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TRADE OFFSETS IN FOREIGN MILITARY SALES--
THE F/A-18 PROGRAM: A CASE STUDY

by

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Trade Offsets in Foreign Military Sales--
The F/A-18 Program: A Case Study

by

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ABSTRACT

This case study is intended to provide an overview of trade offsets and how these arrangements affect the domestic F/A-18 Strike Fighter program. The study defines trade offsets and interprets the existing Department of Defense (DOD) policy concerning these arrangements. Using the F/A-18 as a case study the researcher considered the impact of these offsets in a management analysis manner relative to the Program Manager.

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I. INTRODUCTION

A. BACKGROUND

International arm sales have become one of the fastest growing global enterprises. Arms sales in the past five years have equaled all world-wide arms sales trade during the preceding quarter century. Currently, the United States is the leading supplier of arms to the world counting for nearly as many arms exports as all other suppliers combined [Ref. 1:p. 1].

Offsets, and co-production, are quickly becoming common words in the realm of the arms trade negotiations. These compensatory trade agreements incorporate some method of reducing the amount of foreign exchange needed to buy a military item or some means of creating revenue to help pay for it. According to a Department of Defense (DOD) 1983 report, within the next five years about $30 billion in potential U.S. arms sales are expected to involve offsets [Ref. 2:p. 2]. These offsets are designed to improve the economic and industrial position of the receiving country.

As the volume and variety of these trade agreements increase, so does the concern of many people in government agencies, private industries and labor organizations. This study seeks to identify the offset concessions made and

determine the effect of these arrangements on the U.S. Navy F/A-18 Strike Fighter program.

The research was not simple, nor did all of the findings result in satisfying precise answers. Still, the effort was be made in order to better understand the effects of the trade offsets on U.S. military programs and to provide justification for continuing this potentially cost-effective program during times of shrinking, real defense budgets.

B. OBJECTIVES

To properly evaluate the impact trade offsets agreements have had on the F/A-18 Strike Fighter program the following objectives were identified:

1. Define trade offsets and explain their evolution.
2. Determine what the Department of Defense and the U.S. National policy is concerning offsets.
3. Identify specifically the offset arrangements and determine what impact they have had on the domestic program.

C. RESEARCH QUESTIONS

1. Primary Question

What impact have trade offsets agreements had on the F/A-18 strike fighter program?

2. Subsidiary Questions

What are trade offsets and why were they established?

What is DOD policy concerning these offsets?

What are the specific costs and benefits of offsets in the F/A-18 program?

D. SCOPE AND LIMITATIONS AND ASSUMPTIONS

1. Scope

The scope of this study is largely defined by the primary research question--that is: determine the impact that offset agreements have had on the domestic F/A-18 Strike Fighter program. Additionally, this thesis is intended to provide an overview of trade offsets and to interpret the existing DOD policy concerning these arrangements.

2. Limitations

Using the F/A-18 Strike Fighter program as a case study the research will be limited to program management issues impacted by these offset arrangements.

3. Assumptions

The FMS program exists in a regulatory environment which governs the nature and impact of trade offsets. The validity of the findings and conclusions of this study depends on the absence of significant change in current applicable laws or policies, which are introduced in Chapter II.

E. METHODOLOGY

The research methodology for this thesis included a review of current literature including trade journals,

periodicals, previous research reports, congressional testimony, applicable DOD instructions and directives. Personal interviews of individuals associated with FMS offsets at the office of Secretary of Defense, the F/A-18 Program Office, and personnel at the Manufacturing Co-Production Program Office at the McDonnell-Douglas Aircraft Company (MCAIR) were conducted.

F. SUMMARY OF FINDINGS

1. Offsets have become a major contract item in awarding military contracts by foreign governments.
2. The range and magnitude of required offsets have increased in the last five years.
3. The nature of offsets demanded has increasingly tended toward arrangements which include technology transfer and management assistance.
4. DOD policy on offsets is to not become involved in guaranteeing offsets and to not finance direct offsets.
5. The offset agreements used with the sale of the F/A-18 has no serious impact on the program or the U.S. economy.

II. BACKGROUND

This chapter is devoted to explaining the offset phenomenon. The information provided will help the reader to better understand the analysis and conclusions of this thesis through knowledge of the terminology and policies of these offset arrangements. The discussion begins with a definition of offsets, and proceeds to a quick review of the offset elements. Next the chapter presents data on the magnitude of offsets and then concludes with a brief history of DOD's policy concerning offsets.

A. DEFINING OFFSETS

Unfortunately, the concept of offsets lacks uniform definition, and a variety of terms are used by different government and business entities to describe the phenomenon. This study uses the term "offsets" to refer to trade arrangements. These trade arrangements include a variety of compensation practices required by a foreign purchasing government as a condition attached to the sale of defense articles or services. These arrangements are intended to reduce the impact of expensive weapon systems on the buyer's balance of payments, or to provide the buyer with other advantages such as: increased employment, expansion of the industrial base, and enhancement of technology transfer.

Although the terms of the offset on individual contracts may vary, and a contract may call for one or more than one kind, offsets can generally be grouped into one of the following types: [Ref. 3:pp. 185-187]

- **Co-Production**--Co-production is overseas production arrangements made between governments that permit a foreign government or producer to acquire the technical information and "know how" to manufacture all or part of U.S. defense equipment. This includes government to government licensed production. It excludes licensed production based upon direct commercial arrangements by U.S. manufacturers.
- **Licensed Production**--Licensed Production involves overseas production of U.S. defense equipment based upon transfer of technical information under direct commercial arrangements between a U.S. manufacturer and a foreign government or producer.
- **Subcontractor Production**--Subcontractor Production includes overseas production of a part or sub-assembly of U.S. equipment. The sub-contract doesn't include license of technical information or "know how" and is usually a direct commercial arrangement between a U.S. manufacturer and a foreign government or producer.
- **Overseas Investment**--Overseas Investment involves investment coming from the offset agreement. It can take the form of capital invested to establish or expand a subsidiary or joint venture in the foreign country.

- **Technology Transfer (other than licensed production and co-production)**--Transfer of technology may take the form of:
  - research and development being conducted abroad,
  - technical assistance being provided to the subsidiary or joint venture of overseas investment,
  - other activities under direct commercial arrangement between the U.S. manufacturer and a foreign entity.
- **Countertrade**--Countertrade involves the purchase of goods and services from the buying country as a condition of the offset agreement. These reciprocal purchases of civil or defense items may be purchased by the U.S. government or by the U.S. contractor.

Table 1 outlines the most common military offsets.

Offsets can be further divided into two main categories: direct and indirect.

- **Direct Offset**--Direct Offsets include any business that relates directly to the product being sold. An example is the Israel purchase of the F-16 which allows an Israeli contractor to produce the aircraft's composite rudder.
- **Indirect Offsets**--Indirect Offsets are associated with goods or services unrelated to the item being sold. The supplier agrees to use its "best efforts" to purchase a certain dollar amount of the buyer's manufactured products, raw materials or services as a condition of the sale. For example, McDonnell Douglas agreed to use its "best effort" to purchase $100 million of Israeli goods over a 10 year period as a condition of the sale of F-15's to Israel.

TABLE 1

TRADE OFFSETS

COPRODUCTION Govt-Govt	LICENSED PRODUCTION Firm-Firm or Firm-Govt	SUBCONTRACTOR PRODUCTION Firm-Firm or Firm-Govt
OVERSEAS INVESTMENT Firm-Firm or Firm-Govt	TECHNOLOGY TRANSFER Firm-Firm or Firm-Govt or Govt-Govt	COUNTERTRADE Firm-Firm or Firm-Govt

These "best effort" agreements are normally the case in these reciprocal purchase agreements.

B. OFFSETS FROM TWO DIFFERENT PERSPECTIVES

From industry's perspective it is preferable to sell outright with no obligations to: share production; transfer technology; or commit to make purchases from a buyer. However, research shows that U.S. contractors are willing to enter into offset agreements because they are considered necessary to remain competitive. As one Sikorsky official put it, "Sixty percent of something is better than 100% of nothing." [Ref. 4:p. 64]

From a buyer's perspective, offsets are very attractive. Offsets reduce the impact of expensive weapon systems, provide valuable technology and production know how, expand employment and create or sustain defense industries. There are some drawbacks of offsets for the buyer; one being the unit cost of a weapon system is usually higher. For example, Japan, who has limited its defense spending to one percent of its GNP, has been willing to spend two to three times more to co-produce some defense items rather than buy them off the shelf [Ref. 5:pp. 291-320].

According to the United States International Trade Commission (ITC), the selling company is normally aware of a required offset prior to negotiations.

> Generally, the only variables in the sales contract to be negotiated are the share of the offset of the total contract price, the specific products to be included,

> scheduling of delivery and the overall time period to be covered. [Ref. 6:p. 38]

If the seller does not accept the terms of the proposed offsets, the sale may go to a competitor.

C. WHAT IS THE MAGNITUDE OF OFFSETS?

The U.S. Government has undertaken two major studies of offsets. On 11 June 1984 the ITC began its Assessment of Effects of Barter and Countertrade Transactions on U.S. Industries. Concurrent with the ITC's investigation, Congress enacted the Defense Production Act Amendments of 1984 (Public Law 98-265) which amended the Defense Production Act of 1950. This law requires an annual report to Congress regarding the impact of offsets on defense preparedness, industrial competitiveness, employment, and the trade of the United States. The reporting requirement was triggered by the sale of McDonnell Douglas F/A-18 to Canada and the impact of that sale on U.S. defense subcontractors [Ref. 7:p. 14].

Since the ITC was conducting an investigation very similar in terms of data requirements, an agreement was reached in November 1984 to combine data collection efforts in the interests of reducing the demands of the private sector. The ITC was designated as the lead and gathered the necessary data for both studies.

