

AFIT/GLM/LSY/92S-29

# OFFSETS IN WEAPON SYSTEM SALES: A CASE STUDY OF THE KOREAN FIGHTER PROGRAM

THESIS

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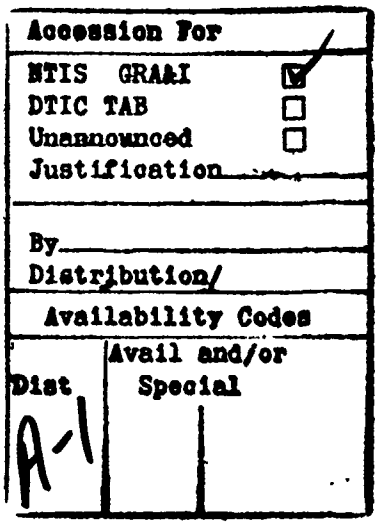

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THESIS

Presented to the Faculty of the School of Systems and
Logistics of the Air Force Institute of Technology
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**Deborah Kremer** **Bill Sain**

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Deborah L. Kremer Bill Sain

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## Abstract

This study sought to develop a framework of factors which impact the success of offset agreements. These agreements are becoming a fact of life in the sales of military items to foreign countries. There are resulting impacts on the U.S. defense industrial base, employment, the balance of trade and the ability of the U.S. to protect its technology. Consequently, the study of offsets is important.

To develop the framework, a literature review was performed to identify factors included in previous studies of a variety of international business agreements. In addition, the researchers accomplished a case study of the Korean Fighter Program (KFP) and applied the factors to determine what impact they had on the KFP offset proposals.

A framework of twenty-two factors were identified and grouped into four categories-buyer-related, seller-related, contract-related, and product-related factors. When this framework was applied to the KFP case study, it was determined that all the factors were considered by the parties in developing and negotiating the offset proposals. Of the twenty-two factors identified, only one, high visibility of the product, appeared to have had an impact on the final selection of the F-16 for the KFP.

This study also sought to determine the impact of the U.S. government's involvement on the KFP offsets. It was found that negotiations between U.S government parties and the Republic of Korea and U.S. restriction of certain components to Foreign Military Sales channels had an impact on the KFP offset proposals.

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## I. Introduction

### Chapter Overview

This chapter provides an introduction to the research topic of offsets. It begins with definitions of offsets and other critical terms and a discussion of the current U.S position on the use of offsets. It then identifies the general issue, the specific problem and the investigative questions for this research effort. Finally it closes with a discussion of the scope of the research and the presentation plan for the remaining chapters in this thesis.

### Definition of Terms

Although authors differ in their precise definitions of offsets, the definitions contain certain elements in common. First, they specify compensation in a non-monetary form. Second, they indicate that the intended purpose of offsets is to make up for (or offset) the buyer's costs. Third, they indicate that offsets are often a condition of sale of military hardware. For the purposes of this study, the definition to be used will be the one adopted by the Office of Management and Budget (OMB) which defines offsets as:

> a range of industrial and commercial compensation practices required as a condition of purchase in either government-to-government or commercial sales of defense articles and/or defense services as defined by the Arms Export Control Act (AECA) and the International Traffic in Arms Regulation (ITAR). (82:3)

The value of an offset agreement is usually expressed as a percentage of the value of the original sale. As implied by the OMB definition, contractors use a variety of techniques to provide compensation to the buyer up to the agreed percentage. These techniques include co-production, licensed production, subcontractor production, overseas investment, technology transfer and countertrade (82:3-4). Detailed definitions of these terms will be inserted in the text where appropriate. In addition, Appendix A contains definitions of terms used throughout this thesis.

This study will be addressing the issue of success in offset proposals. The perceptions of what constitutes success in any type of agreement between two or more parties may differ greatly among the parties involved. Each party is obviously concerned with its own interests which may conflict with the interests of other parties. An agreement that is successfully negotiated and implemented can be considered to meet at least a portion of the interests of all parties and to be perceived by the parties as a win. Therefore, for the purposes of this study, a successful offset proposal will be defined as one that is implemented and an unsuccessful one will be defined as one that is not implemented.

US Government Policy

The current U.S. policy regarding offsets was initiated in 1978 in a memorandum issued by then Deputy Secretary of Defense Charles Duncan. This memorandum, which came to be known as the Duncan Memorandum, states that:

> 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. (23:1)

The memorandum also indicates that the U.S. contractors involved in an offset agreement must bear the total responsibility for fulfilling its conditions. According to Dodenhoff, this policy statement resulted from numerous problems encountered in the offset agreement associated with the 1975 sale of Northrop F-5 aircraft to Switzerland. The US viewed the agreement as a "best efforts" attempt to promote Swiss goods while the Swiss considered it a guaranteed offset. Similar misunderstandings occurred with the 1975 sale of the General Dynamics F-16 to the European Participating Group. To avoid future misunderstandings, the policy in the Duncan Memorandum was adopted. Thus, since 1978, there has been a hands off policy by the Department of Defense towards offsets (22:5). Since that time, U.S. government involvement in defense sales involving offsets has occurred "primarily to ensure the military usefulness of

the project and to protect the technology involved, not guarantee the distribution of economic benefits" (86:41).

In a statement issued on 16 April 1990 the White House issued the latest policy in this area. This statement recognizes the need to ensure that U.S. firms are not hindered in competing for military export sales but it also suggests that offsets are trade distorting and should be avoided if possible. It reads in part:

> No agency of the U.S. Government shall encourage, enter directly into, or commit U.S. firms to any offset arrangement in connection with the sale of defense goods or services to foreign governments...U.S. Government funds shall not be used to finance offsets in security assistance transactions except in accordance with currently established policies and procedures...The decision as to whether to engage in offsets, and the responsibility for negotiating and implementing offset arrangements, resides with the companies involved. (92:46)

The statement goes on to say that there is a need now to begin bilateral discussions with major trading partners in an attempt to reduce government mandated offsets. According to a report issued in June 1991 by the Office of Management and Budget, the governments of Switzerland, France, Italy, and the Netherlands have already added provisions aimed at limiting offsets to their reciprocal defense procurement MOUs with the United States (82:9).

General Issue

> Offsets are a major factor in the competition for international defense sales...Foreign purchasing governments use offsets as a trade management tool for the purposes of preservation of foreign exchange, the targeted development of selected

> industrial sectors, and the enhancement of the capability of domestic industries through technology transfer. (85:II-31)

This was the stance taken in a report submitted in 1986 to Congress by an interagency committee, chaired by the Office of Management and Budget. The importance of offsets to international military sales has also been stressed by the Aerospace Industries of America Association in a report which stated that "foreign competitors use offset proposals aggressively as marketing tools, and an offset package can make or break a sale" (68:61). In a study of eighteen large international military sales occurring between 1980 and 1989, Karmali found that twelve included offset agreements (61:87). In fact, offsets are mandated by over 100 governments around the world (6:5).

