and most advanced systems. [Ref. 10:p. 6]

1. Disruptions of Supply

The concern expressed over foreign dependence is that external supply lines will be disrupted, either through embargoes or blocked transportation lanes, in time of conflict. [Ref. 11:p. 5] The Defense Science Board voiced these concerns when they asked, "What would prevent the government of a county in which critical U.S. components are manufactured from stopping production export in response to dissatisfaction with American foreign policy?" [Ref. 11:p. 5]

The same concern exists over foreign dependence on raw materials as well as manufactured goods. These raw materials include oil, nickel and platinum. A solution used for the problem of dependence on strategic minerals has been to stockpile the materials. The U.S. has been doing this for years. [Ref. 11:p. 5] While this is an answer for raw materials, it will not work as well for manufactured goods. Some manufactured goods require maintenance and/or upgrading. They are susceptible to deterioration and subject to obsolescence. Obsolescence of manufactured goods in storage could become enormously expensive for the stockpiling country.

A more suitable solution than stockpiling, for both raw materials & manufactured goods, is to cultivate more than one supplier. If the U.S. purchases vital goods from only one country, such as aircraft engines from England, it

would be relatively easy to stop that one source from delivering a product to the U.S. If, however, a manufactured good is produced by more than one source it would be far more difficult to interrupt delivery. For instance, if the same aircraft engine could be procured from England, Japan and Canada, there would be little chance of the disruption of all three supply sources simultaneously.

The geography of nations also influences the danger of a supply line disruption. It would be much harder for an aggressor to affect the shipment of materials to the U.S. from Canada or Mexico, than it would be to affect the shipment of goods from Japan or Europe. The geographic location of trading partners will also effect the potential threat of supply disruption and therefore the number of suppliers needed.

Of concern to the U.S., in addition to supply lines being cut by an aggressor, is the withholding of a product by a supplier. The chance of this happening is also decreased with multiple suppliers. The withholding of vital materials would also depend on the relationship with the purchasing country. For instance, Japan depends heavily on the U.S. for its defense. It is therefore unlikely that Japan would willingly withhold vital materials from the U.S. during a conflict. [Ref. 11:p. 91]

2. Engineering Ability

Another problem associated with foreign dependency is the loss of U.S. engineering ability. If the U.S. becomes dependent on other countries for our high technology weapons systems, it is plausible that the U.S. could gradually lose its ability to design and produce these goods. Some fear that "... the U.S. could conceivably become similar to many Third-World nations who currently rely on U.S. technological training for their state-of-the-art military expansion." [Ref. 11:p. 6] This loss of engineering ability also includes the loss of research and development (R&D) benefits to other industries. "Economic studies have shown that the rate of return of R&D to society as a whole is double the return to individual firms pering it." [Ref. 11:p. 6]

There is another side to the argument concerning loss of engineering ability. This group argues that historically, high tech items have been developed and refined in the U.S., and then produced overseas and imported. When these products are in the beginning stages of their life-cycle, there needs to be close communication between producers, customers and suppliers. However, as the products become highly standardized, the need for this closer communication is drastically reduced. [Ref. 12:p. 206] History has borne out this pattern as new products are introduced in the U.S. and exported. Then, as the product

matures and standardizes, production moves overseas and the product is imported. This clears the way for U.S. scientists and engineers to develop the new generation of products. Thus, foreign dependency does not necessarily mean a loss of engineering ability, but may clear the way for new products.

Those that fear the loss of U.S. engineering ability should consider the effect that total self-dependence has had on the Soviet Union. This policy has lead to technically inferior forces and domestic economic chaos. It is very expensive to attempt, and impossible to achieve, leadership in every field. As was pointed out in section two, one of the benefits of international trade and comparative advantage is that there is more for everyone at a lower price.

Even with the benefits of international trade discussed in section two and above, the U.S. dependence on foreign production for a large portion of its weapons systems does raise concern for our ability to fight a prolonged war if supplies are disrupted during a conflict or for political reasons. If, however, the war is short, this argument becomes less relevant. Foreign dependence also impacts on civilian industries as spinoff technology is lost.

B. PROTECTIONISM

"Protectionism ...is the regulation of trade between the residents of different countries for the supposed benefit of certain home country residents." [Ref. 11:p. 9] There are many reasons for the protectionist sentiment. One of the biggest reasons, and one of great concern to individual congressmen, is the protection of domestic goods and support for domestic, in-district, industries. There is a sentiment that the market share of domestic producers must be protected against cheaper foreign goods. It is often claimed that these foreign goods are being produced at less cost due to government subsidization and cheaper foreign labor. Also given as reasons for protectionism are the preservation of national product standards (such as automobile pollution standards), national security concerns and the "maintenance of the overall health of the domestic economy". [Ref. 11:p. 9]

To satisfy the protectionists' objectives, several methods of regulation have been introduced. These methods include the following:

1. tariffs--(schedules of duties on imports) not as prevalent as in past years due to international agreements
2. additional charges--above and beyond the normal customs duty on certain imports
3. import quotas--which directly limit the amount of a commodity that may be imported during a given period of time (consumers do not enjoy lower prices when import quotas are enacted, while domestic producers essentially receive a quota profit in addition to

maintaining a secure and less competitive market for their product)

4. export quotas---in the name of national security certain products are restricted in both numbers and destination (one of the more publicized examples was the ban on the sale of various computer systems to Eastern Bloc Nations imposed by the Reagan Administration)

5. voluntary export restrictions--rather than risk even sterner measures, some countries voluntarily restrict exports to other countries (Australia, New Zealand and other beef producing nations voluntarily restricted exports of beef to the U.S. from 1968-1971 rather than trigger automatic quotas under the Meat Import Act; Japan voluntarily restricted its export of cotton textiles to the U.S. during the 1950s and, more recently, Japan cut back its exports of automobiles and semiconductors to the U.S. in reaction to U.S. pressure)

6. anti-dumping legislation--dumping refers to the sale in foreign markets of products below prices charged in home markets for the same products (according to Article VI of the General Agreement on Tariffs and Trade (GATT), such sales are only considered unfair and subject to anti-dumping duties when they are also injurious to U.S. producers of similar products). [Ref. 11:p. 10]

The protectionist sentiments have spawned "Buy-American" rules. This is legislation that requires Federal agencies to buy American made products, even if these products are more expensive than foreign products of equal or superior quality. This decreases the amount of defense the public gets for their dollar. The "Buy American" sentiment is attractive to labor unions, domestic industries and Congress (because of constituent interests). However, it would be better for the Department of Defense to buy the best and most cost effective technology wherever it can be obtained.

Obtaining the best technology available may actually force the domestic industries to upgrade their products. [Ref. 11:p. 90]

Protectionism, while meeting the needs of many special interest groups, goes against the ideas of trade expressed in section two. Protectionism does not allow for the free flow of goods and ination between countries and is therefore not conducive to international armaments cooperation.

C. TECHNOLOGY TRANSFER

"One of the principle means of keeping the U.S. military ahead of the Soviet Union has been through the use of technologically superior weapons." [Ref. 11:p. 28] This technological superiority has been used by the U.S. and its allies to counter the numerically superior Warsaw Pact Forces. If the U.S. loses this superiority, there are only two choices of action: (1) a massive build up of military forces or (2) the acceptance of a decreased level of security. One way to maintain this level of technological superiority is to take advantage of the synergism that is created when the strengths of various nations are focused on a project. However, not everyone is convinced that International Armaments Cooperation with other countries is beneficial.