The ITC received questionnaire data from 154 firms having offset obligations resulting from military related

export sales. The following are the results of the study's findings as they relate to the volume and nature of offsets associated with military related exports.

The first measure of offset magnitude included total military export sales of $47.8 billion during the survey period of 1980-84. Additionally, offsets were associated with almost half of the total military related export sales --$22.5 billion of the 47.8 billion. Aerospace products account for more than 80 percent of the reported value of military export sales agreements.

Export sales agreements containing an offset agreement were subject to significant year to year fluctuations. They were at their highest level--$6.6 billion and 94 percent of military sales in 1980, and at their lowest--$732 million and 7 percent of sales in 1982. The fluctuation in the value of sales were a reflection of the sporadic procurement of major weapon systems by foreign governments. Detailed data is in Table 2.

The second and most significant measure of magnitude is the amount of offset obligations incurred--$8.8 billion. NATO-Europe accounted for more than half (4.6 billion) of all reported offset obligations signed during 1980-84 while Asian countries accounted for 20 percent. Offset obligations with other countries (Australia and Canada) accounted for the remaining 20 percent. See Table 3. Table 4 depicts the face value of goods and services that were

TABLE 2

EXPORT SALES AGREEMENTS

Year	Collective U.S. military export Sales (million $)	Collective face value of sales contracts associated with a military related sale involving offsets (million $)	Ratio of sales contract with a military related export to total U.S. military export sales (percent
1980	6,964	6,568	94
1981	8,907	4,919	55
1982	10,315	732	7
1983	10,428	4,377	42
1984	11,222	5,890	52
Total or Average	47,835	22,486	47

TABLE 3

COLLECTIVE VALUE OF OFFSET OBLIGATION, BY REGIONS AND YEARS OFFSET AGREEMENTS WERE ENTER INTO, 1980-84
(In Millions of Dollars)

Region	1980	1981	1982	1983	1984	1980-84
Europe:						
NATO cty.[1]	159	275	52	3,024	1,128	4,638
Non-NATO cty[2]	-	300	106	40	93	539
Subtotal	159	575	158	3,064	1,221	5,177
Asia[3]	236	553	98	160	799	1,846
All others[4]	15	1,423	183	20	162	1,803
Total	413	2,551	440	3,244	2,182	8,830

[1]Belgium, Denmark, Greece, Netherlands, Norway, Spain, and the United Kingdom.

[2]Sweden, Switzerland, and Yugoslavia.

[3]Israel, Japan, Philippines, Singapore, Republic of Korea, and Turkey.

[4]Mainly Australia and Canada.

Note: Because of rounding, figures may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

TABLE 4

FACE VALUE OF GOODS AND SERVICES THAT WERE OBLIGED IN SATISFYING OFFSETS, BY TYPES OF OFFSET AND YEARS OFFSET AGREEMENTS WERE ENTERED INTO, 1980-84
(In Millions of Dollars)

Type of Offset	1980	1981	1982	1983	1984
Direct:					
Co-production	29	532	141	45	770
Licensed production	-	-	-	16	50
Licensed production and co-production	-	-	-	-	-
Subcontractor production	338	1,271	116	640	521
Subcontractor production and technology transfer	1	3	-	-	-
Technology transfer	-	1	3	6	8
Technology transfer and licensed prod.	5	-	-	-	-
Direct offsets but not yet specified	-	184	3	-	81
Total	373	1,990	263	707	1,430
Indirect:					
Foreign investment	-	-	-	5	32
Technology transfer	-	-	5	6	1
Countertrade	14	302	73	39	383
Indirect offsets but not yet specified	-	161	1	2,448	159
Total	14	463	78	2,498	574

TABLE 4 (CONTINUED)

Type of offset	1980	1981	1982	1983	1984
Not yet specified:					
Contractually bound to not disclose details other than actual amount	-	75	-	-	-
Combination of direct and indirect offsets	-	-	80	7	4
Combination of direct and indirect offsets, not yet specified	12	3	-	3	45
Other	-	6	3	10	141
Total	12	84	83	10	141
Grand Total	399	2,538	426	3,215	2,144

[1]Less than $0.5 million.

Note: Because of rounding, figures may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

obligated in satisfying offsets, by types of offsets and by the year offset agreements were entered.

The third measure of offset significance is the actual fulfillment of the obligation. Since fulfillment may take as long as 10 years to complete, it is not surprising that slightly less than $3 billion of the $8.8 billion of obligations have been fulfilled. More than half of the offset fulfillment was in the aircraft and parts category (see Tables 5 and 6).

TABLE 5

TOTAL FACE VALUE OF OFFSET OBLIGATIONS OF MORE THAN $2 MILLION FULFILLED, BY REGIONS AND YEARS CONTRACTS SIGNED, 1980-84
(In Millions of Dollars)

Region	1980	1981	1982	1983	1984
Europe:					
NATO countries	62	163	152	205	381
Non-NATO countries	-	2	23	30	54
Subtotal	62	165	175	235	435
Asia	49	31	45	80	262
All others	246	266	158	225	313
Total	357	461	378	540	1,010

TABLE 6

FULFILLMENT OF OFFSETS

Year	Fulfillment of the offset obligation of $2 million or more for aircraft and parts (Million $)
1980	277
1981	303
1982	136
1983	249
1984	441

In conclusion it appears, for the period 1980-84 that offsets are increasingly being required as a prerequisite for purchasing major defense equipment. Defense contractors can continue to offer offset arrangements to enhance their business activity or lose sales to competitors that offer more attractive offset proposals.

D. WHAT IS THE CURRENT U.S. NATIONAL POLICY ON OFFSETS?

The U.S. policies on arms sales seem to be a reflection of current political and economic factors, and as these factors change so does our policy.

The Department of Defense has been an active player in offset deals. In 1975, Switzerland purchased 72 F-5 fighters with $400 million; $120 million of guaranteed countertrade offsets were part of this arrangement. James R. Blaker, then Deputy Assistant Defense Secretary for

Policy Analysis, explained to the House Economic Stabilization subcommittee:

> The department was placed in a strange position of trying to help market Swiss produced electrical generators --in effect being in competition with American producers. The Department of Defense did not like this. [Ref. 8:p. 764]

The current U.S. policy was initiated in a memorandum from then Deputy of Defense Secretary Charles W. Duncan Jr. on 4 May 1978. The memorandum notes the increased frequency of offset arrangements, designates management responsibility for evaluating and monitoring such agreements within the DOD and establishes the basic policy with respect to compensatory co-production and offset agreements with other nations. The memorandum states:

> Because of the inherent difficulties in negotiating and implementing compensatory co-production and offset agreements, and the economic inefficiencies they often entail, DOD shall not normally enter into such agreements. An exception will be made only when there is no feasible alternative to ensure the successful completion of transactions considered to be of significant importance to United States national security interests. . . . [Ref. 9:p. 1]

The same document specifies that when compensatory agreements are necessary, they should:

- be as broad as possible to obtain maximum credit for U.S. purchases of defense goods and services;
- avoid offset targets whether stated in percentage or money terms;
- be used to reduce administrative barriers to defense trade by all parties;
- encourage equal competition between U.S. and foreign firms concerning bidding on contracts;

- specify that the burden of fulfilling any commitment rest with the U.S. firms directly benefiting from the sale.

Co-production is not prohibited by the Duncan memorandum. The U.S. government is involved in negotiations leading to granting permission for co-production by a foreign country. However, the U.S. government does not guarantee the purchase of defense products produced under such an arrangement.

The second basic DOD policy with respect to offsets involves the use of FMS credit funds to finance sales involving direct offsets. DOD policy stipulates that direct offsets will not be financed with FMS credit funds.

The most recent iteration of Defense Security Assistance Agency's (DSAA) GUIDELINES FOR FMS LOAN FINANCING OF DIRECT COMMERCIAL CONTRACTS issued on October 9,1985 states that:

> Loan financing is discouraged for purchases containing offset provisions as a condition for securing the purchase. Offset provisions are agreements by the seller to make investments or procurement in a country other than the U.S., either concurrent with or subsequent to the purchase for which financing is being requested. No FMS loan funds will be authorized or disbursed to pay for mandatory direct offsets. Mandatory direct offsets are procurement of a foreign-made component required by the foreign government as a condition of sale, for incorporation in a U.S. produced end item being sold. While FMS loan funds will not be authorized for foreign produced contract resulting from mandatory direct offsets such funding can be authorized for the U.S. contract. [Ref. 10 :p. 1]

The only exception to this policy is Israel. During FY 1985 in a policy determination intended to assist Israel's industrial capability, the administration approved a $200

million level of FMS credit financing for direct offsets to Israeli industries. In all other countries the financing of any foreign production of components for, or final assembly of, the item being purchased must be financed using the government's own national resources.

To summarize, offsets are defined as a range of industrial and commercial compensation practices required by a purchasing government as a condition sale of defense articles or services. These practices include: countertrade, co-production, mandatory subcontracting, overseas investment, technology transfer, or other arrangements for the transfer of advanced production processes and management shifts. The ITC study clearly outlines several trends in foreign government policies:

> Offsets have become and will continue to be a main factor in awarding military contracts by foreign governments.
>
> The range and magnitude of required offsets has increased in the last five years.
>
> The nature of offsets demanded has increasingly included arrangements which involve technology transfer, production and management assistance.

The Department of Defense's policy on offsets is to not become involved in guaranteeing offsets and to not finance direct offsets, except for a limited amount for Israel.

III. OFFSET ARRANGEMENTS

A. INTRODUCTION

This chapter begins with a short discussion of the FMS bureaucratic process and a comparison with commercial sales.