The importance of offset proposals in making sales for U.S. defense contractors highlights the need to identify factors that impact the likelihood of implementation. The first objective of this study is to develop a framework of these factors. The second objective is to use the framework to analyze a current sale to determine if the factors identified in the literature actually affected the negotiations and implementation. The current sale which will be used to evaluate the framework is the Korean Fighter Program.

Specific Problem

This research attempts to answer the following broad questions:

1. What are the factors which impact the implementation of offset proposals?

2. Can these factors be consolidated into a framework against which future offset proposals can be evaluated?

3. Will this framework stand up when tested against an actual case?

Investigative Questions

This research effort will attempt to answer the following investigative questions:

1. What are the characteristics of buyers which might impact the success of offset proposals?

2. What are the characteristics of sellers which might impact the success of offset proposals?

3. What are the characteristics of related sales contracts which might impact the success of offset proposals?

4. What are the characteristics of the technology which might impact the success of offset proposals?

5. Were these factors present in the Korean Fighter Program (KFP)?

6. What impact, if any, did they have on the outcome of the competition?

7. Did the existing U.S. government policy and U.S. government actions impact the offset negotiations in the KFP?

Scope/Limitations

The literature review found in Chapter IV of this thesis provides an extensive background on factors that may impact offset proposals. The purpose of this study is to refine and test these factors to determine their impact on the negotiation and implementation of offset proposals.

The scope of this study is limited to those offset proposals associated with defense-related transactions. The factors identified may also impact offset proposals related to sales of non-military commercial items. However, that determination is beyond the scope of this study.

Presentation Plan

Chapter II identifies the research methods to be used in this research effort as well as any limitations of the methods.

Chapter III presents an overview of the current literature on the subject of offset agreements and their impact on U.S. employment, balance of trade, defense industrial base and technology.

Chapter IV identifies factors that impact the likelihood of success of offsets.

Chapter V provides a comprehensive case study of the Korean Fighter Program including an analysis of the offset proposals made by the two competing U.S. contractors.

Chapter VI analyzes the KFP in terms of the factors identified in chapter IV in an attempt to validate the factors framework.

Chapter VII provides findings and recommendations about both the Korean Fighter Program and the factors framework.

# II. Methodology

## Chapter Overview

This chapter describes the research design utilized to collect data for this study. The methodologies used will be described first followed by the data collection methods. Next justification for the methodologies will be discussed. Finally the limitations of the research methods will be addressed.

## Research Design

Because the research problem was not well defined, the researchers decided to conduct an exploratory study. Exploratory studies are necessary in order to define the research problem and its importance (24:144). It is hoped that this analysis will help to define the research problem and form a basis for further study by other researchers.

The study was conducted in three phases. In the first phase, factors were identified that appear to impact offset agreements and which should be considered by defense contractors in developing proposals. A traditional narrative review was performed. A meta-analysis was considered inappropriate since little or no quantitative data were available (19:1). In the second phase, data was collected relating to the Korean Fighter Program (KFP) and a number of questions were answered regarding the impact of the offset proposals on this specific program. In the third

phase, the data pertaining to the Korean case were analyzed to determine if the factors identified were present and what impact they had on the eventual outcome of the offset negotiations.

Data Collection

In phase one, a review of existing knowledge regarding factors which impact international agreements was undertaken. The review began with research into the general nature of offset agreements and the US policy regarding them. Next factors affecting various types of international agreements were researched. International agreements other than defense related offsets were included in this review because the available literature was limited in the narrow area of offset agreements. This broader review was considered appropriate because offsets have many characteristics in common with other types of international agreements. Chapters III and IV contain a more detailed description of this literature review.

Phase two consisted of collecting data on the offset proposals submitted by the two companies involved in the competition for the KFP sale and compiling this data into a comprehensive case study of the program. This data was collected using three methods. Secondary data was collected by a review of historical data (e.g., government files, government studies, contractor data, etc.) and by research of current documents (news reports, magazine articles,

etc.). Primary data were collected by personal interviews with individuals involved in the program. These individuals represented the parties involved in the negotiations (U.S. government agencies, U.S. companies and Korean representatives). These individuals were chosen based on their knowledge of and experience with the program. Chapter V includes the details of this research phase.

In phase three, the data collected in phase two were analyzed in terms of the factors identified in phase one. The purpose of the analysis was to test the factors framework against actual offset proposals. Chapter VI contains this analysis.

Justification for Methodology

The researchers chose case study as their primary research tool for this effort. It was chosen over traditional statistical methods for two reasons. First, there is considerable reluctance on the part of contractors to respond to surveys about their offset practices because they consider the information to be proprietary. Second, offset agreements are a relatively new area of study and thus the existing knowledge base is limited. While case studies are not as rigorous as statistical studies they are still valuable because they "can provide a major challenge to a theory and provide a source of new hypothesis and constructs at the same time" (24:143). The use of a case study in this instance permitted the researchers to test

their framework of success factors against actual offset proposals.

The researchers also chose to obtain primary information by personal interviews instead of questionnaires. The researchers felt that interviews would yield better information because "interviewing permits rephrasing of questions to assure understanding and permits clarification of answers, neither of which is possible with the questionnaire" (104:68).

Limitations of the Research

According to Smith, the information derived from secondary sources, such as news reports, other studies, and historical government documents must be evaluated in terms of its impartiality, accuracy, and author qualification (104:56). The researchers were able to verify the accuracy of much of the secondary data by cross-checking with other sources. They were also able to verify the qualifications of most of the authors cited. However, they were limited in terms of their ability to verify the impartiality of the secondary data.

Smith suggests that there are three potential errors involved in collecting primary data through personal interviews: errors in stimulating responses; errors in handling nonresponse; and errors in recording and interpreting responses (104:70). All of these sources of error can be controlled to some extent through careful

structuring of the interview questions but they cannot be avoided entirely. Another limitation of interviews is that some of the people interviewed may have a vested interest in having their participation in the program portrayed in a positive light. This could slant their responses and taint the information provided. Finally, the researchers had to rely on the interviewees' memories of events occurring several years ago. Thus there may be accuracy problems with the data.

Conclusion

In summary, this study consisted of a literature review to identify factors impacting international agreements, a literature review and interviews to develop a case study of actual offset proposals in the Korean Fighter Program, and analysis of that case study to answer a variety of research questions. While a number of limitations have been discussed in this chapter, the researchers feel that the methodology utilized was both appropriate and effective in providing answers to the research questions.

## III. Offsets

### Chapter Overview

This chapter will begin with a general background on the world arms market and the factors that led to the growth in the use of offsets. This discussion will be followed by examples of recent offset agreements to illustrate their complex nature. Finally, potential impacts of offsets on employment, the U.S. trade balance, the defense industrial base and technology will be discussed.

### The World Arms Environment

In the years since World War II, there has been a change in the nature of world arms transfers. Immediately following the war, arms trade in the West consisted almost entirely of the transfer of surplus weapons on a grant (free) basis from the United States to Western Europe. The U. S. considered these transfers necessary to help Europe defend itself against communism as it rebuilt its damaged industries.