There are competing views, mainly among Congress, the Department of Defense, and the Commerce Department, on how

to take advantage of the technological and financial gains offered by cooperative R&D efforts, while protecting U.S. industrial competitiveness and long term national security interests. For instance, Senator Alan Dixon has argued that an aerospace deal with Korea will strengthen Korea's aerospace industry at the expense of the U.S. aerospace industry. Congress is concerned that the transfer of U.S. technology will hurt the U.S industrial base as a whole. [Ref. 2:pp. 16-17]

A major problem with the transfer of technology is that many of our security partners are also our trading partners/competitors. Joint cooperation on military R&D projects also provides our R&D partners, and economic competitors, with spinoff technology that can be used to compete with U.S. domestic industries. However, not participating in these joint R&D projects could also cause the U.S. defense industry to miss out on technological advances that could be used to compete for defense contracts, both overseas and domestically.

The Defense Department has recognized both sides of this argument, and in November 1989 the Defense Science Board Task Force supported increased defense cooperation between U.S. and Pacific Rim Nations. It emphasized that cooperation must involve two way technology transfers. It stated "...that we must explicitly link cooperative defense sharing issues with economic issues, including the trade-

balance and market access." [Ref. 2:p. 14] The Defense Science Board also stated that relations with the Pacific Rim Nations may be more complex than with NATO nations because of trade relations with these nations. [Ref. 2:p. 14]

It has been argued that in light of reduced defense spending by the U.S., the U.S. defense industry would benefit from shared technological resources and more open markets. If the U.S. is to maintain its technological superiority it must use every avenue to stay in the lead. Cooperative R&D projects are one way for U.S. defense industries to stay on the cutting edge of technology.

D. BUREAUCRATIC PROBLEMS

The bureaucracy of the U.S. makes it difficult to establish international armaments agreements. There are four departments that oversee and regulate U.S. exports: the State Department, the Department of Defense, the Department of Commerce, and Congress. With this much supervision, there are many regulations that must be satisfied before an arms agreement can be signed.

> This kind of uncertainty, in addition to the instability associated with the U.S. defense budget process, makes foreigners - especially Europeans - wary of entering into cooperative agreements with the United States. Even after large R&D expenditures by foreign nations, no guarantee exists that these investments will not be lost if the U.S. must pull out of an agreement due to budgetary pressure. [Ref. 2:p. 29]

The world has changed since the late 50's to early 60's when America could afford to be self-sufficient. In the 1990's many of the ideas of that time will be counter-productive. We can no longer afford the "Buy American" policies that once prevailed in this country. Diversification is not only a way of obtaining the lowest cost products, but it is a way of forcing American producers to continue research and development to keep up with the competition, both foreign and domestic. Purchasing from several sources will also lessen the problem of foreign dependence. As stated in this section, purchasing items from more than one source provides alternatives if one provider is disrupted. This means that the U.S. must be willing to pay a little more for some items so that the most efficient producer does not become the only producer of a product. While we want the lowest cost items, the additional cost paid to a less efficient producer could be considered the premium for a more reliable system.

While international armaments cooperation agreements have many advantages as discussed in section one, they also have many problems that must be considered as discussed in this section. The following sections will outline the background of the Fighter Support Experimental (FSX) cooperative joint venture project involving the United States and Japan, and discuss objections, and the validity of these objections, in the U.S. and Japan. Many of the

advantages and problems discussed in chapters two and three will be highlighted using the FSX as a case study.

IV. THE FIGHTER SUPPORT EXPERIMENTAL

The Fighter Support Experimental (FSX) is a new generation of fighter aircraft based on General Dynamics' F-16. It involves a joint venture agreement between America's General Dynamics and Japan's Mitsubishi Heavy Industries. The final agreement was shaped by international business opportunities and constraints, in addition to a "...political process which dictated that neither economic or security considerations were paramount, but that the two were inextricably intertwined." [Ref. 13:p. 1] This section will describe the events leading to the FSX co-development agreement with highlights on some of the significant events. Following sections will discuss the objections, and the validity of these objections in detail.

A. BACKGROUND

The FSX project started in 1984/1985 with the Japanese decision to replace its 1960 vintage fleet of F-1 jet fighters. While the F-1 was developed primarily as a close-in support aircraft for ground forces, the Japanese Defense Agency (JDA) wanted the replacement aircraft to have an expanded role and capability. The replacement was to be a longer range, more advanced fighter. It would be a

multipurpose aircraft with modifications for air combat, sea-lane surveillance and anti ship capability. Specifically, the FSX would be required to have a top speed of mach two, a maximum payload of 22,000 lbs. and a range of 500 miles with four air-to-surface missiles. To that end, the Japanese Defense Agency conducted a study in September 1985 to find a replacement aircraft. [Ref. 13:p. 6]

B. PRODUCTION OPTIONS

When the selection began, three options were considered. The first option was to use an existing domestic Japanese model and modify it to meet the FSX requirements. The second option was to modify a foreign produced fighter, under license. The third option was to develop and produce an upgraded fighter domestically. [Ref. 13:p. 6]

There was strong support for developing and producing the aircraft domestically, particularly among the Japanese Air Self-Defense Force, the JDA and the Ministry of International Trade and Industry (MITI). JDA's technical research and development determined that it was possible to do this domestically, with the exception of the proposed engine, but it would take 10 years. Some of the reasons for producing the fighter domestically were:

1. Reducing Japan's reliance on the U.S. for weapons and aircraft.
2. Maintaining the market share that Japan held with the F-1.

3. Providing increased application of advanced Japanese technology in weapons systems.

4. Providing the Japanese ordinance industry with an attractive, long term, expensive project. [Ref. 13: p. 6]

An article for the Japan Quarterly stated that:

> While Japan has made technological advances in almost all fields, including rocketry, it lags far behind in aeronautics. The Ministry of International Trade and Industry, which once promoted the domestic development of a civilian plane, endorsed domestic development of the FSX as an alternative. Both the ministry and the ordinance industry viewed the FSX project as the last chance in this century to rebuild the Japanese aviation industry. [Ref. 13:p. 7]

While Mitsubishi Heavy Industries and four other Japanese defense related companies lobbied for domestic development, the JDA Ministry of Foreign Affairs brought up the possibility of an international arrangement. Inquiries about modifications and/or licensing agreements for co-production or technical assistance identified four possibilities: the European Tornado produced by the British; the French and German Panvia; the F-16 produced in the U.S. by General Dynamics; or the F/A-18 produced in the U.S. by McDonnell Douglas. [Ref. 13:p. 8]

The JDA sent letters to the foreign defense contractors that built these four aircraft. These letters inquired about modifications the countries would allow to their planes to meet FSX specifications. The July 1986 replies ruled out the European produced Tornado. [Ref. 13:p. 9]

JDA study groups were sent to both General Dynamics and McDonnell Douglas. In late 1986, Kurihara Yuko, then the Director General of the JDA, reported to the Japanese National Security Council the study groups' conclusions and recommended additional study of the joint development option with an American firm. [Ref. 13:p. 9]

The JDA report and Kurihara Yuko's recommendation were the first setbacks for the domestic development proponents. All of this came at a time of increasing American pressure over the trade imbalance and burden sharing. [Ref. 13:p. 9]

C. FSX ISSUE IN THE U.S.

By the summer of 1986, the FSX was a political issue between Japan and the U.S. The U.S. defense contractors were becoming concerned that the U.S. would be denied access to another part of the Japanese market. At this time, the main concern was to ensure participation of the U.S. in the development and production of the FSX. The issues of technology transfer and American protectionism had yet to be addressed. [Ref. 13:p. 9]

1. FSX Under the Reagan Administration

In early 1987 the Reagan Administration and several members of Congress had started to pressure Japan to purchase a U.S. fighter off the shelf or to jointly develop the FSX with an American Fighter as the baseline.