The two most common methods used by foreign governments to purchase US defense goods is by FMS or commercially. FMS entails the American Government selling military hardware directly to the foreign government. The commercial sale (also referred to as direct sales) enables the purchaser to buy directly from the manufacturer. Both types of transactions must obtain U.S. Government (USG) approval and both must follow Congressional notification procedures if above thresholds specified by Arms Export Control Act of 1976 (AECA). Highlights of the latest amendments to AECA, which became effective in February 1986, require Congressional notification when: 1) any Letter of Offer and Acceptance (LOA) to sell defense articles or services for $50 million or more, 2) any design or construction of defense articles for $20 million or more, 3) and proposed sales of any individual major defense equipment of $14 million or more [Ref. 11:pp. 14-15].

B. FOREIGN MILITARY SALES

A condensed discussion of the FMS bureaucratic process is provided below. When the USG receives a request for

significant military equipment (SME), several basic procedures must occur before the transaction is complete. The request for SME must include justification of the need for the equipment, the affect on the nation's force structure, the neighboring country's expected reaction to the purchase, the purchaser's ability to operate the equipment, and the financial arrangements to be made for payment. The Department of State's Bureau of Politico-Military Affairs (State PM) takes the request and may confer with the requesting country's Bureau of Political Military Affairs. Assuming that there are not any problems, the Defense Security Assistance Agency (DSAA) is given the go ahead for the transaction. If the equipment must receive Congressional review, the State PM first notifies Congress, and then gives DSAA permission to proceed. [Ref. 12:pp. 7-9]

After the initial request for the FMS purchase has been received by the U.S., the purchaser may request planning and review data (P&R) about the proposed equipment. The P&R data is preliminary informational data that assists the buyer in planning for receipt of the order upon approval. In addition to P&R data, price and availability data (P&A) may also be requested. P&A data is very specific it gives precise estimates of the cost involved and the delivery available. P&A data is ordinarily given to the purchaser

only when it is fairly certain the transaction will be approved by the USG.

The document used to consummate the FMS is the LOA. The LOA contains the exact price as well as the terms of the sale, including any offset agreements. The LOA is routed through the various agencies for approval by the DSAA Operations Directorate (DSAA/OPS). After State Department review, the LOA goes to Congress if Congressional review is required prior to approval. After final U.S. approval of the sale, the buyer has 85 days to accept the LOA. [Ref. 12:pp. 11-13]

After acceptance of the LOA, procurement is handled in the same manner as with any USG contract with a defense contractor. The contractor sells the equipment to the US government then the equipment is sold to the foreign government at which time the USG is paid in accordance with the LOA.

C. DIRECT SALES

U.S. defense contractors may sell directly to a foreign buyer under the U.S. International Traffic in Arms Regulation (ITAR) with the approval of the Office of Munitions Control (OMC). Any company or individual that manufactures or exports defense articles or services is required to register with OMC. OMC in turn coordinates the request for permission to export defense articles and services, as

defined by the United States Munitions list [Ref. 13:pp. 19-20].

A licence must be granted by OMC before defense articles or services may be exported. If there is any doubt about issuing an export license the request is sent to the State Department for review. As with FMS, Congressional review is necessary for any sales above the AECA's thresholds.

After approval by the appropriate government bodies, OMC requires the receiving country to sign an end user certificate, and the export licence is issued. The buyer and seller then conduct the business transaction.

D. DIFFERENCE BETWEEN FMS AND COMMERCIAL SALES

The major difference between FMS and commercial sale is the commercial sale is not administered by DOD and does not involve a Government-to-Government agreement although the US Government monitors the program activity.

E. F/A-18 OFFSET ARRANGEMENTS

This section will address the specific contract arrangements and the offsets used on the F/A-18 strike fighter. Canada selected the commercial program and Australia and Spain selected the FMS procedure as a method of buying the F/A-18. Each of the foreign purchases involve an offset contract. All offset contracts (deeds) are commercial arrangements between the purchasing government and the contractors involved in the F/A-18 program. While

the U.S. Government is fully cognizant of the offset agreements it is not a party to the offset agreements and does not guarantee the favorable economic outcome of these arrangements.

These deeds are comprised of three different and unique offset categories, designated, co-production, and new initiatives.

> Designated offsets are articles and services performed in the purchasing country associated with the that country's own aircraft. (I.e., Spain manufactures the horizontal stabilators for a EF-18 (Spanish) aircraft.)
>
> Co-Production offsets are articles and services performed in the purchasing country involving technology used or similar to that accomplished for the designated work, but for other than that country's aircraft. (I.e., Spain manufactures the horizontal stabilators for other than Spain's aircraft.) MCAIR has a policy that no more than 50% of the total program's requirement can be co-produced. Figure 1 shows the F/A-18 co-production program.
>
> New Initiatives are work (other than designated work and Co-Production work) performed by the purchasing country; this includes articles and services for non-defense related projects, tourism development, and export development.

The following sections provide a short synopsis of each of the F/A-18 foreign sales and the offsets of each program.

F. CANADIAN (CF-18) PROGRAM

- **GENERAL**--The Canadian government has contracted to purchase 138 CF-18 aircraft. Deliveries started 4th quarter of 1982 and will end in the 3rd quarter of 1988. The buy includes 98 single seat (CF-18A) and 40 two-seat CF-18B.

F/A-18 Co-Production Program

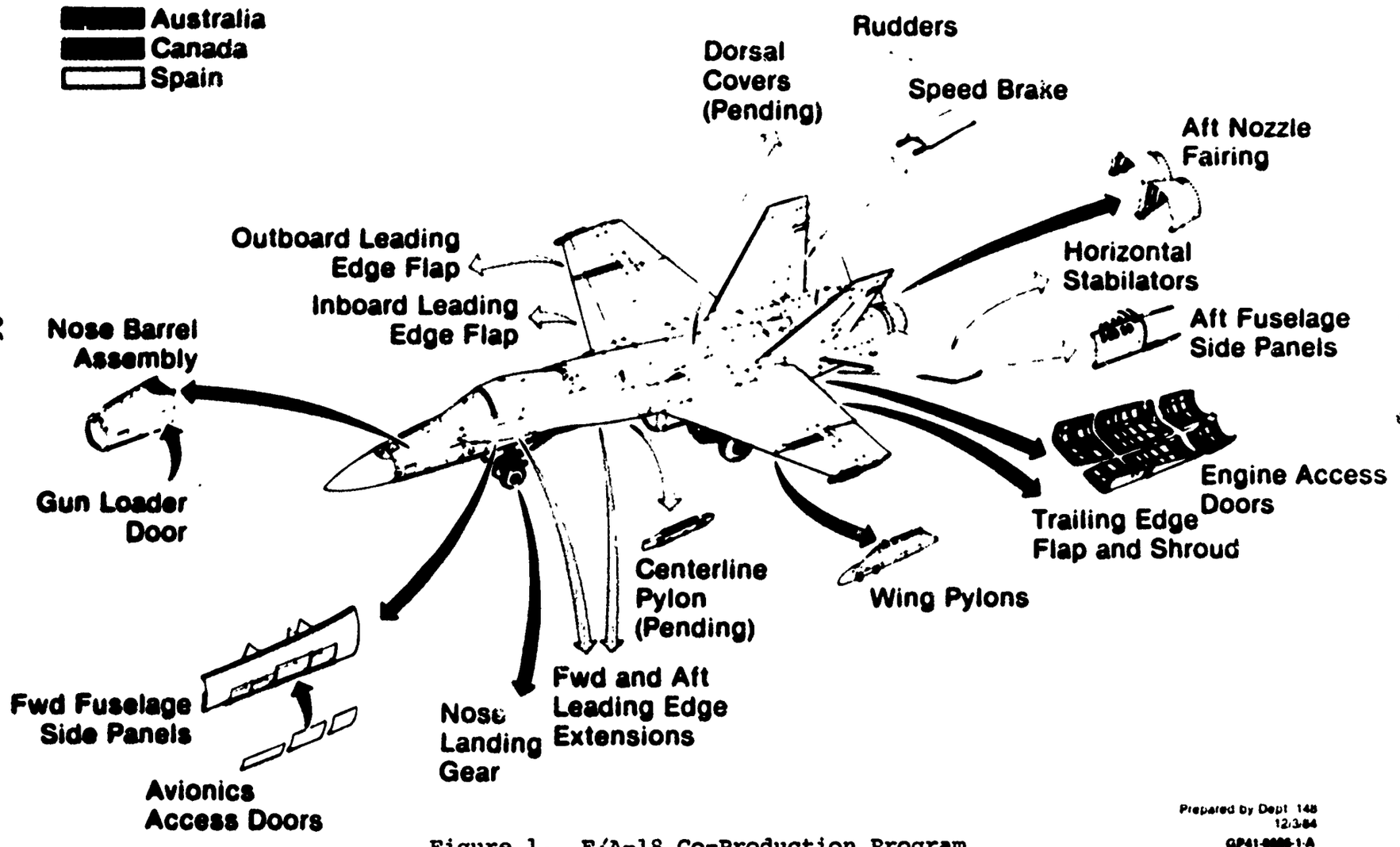

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Figure 1. F/A-18 Co-Production Program

The contract is commercial contract (government to contractor). The contract was signed in April 1980.