By the early 1960s, most Western European countries had recovered sufficiently to begin sharing the costs of their defense. Consequently, sales of U.S. weapons replaced the former grant programs. The effect of these early programs was a reliance on U.S.-made weapons. As Weida says, "NATO Europe had become wedded to the use of a number of U.S.-

designed weapons--particularly in high technology areas" (121:27).

In the early 1970s, Western European countries were anxious to develop indigenous defense industries. However, high-technology weapons are costly to produce and most countries do not have sufficient demand for the weapons or sufficient defense budgets to make stand-alone production either efficient or affordable (121:52-53). The natural solution to this problem was to push for licensed production or co-production of U.S. weapons and thus reduce research and development costs. While licensed production programs date back to the 1950's (one of the earliest was the F-104 which was licensed to a number of European countries), the first major European co-production of a U.S. weapon system was the 1975 F-16 program with Norway, Denmark, Belgium, and the Netherlands (120:14). The four countries agreed to purchase 348 aircraft from General Dynamics and in return were guaranteed that they would receive "production contracts worth at least 58% of the purchase price" (107:5). This deal prompted other European countries to demand similar arrangements and the growth in offsets began.

Extent of Use of Offset Agreements

The highly competitive nature of the world arms market makes the buyers powerful. Consequently, they can demand and receive substantial offsets for military purchases. In a 1988 article in The Banker, Jason Nisse says "as more and

more countries realize their leverage in competitive world markets, countertrade and offset requirements have become part and parcel of international business" (81:74). The number of countries that require some form of countertrade has risen from about fifteen in the early 1970's (52:72), to twenty-seven in 1979 (80:28), to eighty-eight in 1984 (14:31), and to 100 in 1990 (6:5). In terms of percent of world trade, countertrade has grown from two percent in 1975 to ten percent in 1984 (14:31) and to as high as thirty percent in 1990 (88:39). These numbers are inflated in the context of defense purposes because they also include non-defense purchases. However, they still serve to illustrate the rapid growth in the use of these types of arrangements.

Examples of Offset Agreements

The best way to illustrate the operation of offset agreements is through some recent examples. One of the most highly publicized offset agreements was related to the sale of Boeing E-3 aircraft to the United Kingdom in 1985. Boeing originally offered a 35% offset, later raised the offer to 100% and finally to 130% to beat out their final competitor, GEC Avionics, the producer of the British Nimrod aircraft. Five percent of the approximately $1.5 billion in offsets are of the direct variety (related to the production of the E-3 itself). The remaining 95% are indirect (unrelated to the E-3) investments in high technology aerospace and defense industries (83:77-78). The UK example

is used because it illustrates that offsets can exceed the value of the purchase itself. It is interesting that the United Kingdom does not have a mandatory offset percentage. However, in practice, Boeing had to offer an offset of over 100% to make the sale.

Another less publicized but more complex agreement was concluded between General Dynamics and the Turkish Government in 1983. The offset percentage was about 25% or $1 billion. In exchange for the purchase of 160 F-16 aircraft, GD agreed to allow the assembly of 152 of the aircraft in Turkey using parts from U.S. and European plants (those which co-produced parts for the sale to Norway, Belgium, Denmark and the Netherlands mentioned earlier) as well as from new Turkish plants co-owned by GD, General Electric, Turkish industry and the Turkish government (107:7). GD also agreed to provide about $800 million worth of non-defense related offsets including investments in the Turkish hotel industry and in a thermal power plant project (97:38-42). Turkey also does not have a mandatory offset policy but it is unlikely that the sale would have been made without the offset provision because of the Turkish need to develop its industries and provide employment.

Impacts on Employment

Negative influences of offsets on U.S. employment can arise out of two situations: loss of jobs because parts that can be produced in the U.S. are instead being produced

overseas, and loss of jobs because items are imported to fulfill offset obligations (121:4). Many authors take the position that employment actually increases because offsets allow sales that would not otherwise occur. A 1988 OMB report, Offsets in Military Exports, concludes that "the effect of offsets on total U.S. employment is minor, if not actually positive" (83:58). According to Weida, even if there were a net loss, the impact would be insignificant because industries that produce arms for foreign sales represent only about 200,000-300,000 jobs, or about one-half of one percent of private sector employment (121:131-132).

Impacts on Balance of Trade

None of the authors presents a quantitative discussion on this issue. In fact, the OMB report states "any attempt at direct estimation of the precise impact is suspect" (83:64). The consensus of the authors is that there may be negative impacts but they are mitigated by three factors. First, offset credits are often recorded at more than a one-to-one ratio. For example, the Canadian government grants more than a dollar's worth of credit for each dollar spent in underdeveloped provinces (121:64). General Dynamics' worldwide experience has been that they need to invest only four cents for each dollar's worth of credit they receive (97:35). Second, because the payback period exceeds the original contract period, the offsets are paid off in later year dollars that are worth less than current year dollars.

Thus, the value of the offset is reduced in relation to the value of the sale (68:61). Finally, some companies are able to make up for any lost profits by increased business in other areas. As Schaffer says:

> larger companies, like Boeing, are finding that offset agreements are a way of expanding the scope of a transaction, creating more opportunities for profit. What they give up in subcontracts and coproduction, they more than recover in service agreements, training, and market position in a country over time. (97:68)

Impacts on Defense Industrial Base

In an analysis of industrial base impacts, two separate but related issues need to be examined. The first is the issue of erosion of the defense industrial base because of competition from foreign contractors. The second is the effect on U.S. war fighting capability because of potential reliance on foreign made parts.

Regarding the first issue of industrial base erosion, the impacts of offsets need to be looked at in terms of the three tiers of the defense industry-prime contractors, subcontractors and parts suppliers. Most of the authors agree that there are probably positive effects on prime contractors and major subcontractors (like engine producers) in two ways. First, as stated earlier, they make possible sales that would otherwise not occur. Thus they can help to sustain operations at U.S. defense plants that are running out of U.S. orders because of budget cutbacks. Second, as

Schaffer suggests, they encourage cooperation among U.S. companies to meet their offset obligations (97:8).

On the other hand, the authors disagree about the effects on small subcontractors and parts suppliers. Most of them agree that there is a strong potential for negative impacts in these areas because most offset deals involve subcontracting of parts production to foreign companies. These foreign companies may then supplant U.S. suppliers of the parts. A recent report by the U.S. Congress Office of Technology Assessment (OTA) says that in the long term "global sourcing...will tend to displace U.S. subcontractors (and U.S. workers) and increase U.S dependence on foreign-made defense products" (114:26). Weida believes that to the extent that:

> the offset creates a new foreign manufacturer of arms, it has the potential to alter procurement patterns in the long run by lowering the growth rate and reducing the ultimate size of the U.S. defense industrial base. (121:118)

The author of the OMB report agrees that offset agreements that include direct subcontracting and thus increase competition, have the most potential for an adverse impact. However, the conclusion drawn in the report is that the impacts do not appear to be significant. The author states:

> if the defense industrial base effects that may be attributed to offsets were significant, one would expect to see lagging competitiveness in this sector. In fact, at a time when other economic sectors are experiencing large trade deficits, aerospace exports have remained highly competitive and have continued to show large, growing trade surpluses. (83:38)

There are several reasons why the lower tiers of the defense industrial base are more likely to be adversely affected by offset deals than are prime contractors. First, prime contractors and major subcontractors are the ones who negotiate the deals and they "structure offsets so that they derive the maximum benefit" from them (121:132). In the process they often pass on their offset obligations to their subcontractors and parts suppliers who are often in weak bargaining positions and who must accept the conditions imposed by the prime contractors. Second, the large defense contractors have more resources and thus have an easier time fulfilling offset obligations in the first place.