According to Richard Grimmett and Larry Niksch of the Foreign Affairs and National Defense Division of the Library of Congress Congressional Research Service:

'Other proposals in Congress reportedly called on Japan to purchase outright 100 U.S. fighters. The U.S. bargaining position was strengthened by the massive U.S. trade deficit with Japan ($59 billion in 1987), by the consequent congressional concern with Japanese trade barriers, and the controversy and Japanese embarrassment over the Toshiba Corporation's export of sensitive materials to the Soviet Union in violation of the Coordination Committee for Multilateral Export Controls (COCOM) regulations.' [Ref. 13:p. 10]

In June 1987, Secretary of Defense Casper Weinberger went to Japan to advocate a cooperative production arrangement. In October of 1987 a joint development plan for the FSX was adopted by U.S. and Japanese defense officials. The plan called for the use of General Dynamics' F-16C fuselage as the base aircraft of the FSX, with some structural modifications and additional new electronics. [Ref. 13:p. 11]

Broad outlines were drawn up in October 1987, but negotiations on the project continued for over a year. At issue were: (1) the financial return to participating companies, (2) the extent of their involvement in the design and manufacture of the FSX and (3) agreement for American firms to receive Japanese technology applied to the aircraft. [Ref. 13:p. 12]

2. Congressional Concerns

In April 1988, members of the Senate Armed Services Committee published their concern that the U.S. was subsidizing foreign advanced weapons development to the detriment of the U.S. aerospace industry. The concern was

that the transfer of U.S. technology to Japan would be counterproductive for the U.S. This transfer could allow Japan to be more competitive in a market area where the U.S. was the current leader. They also wanted to be sure that the U.S. could force Japan to share its technology according to a flow-back agreement. [Ref. 13:p. 12]

The Senate Armed Services Committee demanded that no F-16 technology be transferred to Japan until the Memorandum of Understanding was officially established. Dennis F. Kloske, then the Deputy Undersecretary of Defense, reported to the committee that the U.S. sought assurances for a thirty percent share of production work and a forty percent share of the development work. However, many Japanese officials considered forty percent of the development work to be too high. [Ref. 13:p. 13]

The April meeting of the Senate Armed Services Committee also added a provision to the Fiscal Year 89 Defense Authorization Bill mandating that the Secretary of Defense consult with the Secretary of Commerce in negotiating final terms of the FSX agreement. Not only did this provision underscore the Congressional sentiment of the commercial implications of the U.S.--Japanese defense related technology, it also introduced a new player into future defense contracts. [Ref. 13:p. 13] This will be discussed in future sections.

On April 27, 1988, the House Committee on Science Space and Technology conducted hearings on ways to improve cooperation in sharing foreign technology and U.S. demands for foreign scientific & technical ination.

> During the hearings, reference was made to two diametrically opposed perspectives. One called for restriction of access to U.S. science and technology, taking the position that sharing such knowledge undermines U.S. technological superiority and economic competitiveness. The second advocated the exchange of technological ination via joint research and development ventures because such ination gains would serve as a boon to all participants by short cutting individual R&D processes while gaining access to new materials, processes, products, and productivity improvements.' [Ref. 13:p. 14]

3. FSX Agreement Reached

The Memorandum of Understanding (MOU) was signed on November 29, 1988 and defined specific development work shares and cooperative technology arrangements. According to the MOU, General Dynamics and its U.S. subcontractors were to receive 35 to 45 percent of the development work, at an estimated 1.2 billion dollars. [Ref. 13:p. 13]

On January 12, 1989, a licensing agreement between General Dynamics and Mitsubishi Heavy Industries was signed for technical assistance to build 130 aircraft. This agreement was classified, but government statements and press accounts indicate that it included the following:

1. The Government Accounting office estimated the cost of the FSX at over $50 million per plane with $9 million development cost per plane.
2. Mitsubishi Heavy Industries would be the lead company in the license production arrangement, with General Dynamics as a partner.

3. A 40 percent share of both development and production programs would go to U.S. defense related corporations, led by General Dynamics.

4. The total development costs would be borne by Japan - approximately $1.2 billion.

5. The U.S. would have access, at no cost, to all Japanese technology derived from the FSX project.

6. Production of the FSX would begin in 1994, with delivery of the first FSX fighter to Japan in 1997.

7. The engines for the FSX would be either General Electric or Pratt and Whitney, purchased off the shelf by the Japanese. [Ref. 13:pp. 15-16]

The Defense Department estimated that the deal would bring $2.5 billion into the U.S. and create 22,700 U.S. jobs in development and production. The U.S. would also have access to any new technology including the miniaturized phased array radar and radar absorbing materials. These radar absorbing materials consisted of layers of carbon fibers coated with epoxy resin used in the wings. [Ref. 14:p. 461]

4. FSX Under Bush

In mid January of 1989, the Japanese and the Pentagon were pressing for approval of the F-16, licensing transfer of production to Mitsubishi. The Japanese wanted the technical data from General Dynamics so that they could begin letting contracts before the end of their fiscal year, on March 31st. The Pentagon wanted this deal to ensure that U.S.--Japanese security interdependence would be maintained. They were concerned because of the delays

already suffered due to long negotiations over U.S.--Japanese work shares. [Ref. 13:p. 17]

The New York Times reported that the Defense and State Departments feared that a long delay would push the Japanese to develop a plane on their own. This would decrease the security interdependence of the two nations and leave the U.S. defense industry without the technological or financial benefits of the project. This report showed that military and economic issues were fused even in the Pentagon. The Pentagon did seem to put security interdependence above economic/defense industry concerns. Pentagon officials, however, were aware that "...aircraft and weapons are among the few areas where the U.S. can keep the trade balance with Japan in the black." [Ref. 13:p. 17]

These economic and defense concerns helped to put the FSX at the top of the Bush Administration's agenda. The executive agencies were increasingly at odds over the precedence of issues for U.S.--Japanese foreign policy. U.S. Commerce and Trade Representatives made the argument that economic concerns were being overlooked. The Pentagon maintained that national security took precedence over economics. The FSX deal again began to receive congressional criticism. This time due to increasing concerns about U.S. competitiveness and technological diffusion. [Ref. 13:p. 18]

The Senate used the confirmation hearings of James Baker III (Secretary of State), Carla Hills (U.S. Trade Representative), and John Tower (Defense Designate) to voice concerns about the FSX agreement. They were concerned that Japan would receive American aerospace and production technology that would allow them to become more competitive in the aerospace industry in the long run. [Ref. 13:p. 18] During these hearings, "Senator Jesse Helms led other critics in extracting a promise from the Secretary of State nominee James Baker III that the FSX issue would be reexamined by the new Bush Administration." [Ref. 13:p. 19]

In late January 1989, Senators Helms, Bingamen and nine others sent a letter to President Bush which was critical of the way the FSX program was being handled. In the letter they requested the technology transfer be suspended until the Departments of Commerce, Defense, Energy, State, the Office of Trade Representative and the Office of White House Science Advisor could review the arrangement. [Ref. 13:p. 19] Senators Helms and Bingamen had been opposed to this deal from the beginning. This may have been just another excuse to delay or cancel the deal.