- **PROGRAM VALUE**--$2.457 billion Canadian.
- **INDUSTRIAL BENEFIT VALUE**--$2.453 billion Canadian then-year dollars firm, $475 million then dollars conditional. Firm commitments will be placed with Canadian industry. The conditional F/A-18 work is now placed.
- **TYPES OF INDUSTRIAL BENEFITS**
  - Aerospace
  - Non-aerospace, non-defense related

  PARTICIPANTS
  - McDonnell Douglas Corporation (MCAIR)
  - CF-18 suppliers
  - Eligible third parties
- **DISTRIBUTION**
  - 60% must be aerospace work
  - 40% is the maximum non-aerospace
  - 10% of non-aerospace is maximum allowable for tourism development.
  - Technologies transfer shall be not less than 10% of the aggregate.
- **TIME PERIOD FOR I.B. PERFORMANCE**--Industrial Benefits can be accrued from March 1977 to December 1994. Performance periods are divided into 3-year periods.
- **STATUS**--Industrial Benefits are presently running well ahead of schedule. The commitment at the end of the 3rd

quarter of 1987 was $ 1.233 billion and MCAIR's performance is $ 1.998 billion.

- **TYPES OF INDUSTRIAL BENEFITS**--See Figure 2 (CF-18A/B Industry Participation) Designated Work.

• F/A-18 RELATED COMPONENTS	CANADIAN SUPPLIER
Cruise Missile Guidance	Litton Canada
Nose Barrel	Canadair
Side Panels	MCAIR Canada
Composite Doors	Fleet Industries
Heads-up displays	Litton Canada
Wire bundles	MCAIR Canada
Engine guide vanes	General Electric

- **INDUSTRIAL**
  - MD-80 and KC-10 wings at MCAIR Canada
  - Production G.E. TV components
  - Establishment of a manufacturing technology center in New Brunswick with McDonnell Douglas Automatic, (computer aid design/computer aid manufacturing).
  - Tourism

G. AUSTRALIAN (F/A-18) PROGRAM

- **GENERAL**--The Commonwealth of Australian (COA) contracted to purchase 75 F/A18 aircraft. The first two aircraft were fully assembled and delivered at MCAIR in St. Louis. The remaining 73 aircraft (57 single and 16 dual seat) are scheduled to be final assembled and accepted at the Government Aircraft Factory (GAF) in Australia. Deliveries

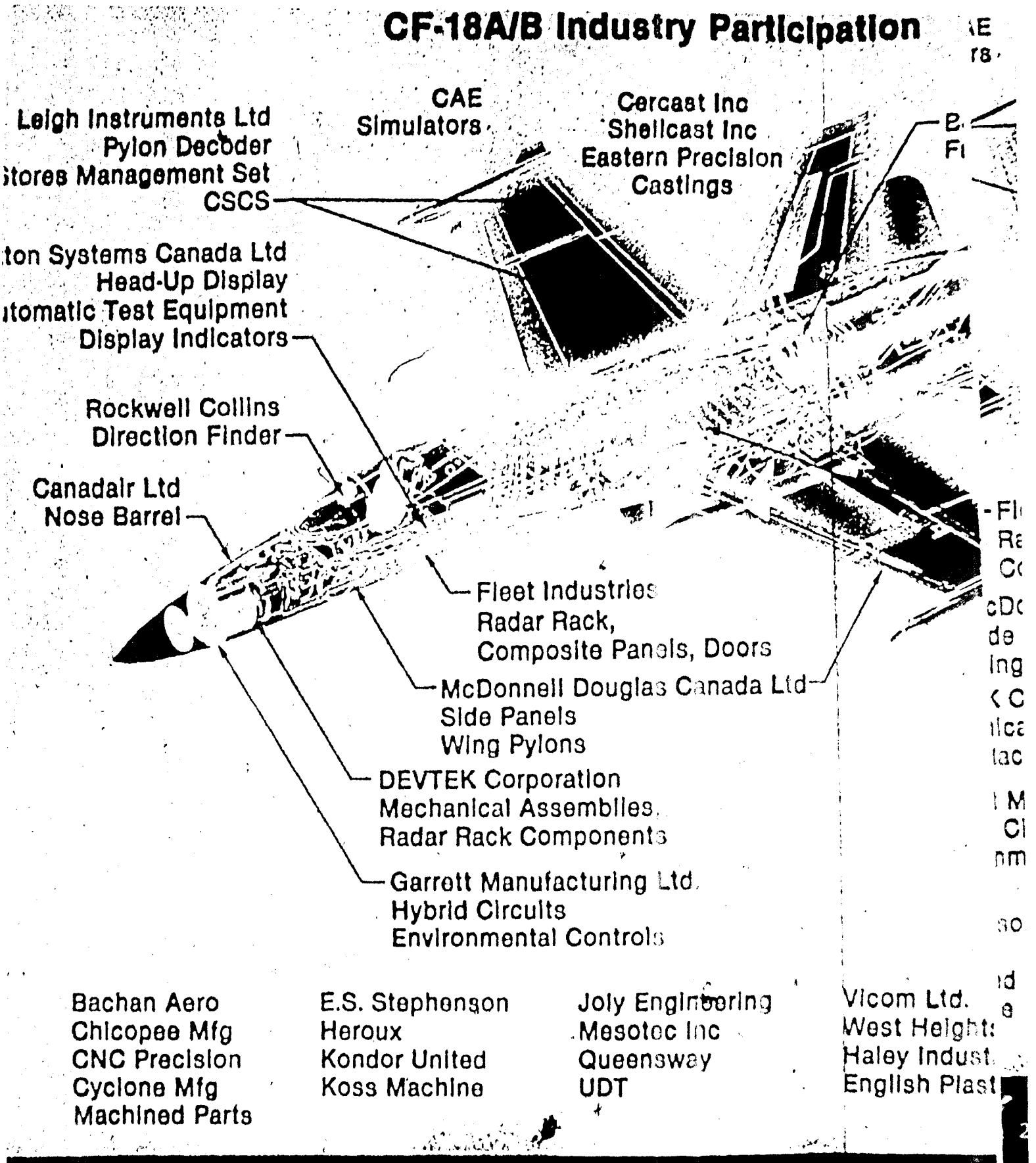
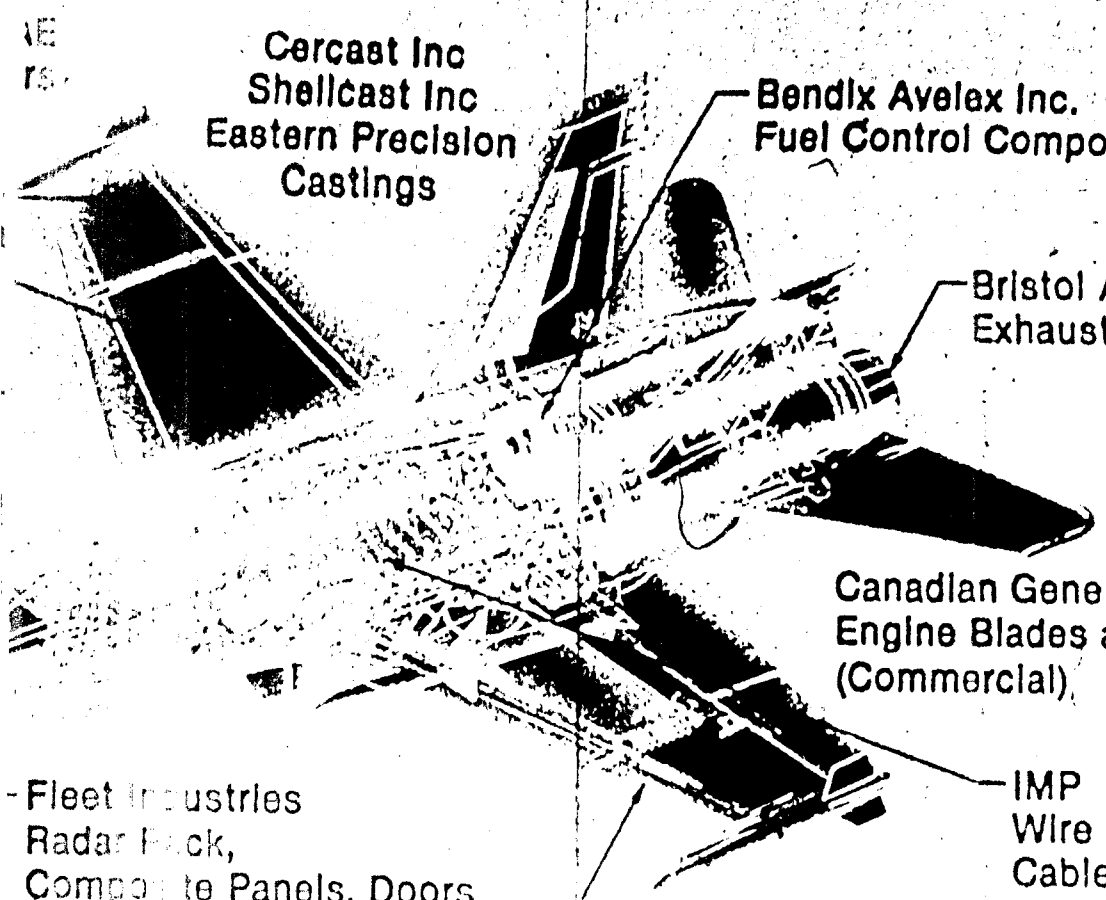


Figure 2. CF-18A/B Industry Participation

8A/B Industry Participation



Cercast Inc
Shellcast Inc
Eastern Precision
Castings

Bendix Avelex Inc.
Fuel Control Components

Bristol Aerospace Ltd
Exhaust Frame

Canadian General Electric
Engine Blades and Vanes
(Commercial)

IMP
Wire Bundles
Cable Assembly

-Fleet Industries
Radar Deck,
Composite Panels, Doors

McDonnell Douglas Canada Ltd
de Panels
ing Pylon

Corporation
ical Assemblies,
tack Components

Manufacturing Ltd.
Circuits
nmental Controls

son	Joly Engineering	Vicom Ltd.	Silcofab
	Mesotec Inc	West Heights Mfg.	IMW
ld	Queensway	Haley Industries Ltd.	Cametold
e	UDT	English Plastics	

from GAF start in the 2nd quarter 1985 and will end in the 2nd quarter of 1990. This is a FMS arrangement. The LOA was signed in December 1983.