The foregoing paragraphs imply that increased competition from foreign sources at the subcontractor and parts supplier levels is necessarily a bad thing because there is the potential for U.S. firms to be driven out of business. In fact there may be benefits to the users because of the lower costs and higher quality that usually result from competition. The OTA report mentioned earlier suggests that "global sourcing may already be making defense production more efficient" (114:26). In his book, Affording Defense, Jacques Gansler says that "in many cases the foreign parts are the only ones available that deliver the required performance" (39:271). There must then be tradeoffs between obtaining the benefits of increased competition and protecting the defense industrial base.

A more thorny issue is the reliance on foreign-produced components in combat aircraft and the potential for those components to be unavailable in a wartime situation. Gansler says:

> the U.S. defense industry is now heavily, if not totally, dependent on foreign sources for computer memory chips, silicon for high-powered electronic switching, gallium arsenide-based semiconductors for high-speed data processing, precision glass for reconnaissance satellites and other military equipment, liquid crystal and luminous displays, and advanced fiber optics. (39:271)

Storer says that twenty-five percent of F-15 parts are foreign-manufactured, and access to these parts in time of war is uncertain (41:14). In a 1991 article in Government Executive, James Kitfield says that during Desert Storm, "the Air Force Logistics Command (AFLC) confirmed that it had to go to foreign suppliers in 42 instances" (63:28). Griffin cites a study performed for the Joint Logistics Commanders which "determined for the Sparrow missile, M-1 tank, OH-58D helicopter, F/A-18 and F-16, the impact (of cutting off foreign sources) would be a drop to zero production for periods ranging from 6 to 14 months" (49:48).

None of the effects discussed above can be attributed strictly to the use of offsets. The factors that affect the defense industrial base are very complex. Lopez and Yager acknowledge that the subcontractor and parts supplier tiers of the defense industrial base are declining. However they believe that factors other than offsets are to blame for the decline. In their view, the major factors which affect the

subcontractor and supplier base are "the fragmentation and relative lack of automation of the U.S. machine tool industry, wide differentials between domestic and foreign labor rates, and the strength of the U.S. dollar" (68:61). Other factors cited by authors are: DOD policies which require "buying the best and the cheapest systems"; American suppliers choosing to leave the defense market for commercial markets; and decisions to locate plants overseas to gain market access (39:271).

Technology Transfer

None of the authors takes a firm stand on whether technology transfer is inherently harmful or beneficial. The authors agree that there are two components that determine the potential impact of technology transfer-the technology itself and the timing of the transfer.

In The U.S. Aerospace Industry and the Trend Toward Internationalization, Virginia Lopez says the real issue is

> the level of skill and knowledge passed on . . . and whether skills and knowledge transferred are highly specific to some aspect of development such as component production capability, or are more general in nature, such as design and management of the critical transition from design to production. These last capabilities provide the recipient with greater overall expertise and a stronger position as a future competitor. (68:46)

Schaffer says that a company must judge "how much the loss of technology will hurt it in future bids against a now technically enhanced competitor" (97:194). Storer maintains that companies "tend to give away only those technologies

which they can afford to give away -- not 'patented' high technology" (107:12).

Weida believes that technology is a perishable commodity. If it is held too long, it becomes worthless. If it is sold too soon, it adversely affects the company's competitive advantage. If it is transferred at the right time, the company may lose a little but stands to gain more (121:143). Schaffer suggests that companies tend to transfer only technology that they believe will become outmoded in two or three years (97:35).

## Conclusion

This chapter has presented an overview of the world arms market and the developments that led to the use of offsets in sales of military hardware. Also included was a discussion of the potential impacts of these offset agreements on employment, U.S. trade balance, the defense industrial base, and technology. This discussion highlighted the difficulties involved in identifying and quantifying those impacts.

## IV. Factors Affecting the Success of Offsets

### Chapter Overview

This chapter will discuss factors which are identified in the literature as contributing to successful offset agreements. It will begin with the views of various authors on how to define success. It will then cover the factors. It will conclude with a framework of the factors.

### Definitions of Terms Used in This Chapter

*Countertrade* is defined by OMB as various types of agreements that involve exchange of goods and services for other goods and services (barter), mandated purchase of goods from the original importer (counter-purchase), or acceptance as "full or partial payment products derived from the original exported product" (buyback) (82:3-4). An example of a countertrade transaction occurred when Rockwell offered to export ferrochrome and nickel from Zimbabwe in order to win the sale of a printing press to that country (97:2). *International joint ventures* are arrangements which "involve two or more legally distinct organizations (the parents), each of which shares in the decision making activities of the jointly owned entity " and in which at least "one parent is headquartered outside the venture's country of operation" (43:249). The development of the Airbus by France, UK, West Germany, and Spain is an example of an international joint venture (68:40). As used in this

research effort, *international cooperative projects* are projects for development and/or production of military hardware which involve parties from more than one country and in which costs, risks, and responsibilities are shared by the parties (49:16-18). The NATO Airborne Early Warning and Control System (AWACS) project falls into this category (26:183).

Literature Review Approach

The issue of success in offset agreements has received only limited attention in the literature. To obtain sufficient information on the topic, it was necessary to review literature on the related topics of countertrade, international joint ventures, and international cooperative projects, in addition to offsets. This approach was considered appropriate because these types of agreements share several important characteristics. First, they are agreements between two parties from different countries and potentially different cultures. Second, they require negotiations between parties who have differing and perhaps conflicting goals. Third, they require a written agreement which details the terms and conditions under which the parties will operate. Finally, they require the parties to establish a long-term business relationship.

There are, however, unique characteristics of each of these types of agreements. The amount of investment required by each party, the amount of risk assumed by each

party, and whether or not there is any joint ownership of assets depends on the category into which the agreement falls. Therefore, the researchers had to use their own judgment in determining whether the specific situation described by an author was similar enough to an offset situation that the author's assumptions and conclusions were pertinent to this research effort. Table 1 lists the types of agreements and the authors cited.

When addressing the issue of success, two phases in the development of offsets need to be considered. The first phase, development and implementation, begins with the development of a proposal by the seller in response to the buyer's demands and ends with the signature of an agreement by both parties or with a decision to end the negotiations. In this phase, the parties are attempting to reach an agreement on issues such as work content, work share, division of responsibilities, administrative relationships The second phase, execution, begins with the signed agreement and ends with the fulfillment of all obligations under the agreement or with payment of penalties for non-fulfillment. Obviously getting through the first phase is essential to success. According to Welt, "90 percent of countertrade proposals fall through before a final agreement is reached" (122:29).