Senate Resolution 61 was introduced in February 1989 by Senator Dixon and 20 other Senators. This resolution called for a sixty day interagency review before Congress received al notification of the licensing agreement. This is important because after al notification, Congress only

has 30 days to disapprove it, or it goes into force. Five days after the introduction of Senate Resolution 61, 24 House members threatened to introduce legislation disapproving the arrangements if modifications were not made to the FSX plans and if the Japanese did not provide certain assurances. [Ref. 13:p. 20]

5. Interagency Debate

There was also opposition in the Executive Branch to the FSX deal. Commerce Secretary, Robert Moshbacher, won a three week delay in the project's implementation. He persuaded President Bush to order the review of the joint venture by the Commerce and Defense Departments. This review was completed on March 10, 1989. Then another delay in the FSX approval was demanded by members of Congress until an investigation of Mitsubishi's role in establishing a chemical-weapons plant in Libya could be conducted. [Ref. 13:p. 20]

"A bitter interagency debate erupted over the proposal to delay the transfer of F-16 technology to Japan." [Ref. 13:p 20] The State and Defense Departments wanted approval of the technology transfer in early February 1989. They saw the FSX as an economic and strategic boon for the U.S. They were also receiving pressure from Japan for quick approval so that contracts could be let by Mitsubishi. However, critics, lead by Commerce Secretary Moshbacher, wanted more intensive study of the project's long term

effects. They wanted a sixty to ninety day delay to study the effects of the joint venture on trade. The National Security Council granted the delay on the grounds that the agreement lacked specification. [Ref. 13:p. 21]

One of the most important long range implications of this debate was that Secretary Moshbacher managed to convince President Bush that the Commerce Department should be included at the start of any negotiations that involve the exchange of military or technology secrets.

President Bush proposed modifications, to the Japanese, of the FSX agreement on March 20th, 1989. He stated he would approve the FSX co-development plans if the Japanese would accept new "clarifications". These clarifications specified: (1) tighter restrictions on the transfer of technology, particularly F-16 flight control technology and weaponry source codes, and (2) "a guarantee that General Dynamics would receive a share of the estimated $5 billion that Japan proposed to spend on FSX production." [Ref. 13:p. 22] The bureaucratic fighting between executive agencies ended with the announcement of these clarifications. [Ref. 13:p. 22]

D. JAPANESE RESPONSE

At the time the U.S. was having second thoughts, the controversy had also resurfaced in Japan. Members of the Japanese Liberal Democratic Party recommended that the

project be scrapped if the U.S. could not move forward. They argued again for a purely domestic Japanese fighter. [Ref. 13:p. 22]

Many in Japan now saw President Bush's clarifications as an attempt to change a deal that had already been reached. The proposal "led to sharp expressions of irritation and bitterness among Japanese officials." [Ref. 13:p. 22] Japanese domestic concerns were also leading to second thoughts about the FSX. "In response to the Bush Administration's demands, Director General of Defense Kichiro Tazawa stated `that Bush should respect what has been agreed to.... the FSX agreement should not be changed, and we want to ensure that it is not.'" [Ref. 13:p. 23] It was again suggested by some in the Japanese Defense Industry that Japan drop the deal and build the fighter on its own or in conjunction with a European country [Ref. 15:p. A14].

Secretaries Baker and Moshbacher, along with National Security Advisor Brent Scrowcroft, met on March 23, 1989 with Japan's Vice Minister of Defense and the Japanese Ambassador. This was an attempt to seal the agreement. While no agreement was reached at this meeting, the U.S. and Japan did agree that the deal was still on. [Ref. 13:p. 24]

The clarifications were not enough for some Congressmen, and Congressman Levine led a group that sent yet another letter to President Bush. In this letter they were "...insisting that the U.S. pressure the Japanese into

purchasing existing F-16 or other top of the line fighters directly from the U.S. and abandon its cooperative production plans." [Ref. 13:p. 24]

Agreement was reached on April 28, 1989 between the U.S. and Japan to go ahead with the co-development plan. [Ref. 13:p. 25] The Japanese agreed to the clarifications. This agreement included provisions for a forty percent share of production work guaranteed to U.S. companies. Japan agreed to safeguard sensitive computer software, and guarantee that Japanese technology would flow to the U.S. [Ref. 15:p. A14] With the agreement made, President Bush had to persuade Congress.

E. THE CONGRESSIONAL BATTLE

On May 1, 1989, written authorization was submitted to the Speaker of the House and the Senate Foreign Relations Committee, by President Bush, in accordance with the Arms Export Control Act Section 36(d). This process is called certification. [Ref. 13:p. 25] It gives Congress a 30 day oversight period to block foreign military agreements. This blockage requires a two thirds majority in both the Senate and the House. [Ref. 16:p. 22] In the case of the FSX, they responded rapidly.

Congressional critics argued that the agreement was a give away of U.S. technology. They believed that this would allow the Japanese to develop their domestic aerospace

industry which would hurt the U.S. aerospace industry. Some of the most outspoken critics included Senator Alan Dixon (D-ILL), Senator Alfonse D'Amato (R-NY), Congressman Richard Gephardt (D-MO), and Congressman Mel Levine (D-CA). Senator Dixon and Congressman Levine both introduced legislation disapproving the agreement. [Ref. 13:p. 26]

There were also Congressional supporters that included Senator Claiborne Pell (D-NY), majority leader of the Senate Foreign Relations Committee; Senators Cranston (D-CA), Moynihan (D-NY), Kassebaum (R-KS), Murkowski (R-AL), Rockefeller (D-WV) and Leutenberg (D-NJ). They argued that the joint project served U.S. national security and industrial interests. They pointed out that Japan could produce the plane domestically, but now will pay the U.S. for assistance in the project. This will also improve U.S. Japanese military ties and improve Japanese self-defense capability. The agreement would also provide for sharing new Japanese technology with the U.S. [Ref. 13:p. 27]

Secretary of State James Baker, Defense Secretary Cheney, Deputy Secretary of State Eagleburger and Commerce Secretary Moshbacher testified before the House committee on May 3, 1989. They were attempting to convince skeptical members that sufficient precautions had been taken to ensure the protection of American high technology. [Ref. 13:p. 27]

> Cheney testified that the classified letters of understanding between the U.S. and Japan that finalized the agreement stipulated the creation of an American--Japanese Committee in order to ensure that all provisions

of the technical licensing agreement were enforced. Members of this select committee would include representatives from both the Commerce and Defense Departments. Cheney also announced that the U.S. could pull out of the project at any time if they believed that the Japanese had not lived up to their end of the bargain. [Ref. 13:p. 28]

Senator Dixon's resolution to disapprove the FSX agreement was voted down in the Senate Foreign Relations Committee, but was sent to the full Senate recommending that Dixon's resolution be blocked and that the FSX joint venture project be approved. Senator Dixon's resolution was blocked, but the Senate passed the Byrd Amendment on May 16, 1989. The Byrd Amendment requires the government to determine and report annually on any U.S. technology used in Japan's space or civilian aerospace industry that was obtained by the Japanese in the FSX project. It also requires the tracing and reporting of technology transferred to unauthorized third parties or U.S. adversaries.