- **PROGRAM VALUE**--$2.069 billion U.S. dollars.
- **INDUSTRIAL BENEFIT VALUE**--The industrial benefit value is thirty percent (30%) of the import content. The credit shall be measured in terms of value added in Australia.
- **PARTICIPANTS**
  - McDonnell Douglas Corporation
  - F/A18 suppliers
  - Eligible third parties
- **DISTRIBUTION**
  - 70% must be aerospace work
  - 30% is the maximum non-aerospace work
  - 10% of the non-aerospace is maximum allowable for tourism development.
- **TIME PERIOD OF PERFORMANCE**--Industrial Benefits can be accrued from December 1981 to seven years after the last delivery of 75 aircraft for use by the Royal Australian Air Force (RAAF).
- **STATUS**--The Industrial Benefits are presently running well ahead of schedule.
- **TYPES OF INDUSTRIAL BENEFITS**--See Figure 3 (Australian Industry Participation) Designated Work.

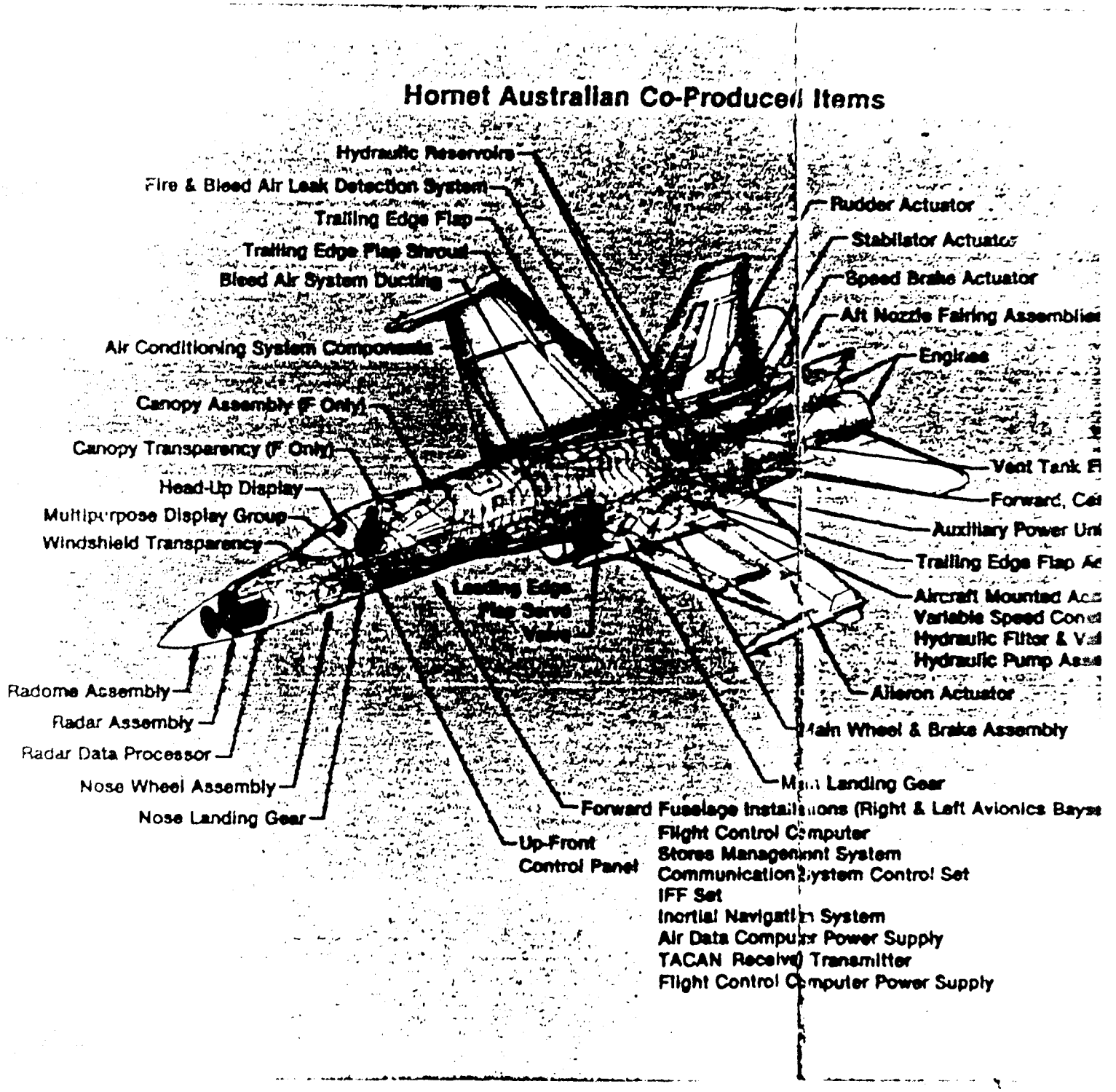
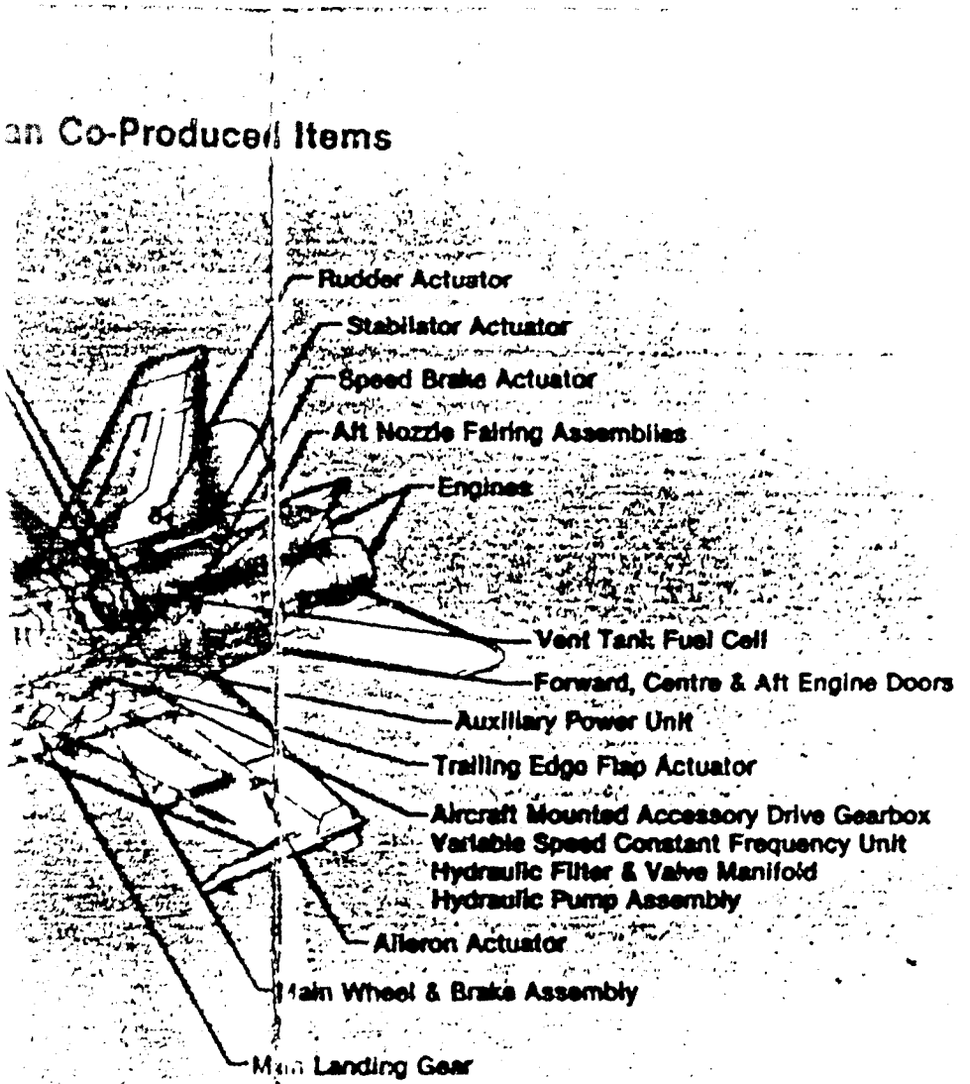


Figure 3. Hornet Australian Co-Produced Items

1092

an Co-Produced Items



ward Fuselage Installations (Right & Left Avionics Bays)
- Flight Control Computer
- Stores Management System
- Communication System Control Set
- IFF Set
- Inertial Navigation System
- Air Data Computer Power Supply
- TACAN Receiver Transmitter
- Flight Control Computer Power Supply

an Co-Produced Items

• F/A18 RELATED COMPONENTS	AUSTRALIAN SUPPLIERS
Fuel Fuselage	Government Aircraft Factories
Trailing Edge Flaps	Government Aircraft Factories
Trailing Edge Shroud	Government Aircraft Factories
AFT Nozzle Fairing	Commonwealth Aircraft Corp.
Canopy Assembly	Government Aircraft Factories
Radome Assembly	Government Aircraft Factories
Engine Access Doors	Commonwealth Aircraft Corp.
Wing Pylons	Commonwealth Aircraft Corp.
Landing Gear	Hawker DeHailland
Hydraulic Actuator	Hawker DeHailland
Rudder Actuator	Hawker DeHailland
Trailing Edge Actuator	Hawker DeHailland
Wheels & Brakes	Dunlop
Canopy Transparency	Government Aircraft Factories
Windshield	Government Aircraft Factories
Windshield Assembly	Government Aircraft Factories
APG65 Radar	Phillips
Tech Pubs	Bambras Press; Pub Pers