As stated before, the topic of offsets has received limited attention in the literature. Most of the available literature addresses success from the perspective of the

TABLE 1

RESEARCH INCLUDED IN LITERATURE REVIEW

| AUTHOR | TYPE OF AGREEMENT |
|---|---|
| Alexandrides | Offsets |
| Bailey | Offsets |
| Carter & Gagne | Countertrade |
| Cohen & Zysman | Countertrade/Offsets |
| Coller | International Joint Ventures |
| Farr | International Cooperative Projects |
| Francis | Countertrade |
| Fraser & Hite | Countertrade |
| Geringer | International Joint Ventures |
| Golden | Offsets |
| Gomes-Casseres | International Joint Ventures |
| Hennart | Countertrade |
| Howard & Yeakel | Countertrade |
| Iaia-McPhee & others | Countertrade |
| Lecraw | Countertrade |
| Main | International Joint Ventures |
| McVey | Countertrade |
| Meyer | International Joint Ventures |
| Rostain | Countertrade |
| Schaffer | Countertrade/Offsets |
| Scherrer | International Contracts |
| Shipley & others | Countertrade |
| Storer | Offsets |
| Verzariu | Countertrade/Offsets |
| Weida | Offsets |
| Welt | Countertrade/Offsets |

execution phase. Few authors have looked at success factors which should specifically be considered in developing and negotiating offset proposals. However, in this thesis, the researchers believe any success factors framework must necessarily address both phases.

Definitions of Success

Only four of the authors specifically address the issue of defining success in offsets. Three of them focus on fulfillment of offset commitments. Golden suggests that an

offset agreement is successful if the company does not incur obligations that are difficult to satisfy (47:67). In a 1988 article in Journal of Commerce and Commercial, Marvin Coller quotes a member of Boeing's offset management team as saying "you still have to deliver your product on schedule and to cost as well as meeting your offset obligations" (15:1A). Farr focuses on the perceptions of the parties involved and the percentages of offsets actually achieved as criteria for success in offsets (26:184). Bailey concluded that defining success in offset proposals might be the wrong focus. In discussing problems with developing a model for determining the probable success of an offset proposal, he states that success "defied objective description" (10:161). He recognized that negotiation of an agreement that is satisfactory to both parties is a necessary first step in a successful ultimate outcome. Therefore, he decided to place the 124 offset proposals in his study into implementation/non-implementation categories instead of success/non-success categories.

Eight of the authors discuss success in countertrade. The concept of "winning" runs throughout their works. To some of them, winning means increasing profits by making sales; to others it means enhancing a firm's image or market position; and to still others, it means balancing risks and benefits. Schaffer implies that successful countertrading occurs when the "numbers add up" (97:196). Lecraw defines success in countertrading as the creation of net economic

value (66:42). Rostain says "when a deal is done satisfactorily, we have achieved our purpose-that is, selling our products or services" (95:55). Shipley and Neale say that countertrade is a success if it "enhances the firm's overall attractiveness to customers" (101:333) and contributes to profit (78:59). Iaia-McPhee and Maerowitz state that successful countertrading enhances a firm's overall market position (54:95). Verzariu maintains that, in successful countertrade agreements, the partners perceive that "the expected benefits outweigh the transaction's liabilities" (119:66). Main says that success is "gaining the benefits of an alliance without succumbing to its dangers" (70:122). Welt implies that those countertrade proposals that are implemented can be considered success (122:29).

The author who writes on international joint ventures takes a more structured approach. In his study, J. Michael Geringer uses three objective measures of performance-stability, survival and duration. Survival was measured based on whether the venture had survived from the time of its formation until 1988 when he conducted his study. Stability was measured based on whether there were changes in the division of equity since the venture's formation. Duration was measured based on the number of years between the venture's formation and either its termination or the collection of the data, whichever came first. He also uses a subjective performance measure in which respondents were

asked for their assessment of their firm's satisfaction with the venture's overall performance. He concludes that there were positive and significant correlations between the subjective and objective performance measures and implies that a subjective measure is both adequate and appropriate (43:254-255).

Farr, who addresses the success of international cooperative projects, also takes a structured approach. He cites six formal criteria and two informal criteria to be used to classify international cooperative projects as successful or unsuccessful. The formal criteria are cost performance, schedule performance, technical performance, achievement of offset goals, withdrawal of dissatisfied partners, and termination of program (for negative reasons). The informal criteria are client/user satisfaction and partner consensus. He goes on to say that client or user satisfaction "may in fact be the eventual measure of success for any program" (26:185).

Two common themes recur throughout the literature when discussing the definition of success. The first theme is that success is a subjective judgment of the parties involved. The decision as to whether an offset agreement is a success must be made by those parties and can vary depending upon the parties involved. The second theme focuses on survival of the offset agreement. This can be viewed in the context of the two phases of offsets discussed earlier. Survival in the first phase (development and

implementation) is reflected by the final signed agreement between the two parties. Survival in the second phase (execution) occurs when the terms of the offset agreement have been fulfilled. Therefore, for the purposes of this research, success of an offset agreement is defined as the implementation (phase 1) and execution (phase 2) of an offset agreement in such a manner that all parties to the agreement are satisfied with the results.

Success Factors

Factors Related to Buyers. International experience of the buyer is mentioned as an important factor by three authors. Farr asserts that both management experience and international experience are critical to the success of international cooperative projects (26:192). Lecraw focuses specifically on countertrade experience. He says that "countertrade is more successful the greater the importer's countertrade experience" (66:51). Verzariu agrees with Lecraw that successful completion of a countertrade agreement depends on "acquaintance with compensatory practices by both trading parties" (119:77).

Four authors indicate that countertrade or joint venture agreements will be more successful if the buyer is not a potential competitor for the seller. Three of the studies in which this factor is mentioned are qualitative studies; one is quantitative. Main advises potential countertraders not to choose a partner "who competes head-on

with you" (70:122). Jacques Rostain, vice president and manager of trading with Combustion Engineering Trading, Inc., says that his company considers it critical for successful countertrading to handle products that are "noncompetitive and complementary" to its own products (95:58). Geringer suggests that there should be a "middle level of dependency between the two partners" in international joint ventures so the partners cannot use "newly acquired capabilities against their former allies" (44:56). Neale, Shipley, and Dodds, the authors of the quantitative study, found that about half (49-52%) of the responding countertraders in the United Kingdom and Canada considered "customer becomes potential competitor" as an important problem encountered in international countertrade (77:29). This factor is reasonable since sellers would not be likely to want to share technology with nor buy products from a potential competitor.