The resolution was vetoed by President Bush on 31 July 1989 and "Bush blasted the resolution as an infringement on his constitutional authority to negotiate with other countries." [Ref. 17:p. 811] The Senate failed to override the President's veto. This cleared the way for the co-development agreement. [Ref. 17:p. 811]

This section has covered the FSX project from the beginning to the point where it was approved by Congress. It touched on several of the controversies surrounding the

project without discussing them in detail. The next section will look at the objections and economic implications of this project in greater detail.

V. OBJECTIONS AND VALIDITY OF OBJECTIONS TO THE FSX PROJECT

Section two discussed burden sharing from the economic point of view and the benefits of international armaments cooperation. Section three discussed the problems of burden sharing and international armaments cooperation. Section four was an overview of the FSX project and introduced problems encountered in the project. This section will discuss more extensively the objections raised to the FSX project, both in Japan and in the U.S. The three main objections raised to the FSX project (transfer of technology, protectionism, and bureaucratic problems) follow the pattern of problems discussed in section three.

> The FSX cooperative venture resulted from the intersection of U.S. domestic interests concerned about the Japanese plan to build a new generation attack fighter which would compete with aircraft produced by the United States. The internationalists including the aircraft industry, free trade interests in congress, and executive interest in preserving commerce in this sector urged the President to support the FSX joint project. On the other hand, the nationalists, including protectionists interests in congress, the public and the government pressed him to refuse such technological cooperation and to force the Japanese government to buy existing United States aircraft instead. Combined with Japanese threats that they would reconsider the Joint Venture with the United States and either build their own aircraft or seek technological cooperation with firms outside the United States, these competing pressures forced President Bush to support the Joint Venture, but with clearly delineated conditions for reciprocal benefits. [Ref. 13:p. 2]

When the Japanese were shopping for a replacement to the F-1 in the mid 1980's, both the Japanese Defense Agency and the Japanese Defense Industry wanted to develop and produce the fighter domestically.

> But faced with U.S. demands to buy American, the embarrassing controversy in the mid 1980's over the Toshiba Corp's sale of military sensitive equipment to the Soviet Union, budgetary problems and skepticism at home, the Japanese government proposed co-development of a plane as a compromise. [Ref. 14:p. 460]

This section will begin by discussing the impacts of canceling the co-development project on Japan and the U.S. It will then go into what will be gained by the FSX project. It will also provide an analysis of the FSX agreement as it relates to technology transfer, protectionism and bureaucratic problems. The next section will provide recommendations and conclusions on the FSX project.

A. IMPACTS OF CANCELING THE FSX AGREEMENT

1. Co-Development Versus Purchase or Japanese Independent Development

Even as late in the deal as March 1989 there were still those in Congress who insisted that the U.S. scrap the deal and "...pressure the Japanese into purchasing existing F-16 or other top of the line fighters directly from the U.S." [Ref. 13:p. 24] For the Japanese, this was never a viable option. A country, just as a rational individual, will make the choices that are best for it. There may be

concerns about trade deficits and adding to the compatibility of the militaries, but there are many other considerations which are important. In the end, a country will do what it perceives to be best for that country overall. In the case of the FSX, the Japanese government believed that the best possible way to replace the aging F-1 fighter fleet was through a co-development deal with the U.S. If it was not the best alternative, all things considered, the Japanese would not have agreed to it.

The Japanese have not bought a U.S. military aircraft outright since 1955. However, they have co-produced the F-15, F-4, T-33, F-104, and P-3C with the U.S. Japan also had a 15 percent share in the development of Boeing's 767 and now are major contractors for production of fuselage parts. Reportedly, they are achieving an advantage over American producers in both cost and quality. Japan also received a 25 percent share of the development, engineering and production of components for the planned Boeing 7J7 airplane, which has been indefinitely postponed. [Ref. 14:pp. 461-463]

Michael W. Chinworth, an associate with MIT-Japan Science and Technology Program, stated "There is no way in hell they were going to buy the planes right off the shelf." [Ref. 14:p. 461] The Japanese Defense Industry saw a long term, very expensive project. After the downturn in business caused by the appreciating yen and the slump in

ship building, the defense industry looked to the FSX for relief. In addition to the defense industry, the Japanese public was eager to see new jobs created for the 30.9 billion dollar annual expenditure of tax payers money on defense. [Ref. 14:p. 461] The Japanese Defense Force was calling for Japan to reduce its dependence on the U.S. for defense. In light of this domestic pressure, and the fact that Japan had a history of co-production with the U.S., it is unlikely that Japan would purchase a military aircraft from the U.S. outright. The more likely alternatives were to either develop and produce the aircraft domestically, or enter a co-development agreement with another country.

Richard J. Samuels, Director of the Massachusetts Institute of Technology, states,

> The Japanese are going to develop it (the FSX) in cooperation with us, or they are going to do it in an environment in which we will not have access. The question is, do we get on the train or not? [Ref. 14:p. 460]

Japan, who has been under pressure in the last few years to take on a greater defense commitment, is on the leading edge of technology. They have access to the components of the best new weapons systems, and one of the world's most vibrant economies. It was inevitable that Japan would emerge as a producer of military technology. [Ref. 14:p. 460]

2. Impacts on the United States of the Likely Japanese Response to Cancellation

When the Japanese began looking for a replacement aircraft, the main aim of the U.S. Defense Industry, and many members of Congress, was to keep from being shut out of another lucrative Japanese market [Ref. 13:p. 9]. In addition to the possibility of Japanese domestic production, there was the possibility of co-development with another country, particularly a European nation. American FSX defenders took the position that half a loaf is better than none. General Dynamics concluded in a press release that, considering Japan's initial intention to embark on the project on its own, the FSX co-development agreement was the best possible alternative.

In accordance with this agreement, U.S. industry will receive 35 to 40 percent of the 1.2 billion dollar development budget and a comparable proportion of the five billion dollar production effort. This deal will bring approximately 2.5 billion dollars into the U.S. economy and will create 22,700 U.S. jobs in development and production. [Ref. 14:p. 461] While this boost to the U.S. economy is less than would have occurred if the Japanese had purchased the F-16 off the shelf, it is a lot more than the U.S. would receive if the aircraft had been developed and produced solely by Japan, or by the Japanese and a third country.

As a 1988 study entitled "The U.S. Aerospace Industry and the Trend Toward Internationalization" stated. this agreement comes at a time when.

> The U.S. industry no longer has the significant margin of superiority it once had, nor the absolute technological edge. The demands of a world market-place mean there is often no alternative for U.S. firms other than participation in various types of international cooperative relationships. It is safe to say that only by forming international business relationships can U.S. manufacturing continue to compete. [Ref. 14:p. 462]

While aerospace is one of the U.S.'s most successful industries, internationally the U.S. is not doing as well as it once did. Commerce Department data shows that U.S. imports of aerospace products has risen to 11 percent of consumption. In the early 1980's, one third of aerospace production was exported. Now one forth of aerospace production is exported. In 1976, the U.S. held 49 percent of world military sales. by 1986 this had dropped to 20 percent. Foreign competitors are now making a variety of competitive commercial and defense products. Presently the principle competition is from Europe, but some analysts think that Japan will be the long range threat. [Ref. 14:p. 462]

B. WHAT WILL BE GAINED BY THE JAPANESE FROM THE FSX AGREEMENT

A 1970 MIT report indicated that Japan considers aerospace to be one of the key technologies for the 21st century. It also appears that the Japanese intend to

develop a military aerospace industry capable of export, and that this military technology would provide the basis for their civilian aircraft industry. [Ref. 18:p. 10] To this end, the Japanese government subsidizes commercial jet engine development and "...Japan has a growing competitive advantage in many of the technologies now driving the aerospace industry - advanced materials, micro-electronics and computers." [Ref. 14:P. 462]

Booz-Allen and Hamilton, a consulting firm, expect the Japanese aerospace production to grow to a 25-30 billion dollar industry by the year 2000 from a current production of seven billion dollars. If Japan increased its defense spending to over one percent of GNP, as the U.S. is pressuring them to do, this will be even higher. [Ref. 14:p. 462] However, this growth will still be a fraction of the U.S. aerospace industry.