• **TECHNOLOGY TRANSFER**

- Titanium Isothermal and Aluminum No Draft Precision Forgings
- Litton AN/APS504 Radar
- Solar Energy
- Technology Transfer Center providing advice and assistance to metal's manufacturing organizations

- **INDUSTRIAL**
  - DC9/DC10 Components
  - Microwave Vacuum Prying
  - Giromills Wind Power Generator
  - Tourism Development

H. SPANISH (EF-18) PROGRAM

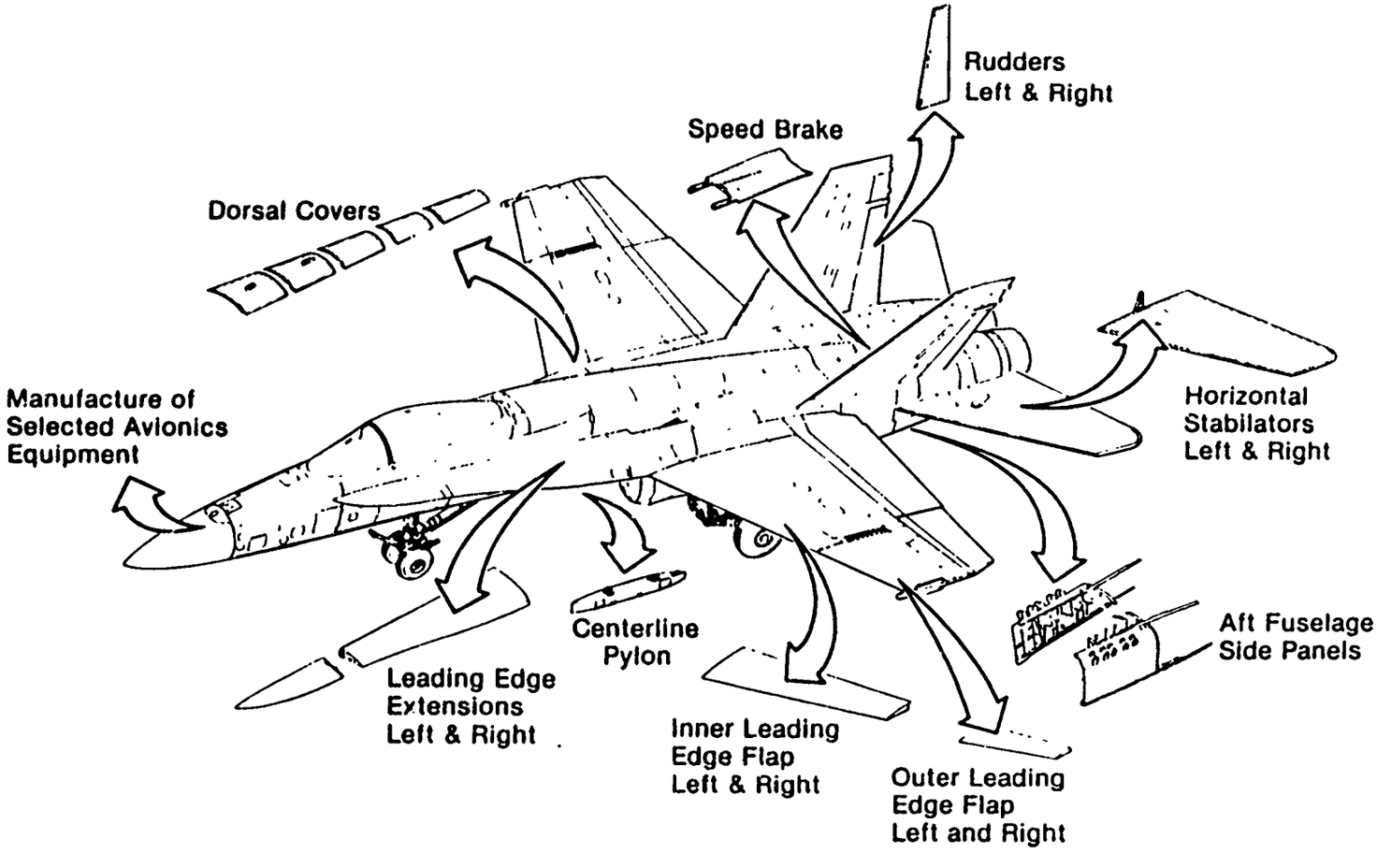
- **GENERAL**--The Spanish government has contracted to purchase 72 EF-18 aircraft. Deliveries started in the 1st quarter of 1986 and will end in the 2nd quarter of 1990. The buy includes 60 single seat (EF-18A) and 12 two-seat EF 18B. This is a FMS arrangement. The LOA was signed May 1983.
- **PROGRAM VALUE**--$2,329 billion U.S. dollars.
- **INDUSTRIAL BENEFIT VALUE**--$1.8 billion U.S. then-year dollars.
- **TYPES OF INDUSTRIAL BENEFITS**
  - Aerospace
  - Non-aerospace, non-defense related
- **DISTRIBUTION**
  - 40% must be designated a co-production work
  - 40% must involve "technology characteristic of developed countries"
  - 10% minimum "high technology" transfer
  - 10% maximum in tourism
- **TIME PERIOD FOR I.B. PERFORMANCE**--Industrial Benefits can be accrued from July 1982 to December 1993.

• **STATUS**--Industrial Benefits are presently running well ahead of schedule. The commitment at the end of June 1987 was $248.6 million and MCAIR's performance is $278.9 million.

• **TYPES OF INDUSTRIAL BENEFITS**--See Figure 4 (Spanish Industry Participation) Designated Work.

• **EF-18 RELATED COMPONENTS**	**SPANISH SUPPLIER**
Leading Edge Extensions	Construccioncs Aeronauticas
Inner Leading Edge Flap	Construccioncs Aeronauticas
Outer Leading Edge Flap	Construccioncs Aeronauticas
Horizontal Stabilators	Construccioncs Aeronauticas
Speed Brake	Construccioncs Aeronauticas
Rudders	Construccioncs Aeronauticas
Aft Fuselage Side Panels	Construccioncs Aeronauticas
Stores Mgmt Set & Comm	Inisel
System Control Set	Inisel
Head-Up Display & Multi-	Inisel
Purpose Display	Inisel
APG-65 Radar Power Supplies	Mesa
<u>Consumer Products</u>	
Wines	
Jewelry	
Home Furnishing	

F/A-18A Components for Spanish Industry



☐ Composite Assemblies

Figure 4. F/A-18A Components for Spanish Industry

Industrial

Metal Cutting Machinery

Construction Equipment

Electronics

Investment

Pre-Anodized Continuous Aluminum Coil

Computer Graphic Plotters

- **TECHNOLOGY TRANSFER**
  - Precision Castings
  - Applied Research/Testing Laboratory
  - Chip Inductors
  - Medical Diagnostic Kits
  - Thermoelectric Coolers

I. SUMMARY

As stated previously, each of the countries pursues its own specific strategic and economic objectives through an offset program. Each has identified areas of emphasis to meet specific needs.

Canada produces several major airframe components of the F/A18 as well as avionic items. It also has considerable work associated with McDonnell Douglas commercial aircraft products. In addition, Canada grants credit in a number of non-aerospace areas as a means of achieving opportunities or economic goals.

Australia has very specific objectives for their offset/industry participation program. It is seeking new

technologies for the Australian aerospace industry and wishes to establish an autonomous support capability for the aircraft. Australia, unlike Spain and Canada, chose final assembly and flyout in country. Although expensive, Australia felt that the benefits gained for the cost were justifiable relative to the development of support capabilities and future aircraft programs. Australia has little emphasis on the commercial offset opportunities.

Spain has followed a pattern very similar to that adopted by Canada. A larger emphasis is on the commercial aspects, principally because of Spain's economy. Spain does build some F/A18 components but final assembly, flyout and delivery is at McDonnell Douglas in St. Louis. As with the other countries, Spain is meeting its objectives via its offset program structure.

IV. IMPACT ON THE F/A-18 DOMESTIC PROGRAM

A. INTRODUCTION

This chapter will analyze the impact of the offset agreements presented in Chapter III and will determine what impact the agreements have on the domestic F/A-18 program. The impacts of the offsets have been separated into three categories: positive, negative, and perceived negative impacts. Perceived negative impacts are impacts that have a negative connotation however the research does not support this perception. The chapter will address the impact of the offsets in a management analysis manner from the perspective of the Program Manager.

Before addressing the specific impacts of these offset agreements there is one basic assumption that is key to the analysis. In order to sell the F/A-18 Strike Fighter to the foreign countries MCAIR had to enter into the offset agreements presented in Chapter III. There are strong competitors in the international defense aerospace industry (General Dynamics F-16, Sweden's Viggen, France's Mirage). If one bidder is willing to make such offset concessions others will have to, unless their product is so unique that there is no competition.

B. POSITIVE IMPACTS

1. Lower Unit Production Costs

The major benefit that DOD has recognized from the offset agreements is the lowering of the production unit cost of a domestic F/A-18. DOD claims that the combined foreign sales (both direct and FMS) has saved the U.S. Navy $1.6 billion in acquisition costs [Ref. 14]. The following efforts contribute most to this economic benefit:

- Recoupment of nonrecurring production cost and Research & Development (RDT&E) expense which would have been absorbed by the U.S. government in the absence of foreign sales. Recoupment of these non recurring costs are explicitly defined and are determined on a pro rate basis according to published formulas.