Six authors include technical experience of the buyer in their lists of success criteria and one author disagrees. Four of the authors focus on offsets. Weida asserts that one of the key elements in success is "the availability of local expertise" (121:81). Pompiliu Verzariu, chief of the Barter and Countertrade Division of the International Trade Administration, and author of Countertrade, Barter and Offsets: New Strategies for Profit in International Trade, says that one of the preferred characteristics of international joint projects is that the technology is

"within the importer's assimilation capability" (119:98). Francis believes that the "recipient of off-set benefit should have the required technical capabilities" (35:28). Bailey hypothesizes that the ability of the buyer to share technology is an important factor in the implementation of an offset agreement (10:141). However, he found that this factor was not a significant discriminator between implemented and nonimplemented agreements. There are several possible explanations for Bailey's finding. First, his sample included a wide variety of codevelopment programs and coproduction programs that spanned the years from 1952 to 1978. During the early years, most of the international projects of this type involved licensed production of already developed systems for the buyer's own use and thus the capability of the buyer to use technology would not have been as important a factor as it is in programs where development and production are shared by the parties or where the products of the technology will be sold to third parties. Second, Bailey used subjective information to measure this variable. He says that it was based on "Department of State determinations, information in the trade journals and agreements executed in the offset agreements" (10:170-171). There may have been problems with his subjective assessment of this variable. Farr contends that joint cooperative projects in which the partners have experience with the technology are more successful than those in which they don't (26:192). Geringer suggests that,

in selecting partners for international joint ventures, a critical success factor is the technical skill of the employees (45:51).

Geringer and Bailey list the availability of financial resources for the buyer as a condition of success. According to Geringer, a partner in an international joint venture must be able to "generate sufficient financial resources to maintain the venture's efforts" (44:57). This is almost a truism. Nevertheless, Bailey's related hypothesis, that the "ability of the recipient to meet financial obligations under the agreement" would be a significant discriminator between implemented and nonimplemented agreements, was not supported (10:141). Bailey admits that it was difficult to determine how to measure this variable. He finally settled on "the acceptance of a sales agreement rather than grant aid by the Department of State" (10:171). This could explain why the variable was not a discriminator. Grant aid would change the source of the financing but not the ultimate payment to the contractor.

The last factor related to the buyer, a stable environment in the buyer's country, was mentioned by Verzariu and Bailey. Verzariu suggests that an important factor for success of an international project is "the host government is stable and has good relations with the Western exporter's government" (119:98). Bailey's "internal stability of recipient country" variable was not a

significant discriminator between implemented and non-implemented offset proposals (10:141). A potential explanation for his finding is that he classified countries as stable or not stable based on his assessment of whether certain subjectively defined societal factors were present. A different researcher may have looked at the same data at the same time and then came to a different conclusion.

The foregoing discussion suggests six buyer-related factors to be included in the framework. These six factors are recapped in Table 2.

TABLE 2

BUYER RELATED FACTORS

| FACTOR | AUTHORS |
|---|---|
| International Experience | Farr; Lecraw; Verzariu |
| Offset Experience | Lecraw; Verzariu |
| Not Viewed as Competitor | Main; Rostain; Geringer; Neale et al |
| Technical Experience | Weida; Geringer; Verzariu; Francis; Farr; Bailey |
| Sufficient Financial Resources | Geringer; Bailey |
| Stable Environment | Verzariu; Bailey |

Factors Related to Sellers. Four authors mention common goals or objectives as a prerequisite for success. Verzariu says success in countertrade and offsets depends on the "matching of ...commercial objectives" (119:77). According to Gomes-Casseres, "partners in a joint venture

need to have compatible goals" (48:20). Two of the authors express this idea in very strong terms. The results of Farr's research highlight "that the relationship of harmonized requirements to project success is overriding and vital" (26:195). In his study, the six successful projects all had harmonized goals and requirements while the eight less than successful projects did not. Geringer agrees with Farr. He considers this factor so important that he states that even if the performance of an international joint venture is satisfactory in other ways, "divergence of corporate goals ... can lead to a venture's downfall" (44:59).

Lecraw was the sole researcher to suggest a link between success and voluntary as opposed to mandatory countertrade arrangements (66:51). His hypothesis was not supported. This may be due to the fact that, according to most of the authors, little countertrade is strictly voluntary. Most countries now have either mandatory countertrade and offset policies or unofficial policies that strongly encourage countertrade and offsets.

The idea of voluntary countertrade is related to the use of a proactive strategy. Adoption of such a strategy is listed as a criterion for success in five of the articles reviewed. Weida says future success in offsets depends on "operating in a pro-active mode" (121:159). The remaining four authors all discuss a proactive strategy for countertrade activities. Hennart suggests that

"anticipating countertrade demands may reduce the cost of accepting countertrade obligations (52:75). Neale, Shipley, and Dodds state that "a proactive strategy enhances countertrading efficiency and marketing effectiveness" (77:31). Schaffer says companies should "think countertrade" in their business development (97:196). Although companies may be forced to countertrade or negotiate offset deals because of the competitive environment and the mandatory policies of some countries, a proactive strategy permits more flexibility and control in the negotiations and thus may lead to successful agreements from the seller's perspective.

Closely related to a proactive strategy is the suggestion to establish an in-house offset group rather than relying on outside sources. Golden suggests that any U.S. aerospace company that wants to be successful in offset arrangements "should concentrate its offset efforts in an in-house offset group" (47:65). Carter and Gagne recommend a separate "multifunctional" countertrade department with "clear leadership" (14:34). Neale, Shipley, and Dodds imply that an in-house group is necessary to protect the confidentiality of a firm's countertrade information (77:32). In another study by Shipley and Neale, sixty percent of the respondents said they were engaging in more countertrade because they had "more in-house expertise" (101:334).

The international experience of the seller is important to success in the view of five authors. As stated earlier, Verzariu believes both parties must not only have international experience but also experience with compensation-type agreements (119:77). Welt asserts that "Western companies that successfully conclude profitable countertrade deals are generally those with broad international trade experience" (122:29). Fraser and Hite state that "with experience, firms appear to have learned to countertrade more efficiently" (36:105). In the only quantitative study that mentions this factor, Lecraw finds support for his hypothesis that "countertrade is more successful the greater the producer's export and countertrade experience" (66:51). Farr finds that the "presence or absence of appropriate management skills and experience was a clear and consistent discriminator between successful and less than successful projects" (26:193).

Four researchers suggest that large producers are more likely to find success in countertrade and offset deals than are smaller companies. In a lengthy discussion on sellers, Weida suggests that prime contractors stand to gain more from offset deals because they have more control in contract negotiations and can coerce subcontractors to assume part of the prime's offset obligations if they expect to win the subcontract (121:131-135). Schaffer attributes their advantage to "sourcing capability", "capital for investment" and "a richer variety of technologies to choose from"

(97:8). Geringer says that international joint ventures "have the best chance of long term success if both parties are comparable in sophistication and size, preferably large" (44:58).

The next seller-related factor, commitment to the project, is mentioned by four authors. Bailey found that "formal commitment for development/production" was the most significant indicator for implementation of offset agreements (10:141). In his study agreements were considered to have formal commitments if they were implemented or if they were canceled before implementation but after another form of formal commitment (10:169). Geringer says that a "partner's perceived trustworthiness and commitment ... are pivotal considerations" in the success of a long term joint venture (44:61). Meyer asserts that "staying power is crucial" in all types of international business transactions (72:39). Farr found that "strong commitment and clear user support are vital whenever the success of a project is challenged" (26:189).