The Japanese admit that the FSX is driven by the benefits of commercial ties. Given the viable Japanese economy and the access to leading edge technology, it seems likely that the Japanese will move into the aerospace industry. Industry analysts predict they will begin by producing sub-components, then components and then continue to produce more complex products. The U.S. aerospace industry will probably first feel the effects of the Japanese aerospace industry as a decline in the Japanese

market, which purchased 2.3 billion dollars worth of U.S. aircraft and equipment in 1987. [Ref. 14:p. 463]

The following are some of the reasons given by industry and technology analysts as to why Japan has not yet entered the world aerospace market:

1. small domestic market
2. high cost of entry into a highly capitalized world market
3. little aerospace engineering experience
4. little experience managing systems as large and complex as commercial transports and advanced military aircraft
5. no worldwide operations network
6. lack of key R&D capabilities. [Ref. 19:p. summary page]

One of the key R&D capabilities, where the Japanese are behind the U.S and European countries, is in the development and use of computational fluid dynamics software. This is made possible by high speed high capacity computers. These software programs "...can be used for detailed and accurate analysis of transonic, supersonic and hypersonic fluid flow and assist in designing more efficient airframe and wing configurations." [Ref. 19:p. 8]

Currently Japan is prohibited from exporting military technology, except to the U.S. through flow-back agreements, but this is just government policy and subject to change. Japan may eventually emerge in the military sales area as Japanese firms see opportunities to profit from applications

of the technology developed for commercial purposes. [Ref. 14:p. 463]

United States proponents of the FSX agreement see this as a time to select partners in Japan while the U.S. has a competitive advantage. Opponents, on the other hand, see now as the time to try to maintain our superiority in aerospace industry. They say that this should be done so that Japan does not overtake the U.S. in the aerospace industry as they did in the automobile and home electronics fields. [Ref. 14:p. 463]

C. TYPES OF TECHNOLOGY TO BE TRANSFERRED

One issue raised by the FSX agreement was the specific value of the technologies to be transferred, both from the U.S. to Japan and from Japan to the U.S. This controversy focused on the following four technologies:

1. the F-16C airframe
2. the composite wing box
3. the avionics source codes for mission and flight control computers
4. the phased array radar. [Ref. 19:p. summary page]

1. The F-16 Airframe

The F-16 is a supersonic, multi-mission, day and night fighter. The first operational F-16C was produced in 1982. Under the FSX agreement, Japan "...would have access to all associated airframe, avionics and life support subsystems, except for those components that they either

develop themselves or purchase directly from the United States." [Ref. 19:p. 3] Japan will purchase directly from the U.S. the engine, aft fuselage and wing leading edges, along with other components and equipment. Japan intends to develop and supply the avionics, radar, inertial navigation unit, electronics warfare package, mission computer and armaments system. In addition, the Japanese plan to modify the fuselage by adding small vertical control fins to the bottom of the engine duct, stretch the fuselage, add a high strength canopy and larger, all composite wings. The aircraft will have to be modified to accept the Japanese armaments and weapons, in addition to the new U.S. engine. [Ref. 19:p. 4]

This agreement involves the transfer of three basic sets of data and ination. The first being operational data. This includes ination needed to fly, maintain and repair the aircraft. It contains flight and repair manuals, schematics etc. Any country who buys F-16's gets this ination, with the exception of components or systems not included in the sale, such as certain weapons systems. [Ref. 19:p. 3]

A second set of data transferred will be manufacturing data. This is detailed specifications on processing, materials, manufacturing and assembly, tool design etc. Any country who is licensed to produce parts for the F-16 receives the ination for the parts they are

licensed to produce. Ten countries have co-produced the F-16, including Denmark, Norway and Turkey. [Ref. 19:p. 4]

The third set of data is design and test data. This data will be transferred to Japan due to the co-development requirements. An example of this data would be data on aerodynamic studies of the wing structure. According to General Dynamics and Air Force officials, the Japanese will have access to raw test data only (i.e., the results of the design and test studies) and not the knowledge base or design techniques that generated that data. In addition, they will only receive this data for the portions of the aircraft that they are modifying. [Ref. 19:p. 4]

2. Composite Wings

The FSX will have a composite, integrally co-cured wing box. A wing box is the main structural element of the wing that attaches to the upper and lower skin. Basically, it is the ribs and spars in the wing. The lower skin will be co-cured with the box and the upper skin riveted to the box. This means that the structural elements and the lower skin will be made by laying sheets of composite materials in a mold and bonding them together by heat and pressure in a process called curing. [Ref. 19:p. 4]

The Japanese have developed the technology and know how to produce these co-cured composite wing boxes. Part of the FSX agreement calls for General Dynamics to receive the Japanese wing design, molds and tooling. In addition, a

number of U.S. materials, industrial, and mechanical engineers will receive instructions on the Japanese process. [Ref. 19:p. 5]

> Most of the development of the composite wing will flow from Japan to the United States. General Dynamics will assist in integrating the wing to the airframe. [Ref. 19:p. 5]

3. Avionics Source Codes

Avionics is the collection of electronic equipment and software used in the aircraft. The Japanese will provide the radar, electronic warfare unit, inertial navigation unit and fire control (mission) computer. Part of the FSX controversy revolves around the source codes (computer programs that instruct a computer to receive, process and output ination) needed for the mission and the digital fly-by-wire control computers. Fly-by-wire means that electrical impulses are sent to solenoids to operate the aircraft control surfaces, instead of using hydraulics or mechanical connections to control the aircraft. As wing and tail surfaces are reduced, drag is also reduced. This increases efficiency, but reduces stability. The advanced fly-by-wire flight control computer can compensate for this. "The flight control computer would continuously monitor the aircraft's stability and manipulate its control surfaces." [Ref. 19:p.10] The fly-by-wire flight control systems are beginning to be used on commercial aircraft. Therefore the

F-16 flight control source codes have a potential for commercial spin-off use.

The modifications of the forward fuselage will change the flight characteristics of the aircraft. The flight control computer coordinates the flight control system and controls the various control surfaces according to preprogrammed flight modes. This, along with the use of a Japanese mission computer, will require source code modification. The U.S. source codes for the U.S. flight control computer will be withheld and the Japanese will develop software codes indigenously for the flight control computer to be used in the FSX. Japan will receive the computer software codes to enable them to integrate their fire control system into the FSX, but only those software codes essential to integrate the fire control computer, called the mission control computer by the Japanese, will be transferred. Similar codes are already provided to the Japanese for the co-production of the F-15.