- Production cost savings result from economies of scale and increased production experience. Foreign orders may increase a contract order to a volume that can be manufactured more efficiently, or provide more production learning and reduce the cost of subsequent domestic purchases.

2. Increased Competition

In principle the offset agreements have the potential to increase the degree of competition for sub-components. The offset agreements allow the foreign country to manufacture components for their own aircraft as well as for U.S. Navy and other international customers. If the foreign manufacturer is competitive and is able to "ramp up," MCAIR will have the benefit of dual sources (the original U.S. manufacturer and the foreign manufacturer). This benefit is somewhat limited as MCAIR has a policy that limits the number of components manufactured outside of the

United States to 50% of the total program production quantity. In reality the foreign companies do not always possess the technical expertise to "ramp up" and be competitive so increased competition may not always result.

3. Increased Defense Industry Business and Employment

The U.S. defense industry business has increased because of the offset agreements. From the perspective of the U.S. companies, the question is not whether to accept a deal with or without offsets. The question is between business with offsets or no business at all. As a result of increased industry business new jobs are created. Various estimates have been reported on the relationship between foreign sales and employment. The Secretary of Defense in testimony before the House Committee on Foreign Affairs on 22 February 1983, emphasized the role military sales play in creating jobs in the United States and increasing revenue when he stated that:

> A recent Bureau of Labor statistics study concluded that annual foreign defense deliveries at levels ranging between $5 billion and $10 billion require between two and three hundred thousand jobs in the U.S private sector. As the value of U.S. defense deliveries increase, as they have in the past few years, the number of private sector jobs also increase. These jobs cut across the economic spectrum, although they are largely concentrated in manufacturing.

4. Increased Taxes Receipts

The sale of F/A-18 to foreign governments also generates a significant inflow of funds to the United States Treasury. The Wharton Annual Econometric Model indicates

that approximately 65 percent of the value of equipment produced in the U.S. for sale to foreign customers eventually flows into the U.S. Treasury in the form of tax receipts [Ref. 15:p. 24]. This revenue comes from 48 percent tax applied to corporate profits of companies engaged in foreign sales (less taxes paid to foreign governments) and personal income taxes paid by stockholders and industrial workers.

5. Military Benefits

The foreign sales enable allied and friendly countries to carry out missions in support of U.S. National Security interests. Using foreign sales to strengthen NATO forces allows European nations to assume greater responsibility for their mutual defense which lessens the need for U.S. forces in Europe. The first operational Canadian squadron of CF-18's arrived in NATO in the summer of 1985. The Spanish have been operating in Europe with EF-18's since the summer of 1986. The offsets also promote the concept of Rationalization Standardization and Interoperability (RSI). While it would be more cost-effective for foreign customers to buy complete systems the offset agreements do achieve standardization through co-production.

C. NEGATIVE IMPACTS

Although DOD has recognized a $1.6 billion savings as a result of foreign purchases they are not without certain

costs. The first cost is the additional program management that is required to manage the offsets arrangements. The other major cost is the additional risk the contractor and DOD assume as part of the offset agreements.

1. Program Management Cost

The offset agreements have dictated a new structure for military system acquisitions. DOD has the responsibility for the overall management of the F/A-18 FMS acquisition programs through the U. S. Navy and its prime contractors. In a commercial contract such as Canada's, DOD is supportive and still involved to a limited extent in the program affairs.

Although the offset programs are commercial agreements, because of the interlocking relationships of offset sales and deliveries, expanded program management is required. This expanded management effort is principally funded by the purchasing countries. However, there is a hidden indirect labor cost that is absorbed by the U.S. government. This hidden labor cost results from the additional bureaucratic procedures, the extensive communication problems, and the manufacturing problems experienced by the foreign firms.

Each F/A-18 international program has two divisions of operations. One is within the continental U.S. and one is within the customer country. There are three elements of

management involved: DOD, the U.S. contractors and customer country government and industry sectors.

DOD has the overall management responsibility for the F/A-18 program through the U.S. Navy and the prime contractors. The U.S. Navy, through the Chief of Naval Operations, ensures the implementation and program execution for the FMS cases and supports the direct commercial sales. The Naval Supply Systems Command has the responsibility for supervision, policy and coordination with the other systems commands to insure proper distribution of funds. Detailed program management for the U.S. Navy is completed through the F/A-18 Program Office (PMA-265) located in Naval Air Systems Command. PMA-265 has ten full time government employees to manage the three foreign programs plus a cadre of contractor support services personnel. All the government employees and the contractor support personnel are charged to the foreign countries.

The standard organization and management structure is altered at the Naval Plant Representative Office (NAVPRO). Because of the offset programs and the type of sales, the responsibilities of the NAVPRO require additional task assignments.

For Canada, the NAVPRO offices at the prime contractors serve for the Canadian government to ensure that the products delivered to the Canadian Forces fulfill the specifications, quality standards and schedules. Canada and

the U.S. government have Defense Sharing Production Agreement. This agreement allows Canadian quality assurance teams to monitor and inspect products to ensure that U.S. standards and requirements are met. Therefore, there is no NAVPRO office located in Canada.

As previously mentioned in Chapter III, Australia is performing final assembly and fly-out of 73 of their 75 aircraft. In addition, Australia is manufacturing a significant number of components for their aircraft and for U.S. Navy and other international customers. A NAVPRO office has been established in Melbourne, Australia to ensure that the aircraft delivered to the Royal Australian Air Force (RAAF) by the U.S. government meet the specifications, quality standards and performance as those for the U.S. Navy. No government-to-government production agreement such as the one for Canada exists between the two countries so the NAVPRO office will remain in country for the offset activity support. The NAVPRO employs approximately 25 U.S. government employees. The cost of operating the NAVPRO in Melbourne is borne by the Commonwealth of Australia (COA).

Spain is very much involved in offset activity. Many similar contract administrative support needs such as those in Australia also exist with Spain. NAVAIR has assigned contract administration functions to the (NAVPRO) at MCAIR. Detachment 19, U.S. Air Force Contract

Maintenance Center (AFCMC), located at Construccioncs Aeronautics S.A. (CASA), in Madrid is currently identified as the responsible office for contract administration in Spain. Currently, the AFCMC has nine people dedicated to the EF-18 program. This support will continue to be billed directly to Spain for as long as the offset activity exists.

MCAIR management is organized under a single Vice President and General Manager reporting directly to the President. There are respective program managers that report to the Deputy General Manager who is tasked with responsibility for the F/A-18 International Program. Each program manager has personnel assigned to him from the various functional divisions. MCAIR has provided offices in Melbourne, Australia and Madrid, Spain because of the co-production effort. These offices are staffed with personnel from the functional divisions for in country support and administration. The cost of support by these offices is directly charged to the respective country.

MCAIR has also established an International Division of approximately 50 people to help negotiate, coordinate and conduct offset operations. The majority of this effort is to monitor the production schedules of both direct and indirect offset work. This division is charged to an international overhead pool and not to the U.S. government.

2. Increased Program Risk

The other negative impact is the increased risk that is directly assumed by MCAIR and indirectly by the U.S. government. These increased risks are primarily the result of the different business environments and the different cultural work values. Consequently, the increased risk associated of the offsets with Canada are minimum and are not addressed below.

If the offset initiative involves a standard technology and low rate production effort the work has a high probability of success. The "designated" work generally involves production of only one and one-half units per month. Most of this work is not meeting purchase order delivery yet, but the U.S. companies have built in a sufficient float to accommodate this situation. Technical and managerial assistance has been required in most cases to develop this production capability.

A few of the designated programs involve significantly newer technology which increases the program risk. In these cases direct and forceful intervention by MCAIR or the respective U.S. contractor is required. The prime cannot hold the foreign company accountable as it would in the U.S. A paternal, guiding, on-site management effort is required. While action is being taken to encourage the foreign contractor to correct the situation, MCAIR has little direct leverage until the problem clearly

threaten purchase order deliveries. Since foreign firms generally tend to resist American's advice, attempting to keep them on track is a frustrating problem.

The co-production program is at least a medium to high program risk. Foreign contractors have to be competitive to receive work. This means that they will have to overcome some inherent inefficiencies and operate in accordance with detailed management plans. A favorable outcome is possible, but it will require some relatively large changes in attitude and behavior of the firms involved. The one thing that makes this prospect attainable is that the majority of the co-production work is concentrated in a few larger projects.

The following examples illustrate the nature of this additional program risk assumed and how this risk impacts MCAIR and DOD.

The Commonwealth Aircraft Corporation (CAC), in Melbourne has a large potential workload for engine access doors worth nearly $200 million. The technology is not exotic and management has made a strong commitment to become competitive. The labor unions and their clout make them less efficient then they could be, however their labor rates are substantially below the U.S. manufacturer--Northrop Corporation. These factors balance to some degree, but they still need to work at being more efficient. CAC has been delivering at a low rate for nearly a year and they have yet

to deliver on schedule. Because of the late delivery, CAC must bear the additional expense of air shipment instead of the planned surface shipment rate. The late delivery has significantly disrupted MCAIR's assembly line as the engine doors must be added on out of station. CAC has a projected production rate of 8 ship sets per month. If CAC doesn't achieve this rate they probably will not be competitive. MCAIR and Navy management have spent a large number of manhours managing this problem to insure that CAC's poor performance doesn't result in the late delivery of U.S. Navy aircraft.