The factor which was mentioned most often, top management support in the seller's company, is also related to a proactive strategy. In discussing General Dynamics' success with offsets, Schaffer says "the persistent attention of management has been critical to the offset department's success (97:45). Welt states that a company's countertrade objectives "should be formulated by top management" (122:82). Alexandrides and Bowers maintain that

such support is "vital" (7:71). Iaia-McPhee and Maerowitz believe that one of the first steps in setting up a countertrade strategy is "to obtain the support and commitment of senior management" (54:103). Neale, Shipley, and Dodds say a "positive approach and strong support by top management" is the first requirement in countertrade (77:30). Carter and Gagne carry it one step further by suggesting that support is essential not only from top managers "but also from functional-level managers throughout the firm who will be affected by countertrade" (14:33). In his study, Farr found that one of the management characteristics which distinguishes successful international cooperative projects from unsuccessful ones is the vesting of authority in "a single manager with overall program authority" (26:190-191). The prior discussion includes eight factors related to the seller which can be added to the factors framework. These factors are recapped in Table 3.

Factors Related to the Contract. Mcvey, Weida, Francis, and Welt all agree that any offset deal which includes a counter-purchase requirement should include a contract clause that permits the seller to transfer his obligations to a third party. Weida and Francis both state this position strongly. Weida says that "any properly negotiated offset contract" will contain such a clause (121:80). Francis says that "specific reference must be made" to the seller's right to transfer his obligations (35:65). McVey and Welt agree but do not use such strong

TABLE 3

SELLER RELATED FACTORS

| FACTOR | AUTHORS |
|---|---|
| Compatible Goals | Geringer; Verzariu; Gomes-Casseres; Farr |
| Proactive Strategy | Hennart; Neale, Shipley and Dodds; Schaffer; Weida; Carter and Gagne |
| In-house Offset Group | Carter and Gagne; Weida; Golden; Neale, Shipley and Dodds |
| International Experience | Verzariu; Welt; Fraser and Hite; Lecraw; Farr |
| Offset Experience | Verzariu; Fraser and Hite; Lecraw |
| Large Company | Schaffer; Geringer; Weida |
| Commitment to Project | Geringer; Meyer; Farr; Bailey |
| Top Management Support | Welt; Schaffer; Alexandrides and Bowers; Iaia-McPhee and Maerowitz; Neale, Shipley and Dodds; Carter and Gagne; Farr |

terms. McVey says this type of clause is "desirable" (71:89) and Welt says the contract should include the clause (122:47).

Five authors suggest the importance of using separate contracts for the sale of the goods and the offset or countertrade obligations. Verzariu (119:27) and Welt (122:41) cite greater flexibility in financing and payments as the principal advantage of dual contracts. Alexandrides

and Bowers imply that obtaining insurance is easier with separate contracts because the risks are substantially different (7:93). Rostain suggests that two contracts are needed to avoid "legal technicalities" (95:56). In addition to these reasons, Francis asserts that separate contracts are necessary because of the different time frames for the obligations (35:60). The absence of this factor in more recent literature implies that dual contracts have become standard practice. In fact, in the purchase of military hardware through the Foreign Military Sales program, separate contracts are required by DOD.

A relationship between the size of the sale and the success of the arrangement is suggested by three authors. Rostain says his company, Combustion Engineering Trading, Inc., a frequent participant in countertrade deals, prefers larger contracts because there is as much time and energy spent on negotiating small contracts as there is on large contracts (95:57). Lecraw hypothesizes that "countertrade is more successful the larger the size of each sale" (66:51). His hypothesis was supported.

Four authors mention a long payback period for obligations as a success factor. Welt advises firms to "press for as lengthy a period as possible" (122:43). Francis says the "basic principle is to negotiate long and discharge short" (35:61). Rostain says his company likes a longer timeframe to allow them more flexibility (95:57). As suggested by Lopez in the discussion on impacts on the U.S.

trade balance, another reason for a long payback period is that the value of the offset is less in relation to the value of the sale because of the effects of inflation (68:61).

The negotiation of low penalty clauses is the final factor related to the contract. According to Weida :

> originally, most offset agreements contained a 'best efforts' clause which stated that the private firm would make its best efforts to purchase as offsets those products of the country which were competitive in both price and quality. (121:77)

These "best efforts" clauses have been, for the most part, replaced by penalty clauses which require the seller to pay a penalty if the countertrade obligations are not fulfilled in accordance with the contract. This factor is mentioned by Rostain, Welt, and Schaffer. Rostain suggests a range of five to ten percent (95:57) and Welt suggests five to fifteen percent (122:31). Schaffer believes penalties should be kept as low as possible. Rostain suggests that no matter what the penalty is, companies must make every effort to meet their offset obligations or they may be restricted from future business with the country to whom they paid the penalty (95:57).

This discussion on contract-related factors suggests the addition of five factors to the framework. These factors are recapped in Table 4.

TABLE 4

CONTRACT RELATED FACTORS

| FACTOR | AUTHORS |
|---|---|
| Transferability of Obligations | McVey; Weida; Francis; Welt |
| Dual Contracts | Verzariu; Welt; Alexandrides and Bowers; Rostain; Francis |
| Large Dollar Value | Rostain; Lecraw |
| Long Payback Period | Welt; Francis; Rostain; Lopez |
| Low Penalties | Rostain; Welt; Schaffer |

Factors Related to the Product. Four of the authors support mature technology as a success factor. In the earlier discussion on technology transfer, Storer, Weida, and Schaffer all imply that companies avoid transferring state-of-the-art technology. Thirty-seven percent of the respondents in Shipley and Neale's 1988 study mention the "disposal of declining products" as one of the benefits of countertrade (40:332).

Three authors mention the complexity of the product as an important factor. Verzariu cites "uniqueness of the exporter's technology" as a factor in the success of compensation-type international agreements (42:77). Francis also believes the success of a countertrade deal depends on the "uniqueness of the company"s technology" (10:28). Finally, Lecraw finds support for his hypothesis that

"countertrade is more successful the more complex the export product" (22:51).

Lecraw suggests an additional product-related factor. He hypothesizes that "countertrade is more successful the higher the 'visibility' of the export product in the importing country" (22:51). This hypothesis received support in his study. It is also supported by intuition. A highly visible product would imply that there is a perceived need in the country for the product. Thus, the seller's power should be increased relative to the buyer.

The discussion above provides three more factors for the framework. These factors are recapped in Table 5.

TABLE 5

PRODUCT RELATED FACTORS

| FACTOR | AUTHORS |
|---|---|
| Mature Technology | Storer; Weida; Schaffer; Shipley and Neale |
| Complex Product | Verzariu; Francis; Lecraw |
| High Visibility of Product | Lecraw |

Conclusion

Twenty-two factors were identified in the review. Of these factors, six apply to characteristics of the buyer, eight apply to characteristics of the seller, five apply to characteristics of the contract, and three apply to characteristics of the product. They are summarized in

Table 6. The following chapter will introduce the facts surrounding the Korean Fighter Program (KFP) and Chapter VI will address the KFP in terms of the 22 factors identified in this chapter.