4. Phased Array Radar

Phased array radar utilizes an array of elements instead of one element to transmit and receive radar signals. The first advantage of this system is that the beam is directed electronically instead of with a mechanical radar antennae. Thus, the beam can scan more quickly and more reliably. The second advantage of this system is that multiple targets are tracked simultaneously because

different parts of the system transmit while others receive. Because the Japanese are solely developing this system, the U.S. will not receive this technology free. However, the U.S. will have access to the basic design, perance and cost data and be able to purchase or license the technology if they desire. [Ref. 19:p. 7]

A Government Accounting Office (GAO) report claims that the U.S. has known this technology for over 12 years, yet this seems to be the technology that the U.S. is most interested in obtaining [Ref. 20:p. 18]. The U.S. does have phased array radar, however, the B-1 Bomber is the only operational aircraft that carries it because it is the only one whose mission requirements justify the high cost [Ref. 19:p.10]. Secretary of Defense Cheney argued that the U.S. is not looking necessarily for the technologies, but for the manufacturing applications the Japanese have developed. He also stated that we are seeking Japanese expertise in miniaturization and low-cost manufacturing for the phased array radar components. He stated that the U.S. would like to use this radar in the Advanced Tactical Fighter and that the U.S. can produce a key component for this system at a cost of 8,000 dollars each. The total cost of this program would be about eight million dollars. He sees this project, among other benefits, as a way to reduce the cost of this particular component and therefore reduce the cost of the new Tactical Fighter. [Ref. 20:p. 18]

D. ANALYSIS OF TECHNOLOGY TRANSFER

Proponents of the FSX agreement state that only 1970's technology will be diverted to Japan. They argue that this technology is basically the same as the F-15 aircraft which the Japanese have been co-producing for the past ten years. Thus, they already have access to this technology. However, this statement does not take into account the transfer of design and test data that will be needed due to the co-development nature of the project. Proponents also state that the technology for a F-16 and a wide body commercial jet are completely different and therefore technology integration is not a realistic threat. In response to opponents who believe that the U.S. will be giving away billions in technology, proponents answer that the Air Force spent less than one billion dollars in the 1970's to develop the F-16, and this is basically the technology that the Japanese will receive. Opponents to this agreement counter that the technology is not old because the aircraft has been continually upgraded since its development. [Ref. 18:p. 3]

There is concern that the U.S. technology that Japan gains from the FSX project will be transferred to a third country. This is prohibited, without U.S. approval, by the clarifications. In addition, a Technical Steering Committee will be established to monitor the transfer of technology and Japanese compliance. However, history shows little

government oversight or control on the transfer of technology. As an example:

> Toshiba sold sensitive quieting technology to the Soviets, enabling their submarines to go undetected by U.S. sonar. A more recent, but similarly illustrative and damaging event was the role Mitsubishi Heavy Industries played in the production of the Libyan chemical plant. Mitsubishi Heavy Industries is a prime contractor for the FSX. [Ref. 21:p. 5]

The U.S. will withhold some military sensitive technologies, such as:

1. nuclear delivery capacity of the F-16
2. advanced medium range air-to-air missiles
3. low-altitude navigation and targeting infrared system for night use
4. engine hot sections and electronic fuel control technologies.

There is a possibility of licensed production in Japan of U.S. engines in the production phase, but this would come under a separate memorandum. The engines for the first six prototypes will be bought off the shelf from General Electric or Pratt & Whitney. [Ref. 20:p. 18]

According to Vernon Lee, Vice President for General Dynamics' Ft. Worth Division and FSX Program Director,

> There will be no transfer of any technology involved in the U.S. advanced tactical fighter or advanced tactical aircraft programs General Dynamics is involved in. Only existing F-16 technology will be transferred. [Ref. 20:p. 17]

E. ANALYSIS OF THE PROTECTIONISM ISSUE

Opponents to the FSX agreement believe that the FSX will spur the Japanese aerospace industry. They point out that the experience that the Japanese will gain by integrating various technologies into one aircraft is important and could help them develop their own civilian aviation industry. In response to those that say fighter and commercial aviation technology is different, they reply that a 1982 GAO study showed that Japan incorporated F-15 technology, learned from a F-15 co-production arrangement, into the NU-3000 Diamond Corporate Jet. They also used the same production line for the NU-3000 that was used for the F-15. [Ref. 21:p. 4]

On the other hand, General Dynamics and the Department of Defense state that the F-16 technology and fighters in general have little potential for commercial spin-off. Fighters require more rigid, stronger structural designs and specialized wing designs due to the requirements to fly in excess of Mach 2, carry a variety of armaments and per stressing maneuvers at high speeds. [Ref. 19:p. 8]

It appears that the production of a small corporate jet, which may use small jet technology, is far different than a large airliner. Secretary of Commerce Moshbacher stated that he "...thought the transfer of military technologies would not substantially improve Japan's ability to compete with the U.S. in the commercial transport field." [Ref. 20:p.

17] Secretary Moshbacher also said that 2.5 to 3 billion dollars worth of work would be gained by U.S. industry due to this project. He states that this is close to the amount that U.S. industry would have received if Japan had bought F-16's off the shelf. [Ref. 20:p. 16]

The FSX deal will provide the Japanese with several advantages in the aerospace industry. It will transfer some U.S. technology and expertise to the Japanese, even if some state that this is not leading edge technology. It will also provide Japan with a generation of aerospace engineers experienced in the design of high perance aircraft. And, it will assure a massive flow of capital to expand the Japanese aerospace industrial infrastructure. [Ref. 18:p. 11] Greg Rubinstein, a er Pentagon official, now Vice President of a Washington trade and technology consulting firm, stated,

> What the FSX will do for the Japanese commercial aircraft industry will close the gap somewhat. But I do not see them pulling in the front ranks in the foreseeable future. [Ref. 14:p. 462]

This project will certainly assist the Japanese in the long run. But, the threat to U.S. aerospace industry will not come from the FSX itself. By the time the FSX is ready to fly in the late 1990's, the U.S. will have two new supersonic aircraft available for export. This indicates that the Japanese will not immediately be taking customers away from the U.S. [Ref. 21:p. 3]

During the FSX debate, many congressmen argued that Japan would "...just take American technology and use it to crack one of the last bastions of U.S. competitive strengths: the civilian aircraft industry." [Ref. 22:p. 14] But the secrets that Japan may be able to get from the deal are outweighed by what we stand to receive in return.

> A sustained exchange of U.S./Japanese military technology would benefit both us and the Japanese - probably us more than them. It would guarantee the two nations international preeminence in military technology, nourish their bilateral security relations, and insulate them against the geopolitical uncertainties of the coming decades. [Ref. 22:p. 14]

As stated above, the Japanese intend and are expected to move into the aerospace industry. They have the economic power and the technology to begin moving slowly into this area. If the U.S. cancels the FSX agreement, the Japanese either produce the aircraft domestically or with a European country. There is every indication that they will not buy an American fighter off the shelf, so this is not an option for the U.S. Therefore, withholding U.S. technology, by canceling the FSX agreement, would slow down Japanese entry into the aerospace industry at best. This would also impose a cost on the U.S. defense industry.