The next example involves a higher technology--composite bonding for the horizontal stabilizers. Construcciones Aeronautics, S.A. (CASA) is scheduled to participate in the manufacturing of this advanced composite technology. CASA has little experience with the manufacturing of advanced primary structure composites. It is unlikely that MCAIR can transfer 15-20 years of extensive hands-on composite experience to a level sufficient to guarantee a quality product. CASA has had an extremely difficult time manufacturing these horizontal stabilizers and MCAIR has had to substantially reduce CASA's production rate and bring most of the work back in house. A task that took MCAIR 400 hours took CASA 2,000 hours [Ref. 16]. This resulted in a tremendous workload increase at MCAIR. This unscheduled work and the incorporation of a major

configuration change put MCAIR at least two weeks behind management's schedule. In the month of August 1987 MCAIR had dozens of production engineers scurrying around trying to figure out how to get back on schedule.

The final example involves labor problems associated with the transition of the Government Aircraft Factories (GAF) to Aerospace Technologies of Australia (ASTA). GAF is the subcontractor to MCAIR for final assembly and ramp of the F/A-18 being produced for the RAAF. GAF has a long history of inefficiency and industrial disputes. Last year GAF required a $10,000 government subsidy for each of the 2,000 civil service employees in order to maintain financial solvency [Ref. 17:p. 1].

In July 1986 the COA decided it wanted to reorganize the GAF, to operate as a commercial corporation, following the British model. On 14 August 1987, ASTA executed a 518 employee reduction in force in order to reduce their overheads so that ASTA would become commercially viable. This caused a strike by most white and all blue collar workers. The unions (a total of 17) demanded that all 518 workers (110 blue collar and 408 white collar) be taken back before they would return to work. As of the end August 1987 ASTA was currently six aircraft behind schedule with program milestones slipping daily [Ref. 18:p. 1].

The solution to this problem depends on whether the COA wants the aircraft delivered to operational squadrons

when originally planned or whether to keep planned work in Australia. The two appear to be mutually exclusive. If the work is to remain in Australia the impact is minimum. It could be a simple country to country agreement to exercise continued patience in hope of improved GAF/ASTA production performance. If the delivery requirements are firm then the U.S. Navy could arrange for production shortfall and schedule recovery to be produced at MCAIR and reschedule the co-production program to reflect ASTA production capability. This is a very politically sensitive topic and falls outside the scope of this paper. The best U.S. Navy course of action would be to determine Australia's needs and direct the FMS program to fulfill those needs, providing no increased cost to the U.S. government occurred.

D. PERCEIVED NEGATIVE IMPACTS

1. Technology Transfer and Competitiveness

Concern is often expressed that technology transferred through offset agreements will be used by the purchasing country not only in the immediate program, but ultimately to produce products that will compete with similar U.S. products. U.S. companies are very aware that technology transfer can create future competition. This is not a major problem.

What the U.S. companies are really transferring is production technology that may be state of the art. Production technology has a limited life. When new it is

very expensive, and when obsolete it can't be given away. The competitive companies within the aerospace industry are aware of the importance of maintaining a technological edge over the competition. They recognize that in order to remain competitive they must not only know the current technology, but have better technologies under development. By the time technology is made available, the U.S firm is certain to be using even newer technology.

2. Erosion of Industrial Base

The claim is also made that offsets tend to involve shifting work from U.S. subcontractors and vendors to their oversees counterparts. To some degree this may be true and might result in an actual decline in the industrial base. The results of the ITC study referenced in Chapter II failed to link offsets to any decline in a specific industry. The major problem in determining the erosion of the industrial base is obtaining the relevant data. There are a few dozen major defense companies which account for most of the prime contractors and the majority of subcontractors. However, there are thousands of lower tier subcontractors that have some interest in defense business.

For example the F/A-18 has roughly 10,000 subcontractors and vendors involved in its production [Ref. 19]. Undoubtedly, among those 10,000 suppliers are some who would get more business if it were not for offsets, assuming that sales of the F/A-18 were made at all. More

importantly, there are other vendors who are not providing parts for the F/A-18 who might have been able to if not for the offsets. The problem is finding subcontractors who don't have a job but might have and deciding whether it is because of the offset agreements or because of performance, price or quality problems. The potential for this problem exists and more analytical work in this area should be undertaken.

V. CONCLUSIONS

Offsets are a way of life. They are rapidly becoming a condition of sale in most international programs. The F/A-18 contractors are not unique in using these offset concessions as a marketing tool.

The reasons for countries requiring offsets vary. In general, they are usually associated with strategic and economic objectives. The strategic objectives may be to gain new technologies or to build up an aerospace industry. From an economic standpoint countries are trying to gain entry into new markets, to provide jobs, and acquire commercial technologies.

These foreign governments are similar to the U.S. government in that they must protect the public trust. Consequently, they feel a need to demonstrate to their public that they have obtained the best possible deal in terms of price, jobs, sales of domestic products, and technology transfer. The U.S. government faces many of the same political pressures. Congress adds a number of additional requirements on defense contractors. Companies are required to establish small business, minority business, affirmative action programs, leader-follower programs, and follow accounting practices peculiar to DOD requirements.

In other words, the U.S. government wants more for its money than just the defense hardware.

The impact of the of the offsets on the F/A-18 domestic program have varied. While the U.S. Navy has realized a $1.6 billion saving in the acquisition costs there are some externalities that need to be considered.

The positive externalities include: increased defense business, increased competition, generated tax receipts, and military benefits such as rationalization, standardization and interoperability (RSI). What is more important is that each country gets a sophisticated aircraft that it would not have been able to afford without offsets.

The negative externalities of the offsets have been minimal. While monitoring and administration of the program has been extensive and sometimes frustrating most of the increased costs are passed on to the foreign customer. The other cost is the additional risk that the contractor and to some extent DOD assumes when entering into these agreements. Although the offset concessions are commercial arrangements between the prime contractor and the foreign government, they have occasionally disrupted the assembly line causing out of station work to be done. In addition, there is the potential of the offsets affecting the delivery schedule of the domestic F/A-18 although this is very unlikely.

To summarize, offsets are a fact of life in the international market place: one that doesn't have a serious

negative impact on the F/A-18 program or on the U.S. economy.

This view is not universally shared. U.S. Representative Barbara B. Kennelly, D-Conn, believes that offsets will seriously affect our national and economic security. She has introduced a bill, H.R. 1652 which calls "for multilateral negotiations to discipline the practice of offsets" [Ref. 20:p. 1]. These negotiations would involve the Secretary of Treasury, Secretary of Commerce and the Secretary of Defense. Because of the little documented data on the effects of offsets, the controversy on the issue will probably increase as the demand for the offsets increase.

LIST OF REFERENCES

1. General Accounting Office, Opportunities to Improve Decision Making and Oversight of Arms Sales, ID-79-22, 21 May 1979.

2. General Accounting Office, Trade Offsets in Foreign Military Sales, ID-84-104, 13 April 1984.

3. Neuman, Stephanie G., "Coproduction, Barter, and Countertrade Offsets in the International Arms Market," ORBIS, Vol. 29, Issue No. 1, Spring 1985.

4. Smith, Kim L., "International Military Sales: Buyers Cash in on Offsets," Rotor and Wing International, Vol. 18, No. 10, October 1984.

5. House of Representatives, Committee on Energy and Commerce, Subcommittee on Oversight and Investigations, Federal Securities Laws and Defense Contracting Offsets Associated with Foreign Military Sales, Testimony of Dr. Paula Stern, Chairwoman, U.S. International Trade Commission on 10 October 1985.

6. United States International Trade Commission, Study on the Assessment of the Effect of Barter and Countertrade Transactions on U.S. Industries, October 1985.

7. Government Contract Services, GCS (14-86); Vol. X, International Contracts: Administration Agrees to Study Effects of Offset Agreements on Defense Industrial Base, 31 July, 1986.

8. Morrison, David C., "Have Weapons, Will Trade," National Journal, 29 March 1986.

9. Deputy Defense Secretary Memo for Secretaries of Military Departments and Others, Subject: General Policy on Compensatory Coproduction and Offset Agreements with Other Nations, 4 May 1978.

10. Defense Security Assistance Agency, "Guidelines for FMS Loan Financing of Direct Commercial Contracts," 19 February 1987.

11. Staff Review; "Arms and The Congress," Defense and Foreign Affairs, Vol. XIX, No. 4, April 1986.

12. Dunn, Michael C., Ackerman, Julia, "The Life History of a Foreign Military Sale," Defense and Foreign Affairs, Vol. XIX, No. 4, April 1986.

13. Marshall, Richard, "The OMC and Export Licensing," Defense and Foreign Affairs, Vol. XIX, No. 4, April 1986.

14. Interview between Mr. Paul Shlegel (PMA 265-1A), Deputy F/A-18 FMS Program Manager, Naval Air Systems Command, Washington, D.C. and the author, 25 August 1987.

15. Anderson, William H., The Impact of Foreign Military Aerospace Sales on the Industrial Base, Master's Thesis, Air War College, Maxwell AFB, Alabama, April 1976.

16. Interview between Mr. Jim Crow, F/A-18 Co-production Manager, Naval Plant Representative Office, McDonnell Douglas Corporation, St. Louis, Missouri and the author, 28 August 1987.

17. Dyer, J.W., CDR, USN, "Protracted Strike at GAF/ASTA," Point paper presented to Wayne Mori, Captain, USN, F/A-18 FMS Program Manager, Washington, D.C., 24 August 1987.

18. Commanding Officer, U.S. Naval Plant Representative Office, Melbourne, Letter Ser 00/740 tc Commander, Naval Air Systems Command, Washington, D.C. (Attention PMA-265), Subject: Program Status Report for August 1987.

19. Interview between Mr. Robert Price, F/A-18 Co-production Manager, McDonnell Douglas Corporation, St. Louis, Missouri and the author on 27 August 1987.

20. Congressional testimony and statement of U.S. Representative Barbara B. Kennelly, Before the Subcommittees on Arms Control, International Security and Science and International Economic Policy, and Trade Committee of Foreign Affairs, House of Representatives, 24 June 1987.

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