F. BUREAUCRATIC PROBLEMS

An FSX agreement had been struck in November of 1988, under the Reagan Administration. When the Bush Administration took over, it began to receive congressional

pressure to reexamine the agreement. During the conation hearings of James Baker, Carla Hills and John Tower, "Senator Jesse Helms led other critics in extracting a promise from the Secretary of State nominee James Baker III that the FSX issue would be reexamined by the Bush Administration." [Ref. 13:p. 19] During the next six months there was a rash of infighting among the U.S. Congress that culminated in additional restrictions. President Bush referred to these restrictions as clarifications.

These clarifications were considered by the Japanese to be a reopening of negotiations in a "done deal". In addition, the Japanese were trying to get the agreement approved by March 31, 1989, the end of their fiscal year, so that they could begin letting contracts. The U.S. Congress seemed to ignore the fact that an agreement had already been signed and that the Japanese were concerned about the coming end of the fiscal year. Congress did not approve the agreement until June 1989. [Ref. 13:p. 29]

During this time there was pressure in Japan to scrap the program and reconsider a purely domestic fighter if the U.S. could not move forward. [Ref. 13:p. 22] Considering the actions of the U.S. Congress, the scrapping of this agreement by the Japanese may have been the best course of action for Japan, the U.S. Defense Industry and Congress. Congress acted as if they were the only player in this game

and that Japan and General Dynamics did not matter. They took an agreement that had been signed, and managed to draw it out for another year and a half. If the Japanese had scrapped this agreement, it might have gotten the attention of Congressional leaders and convinced them that they are not "the only game in town." Scrapping this deal would have cost the U.S. defense industry about 2.5 to 3 billion dollars, plus access to advanced technology, according to Secretary of Commerce Moshbacher. While this would have been a blow to the defense industry, and the U.S. in general, it could have been looked at as an investment in future arrangements.

It is true that there are those in both Japan and the U.S. who are not happy with this arrangement. There are those in Japan who wanted to loosen the ties to the U.S. and who thought that Japan would learn more from the production of this aircraft if it was produced solely in Japan. The U.S. may have actually cut down on the Japanese learning curve with the co-development agreement. There are those in the U.S. who are concerned about the transfer of advanced U.S. technology to a potential competitor and those that want to protect the U.S. defense industry. In spite of this, negotiators for both countries were doing what they considered the best possible alternative for them. If

negotiators in either country had not considered the FSX agreement to be the best possible alternative then the agreement would not have been made.

VI. CONCLUSIONS AND RECOMMENDATIONS

The FSX program was both an economic and military issue. Many in the U.S. saw the replacement of the Japanese F-1's as a chance to reduce the U.S.--Japanese trade deficit. However, this would be thwarted by Japan's plan to build the aircraft domestically or to co-produce it with another country. Also at issue was the effect on the competitive capability of the U.S. and Japanese aerospace industries. Opponents were afraid that the Japanese would use the FSX deal to obtain U.S. aerospace design, development, and productive expertise and then challenge U.S. producers in the international market. [Ref. 14:p. 461]

A. COMPETITIVE CAPABILITY

In the case of the FSX, the knowledge or technology of the F-16 was 15 to 20 years old. It had been upgraded, but it was not the leading edge of present technology. However, the technology that was expected to be gained from the Japanese by the U.S. was leading edge technology and was going to include a new aircraft. The Japanese should have been more concerned about technology transfer than the U.S. They were giving up the leading edge technology of the phased array radar and the procedure for co-curing.

There are those who were concerned that the Japanese would use this project to increase their ability to compete in the world wide aerospace market. The Secretary of Commerce has stated that his concern over the project's effect on America's industrial base and competitiveness were satisfied by the clarifications. He also stated that the agreement would not hurt U.S. economic or security interests and that he was satisfied with U.S. access to Japanese technologies.

While there will always be concerns of this nature when two countries, or companies, are working together on a joint project, the advantages of the project must be considered. If the advantages outweigh the risks, then the project should be undertaken. In the case of the FSX, the advantages do seem to outweigh the risks. The U.S. will receive leading edge technology and will not be giving away our advantages in other areas of the aerospace industry. The Japanese will be gaining the development of a top of the line fighter and modifying that fighter to meet their needs. In this case both countries in the agreement win. This is as it should be. If one party was not deriving any benefits from the agreement, then the agreement should not be entered into.

As discussed previously, when a country concentrates on the area where it has the comparative advantage there is more for everyone. In this case, the U.S. has already

produced the basic fuselage for the FSX and the Japanese have produced many of the advanced electronics. By combining these two advantages, the benefits of international armaments cooperation will be realized.

Whenever there is a project of this size and importance there will be those who will find fault with the agreement. This is not necessarily bad. Those who find fault with an agreement force those who propose the agreement to look at it from all sides. There should be a forum for debate on these issues, but the best forum may not be the floor of Congress.

B. CONGRESS AND EXECUTIVE INTERVENTION

An interesting aspect of this project is that Congress, and other executive agencies, felt free to intervene in Presidential negotiations with other countries. Examples include:

1. The Senate Armed Services Committee added a provision to the Fiscal Year 1989 Defense Authorization Bill requiring the Secretary of Defense to consult with the Secretary of Commerce before negotiating final terms of the FSX agreement [Ref. 13:p 13].

2. Eleven Senators sent a letter to President Bush requesting that the Departments of Commerce, Defense, Energy, State, the Office of Trade Representative and the Office of the White House Science Advisor review the agreement [Ref. 13:p. 19].

3. The Secretary of Commerce convinced President Bush that his department should be included at the start of any negotiations that involved the exchange of military or technology secrets [Ref. 13:p 21].

4. The Byrd resolution, passed by Congress but vetoed by President Bush, placed additional requirements for

tracing the use and transfer of technology from the FSX project [Ref. 23:p. 3].

The intense interest of Congress and executive agencies such as the Departments of State and Commerce indicate a growing awareness that defense and economic issues are intertwined, and are likely to become even more so. The effects of defense spending and burden sharing will become an even more important issue as we push our allies to increase their share of the total defense spending of the alliance. This will mean a continued increase in the amount of attention given to defense issues by previously unconcerned, or minimally concerned, agencies.

The increased attention on burden sharing and international armament agreement matters should lead to better decisions if handled in the proper forum. However, there is a cost for these "better decisions" since Presidential power in dealing with our allies will be decreased to some extent. The forum must be efficient at debating the issues and rendering a decision promptly so that the system does not become even more cluttered. It will also have to understand how international trade and defense effect our economy and the economies of our allies. In addition, this forum must be efficient at separating the facts from the rhetoric of special interest groups. As more and more people/agencies become involved in the decision making process, there will be more and more special interest

groups trying to influence their decisions -- as occurs in Congress.

Our allies will be unwilling to devote more resources to defense unless they perceive a greater benefit. This benefit could be defense itself, if there is resurgence of a threat. However, with the fall of the Warsaw Pact in Europe, this seems unlikely. Therefore, there must be economic incentives for this increased defense spending. The U.S. cannot insist that other countries purchase high tech U.S. weapons while they do not gain any engineering, scientific, industrial, or economic benefits from these purchases.

Since there is not a way to exclude Congress and other executive branch agencies from intervening in these defense-economic matters (and many would argue that this is their job, therefore they should not be excluded), these issues must be integrated together so that they can be considered simultaneously. However, the Senate Confirmation hearings are probably not the proper place to address these issues.

An additional question that emerges from this study is to what extent the U.S. should rely on other countries for their technology and defense systems. The U.S. could demand that only U.S. produced weapons systems be allowed, but as stated in section three, this has been the policy in the U.S.S.R and this policy has not been a success.

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