TABLE 6

FACTORS AFFECTING SUCCESS OF OFFSET AGREEMENTS

| |
|---|
| **Buyer-Related** |
| International Experience |
| Offset Experience |
| Not Viewed as Competitor |
| Technical Experience |
| Sufficient Financial Resources |
| Stable Environment |
| **Seller-Related** |
| Compatible Goals |
| Proactive Strategy |
| In-house Offset Group |
| International Experience |
| Offset Experience |
| Large Company |
| Commitment to Project |
| Top Management Support |
| **Contract-Related** |
| Transferability of Obligations |
| Dual Contracts |
| Large Dollar Value |
| Long Payback Period |
| Low Penalties |
| **Product-Related** |
| Mature Technology |
| Complex Product |
| High Visibility of Product |

## V. Case Analysis of the Korean Fighter Program

### Chapter Overview

This chapter provides a comprehensive case study of the Korean Fighter Program (KFP) and the offset proposals developed by the two U.S. firms competing for this program. It begins with background information on the buyer, South Korea, also known as the Republic of Korea (ROK). This background information will include discussions of the history of the country, its current political, economic and social environment, its relationships with North Korea and the United States, a history of defense purchases from the U.S. and related offsets and its efforts to develop its own defense industry. Next, the two U.S. firms involved in the competition will be discussed. This discussion will include a background on the companies, their offset policies and practices, and the aircraft being offered for sale under the program. Finally, the selection process will be addressed. This final section will include discussions of U.S. and ROK government participation, the offset proposals submitted for the program, the original decision made by ROK and the subsequent reevaluation and reversal of the decision.

### The Republic of Korea

History. The 1000 kilometer long Korean peninsula is located in northeast Asia and is surrounded by the East Sea, the Yellow Sea, China, Russia, and Japan (4:13). According

to archeological findings, early man first inhabited the Korean peninsula 500,000 years ago (4:46). Since the third century B.C. the peninsula has been the target of a number of invasions by foreign armies including the Chinese, Russians, and Japanese. The last of these resulted in the 1910 annexation of the Korean peninsula by Japan (4:56-59).

With the defeat of the Japanese in World War II, the peninsula was partitioned with the US controlling the southern portion and the Union of Soviet Socialist Republics (USSR) controlling the northern portion. This new occupation prevented the Koreans from regaining control of their country and establishing an independent government. The result was a peninsula divided at the 38th parallel into two countries with competing political ideologies ("democracy" in the south and communism in the north). This occurred in 1948 when the ROK (the US portion) and the Democratic People's Republic of Korea (DPRK-the USSR portion) were established. At that time (1948), both the US and USSR withdrew their respective occupation forces (4:112-113).

Both the ROK and DPRK desire a reunified Korea, but each wants to control this unified Korea under their own style of government. In June 1950, the DPRK attacked the ROK in an effort to reunite the peninsula by force. At the ROK's request, the United Nations (UN) issued both a resolution ordering the DPRK troops back across the 38th parallel, and a call for military support for the ROK. The

Korean War had begun. In October 1950, the Chinese joined forces with the DPRK against UN forces comprised mainly of the ROK and the US. In July 1953, after two years of talks, a cease-fire was declared and the hostilities ceased (4:113-114).

The war had a devastating effect on the peninsula as a whole and set the stage for a stand-off between DPRK forces and ROK-US forces that continues today. No peace treaty was ever signed and the two nations have remained in a state of war readiness since 1953. Any hopes of peaceful reunification have been continually dashed by hostilities and the long-term support of China (and later Russia) for the DPRK and the US for the ROK. This conflict became the Cold War personified, pitting the forces of communism against those of democracy (67:27).

ROK has gone through extensive changes economically and politically since the end of the war. A number of leaders have come into power via elections or military coups. The situation in the ROK stagnated until Park Chung Hee came to power in 1964 (4:115-116).

President Park was instrumental in introducing many reforms into the ROK. These include the Yushin (Revitalizing Reforms) system and the Saemaul (New Community) Movement. The Yushin Reforms were implemented as a way to strengthen ROK by creating a national identity among its citizens and were applied to economic, social, and political activities (87:50). The Saemaul movement was a

"pan-national movement designed to conquer poverty without outside help so as to build a more affluent Korea" (87:68).

The ROK flourished under these programs until President Park was assassinated in 1979 (4:117). Park was succeeded by Choi Kyu-hah who served as president during a "difficult period characterized by political, social and economic instability" (4:117). In August 1980, less than a year after taking power, Choi resigned and Chun Doo Wan was selected president by the ROK electoral college. Under Chun's rule, the constitution was revised to allow for "the direct election of the president to a single five-year term and the curtailment of his powers" (4:259). In 1987, Roh Tae Woo became the first ROK president to be elected by popular vote.

Current Environment. Prior to 1987, when the latest version of the South Korean constitution was adopted and the Sixth Republic was born, authoritarian rule prevailed. Now democracy is "sinking ever-deeper roots in South Korea" (116:275). According to Article 1 of the 1987 constitution, "the nature of the Republic of Korea is defined as democratic, and sovereignty is vested in the people" (4:259). The president and two-thirds of the members of the National Assembly are elected by popular vote. The remaining Assemblymen are chosen at large. The president serves a single five year term and the Assemblymen are elected for four year terms.

In the March 1992 National Assembly election, President Woo's Democratic Liberal party won 159 of the 299 seats in the Assembly. The remaining seats were won by members of opposition parties (32:23). The new Assembly was inaugurated in late June 1992. However, the newly elected legislature has not yet met because of "discord among the three parliamentary caucuses over the timetable of the mayoral and gubernatorial elections" (32:23). The local elections were to have been held by June 1992, six months before the December presidential election.

One of the candidates in the December election is Chung Ju-Yung, the founder of the Hyundai Group, who established his own political party (the Unification National Party) in February 1992 and who accuses President Woo of "ruining the economy" (76:50). His newly established party won 32 National Assembly seats in the March election. Thus far his campaign has focused on methods to improve the faltering South Korean economy (79:52) and reduce governmental interference with business firms (46:47). Another candidate is Kim Yong-sam, executive chairman of the ruling Democratic Liberal Party. His economic goals for the country include: "reducing the amount of government regulation," stabilizing "the growth in the consumer price index at 3 percent annually," and returning "the international balance of payments to a surplus within two years" (31:22-25).

Improving the state of the ROK economy will be a formidable task for the winning candidate. There has been

rapid economic growth in the years since military rule ended in 1987 (GNP has risen from $94 billion in 1986 (1:9) to $272.7 billion in 1991 (99:60)). However, current economic indicators for the ROK do not look promising. According to International Monetary Fund financial statistics, the inflation rate at the end of 1991 was about 9% (57:312) and the current rate is reported at 15% (79:52). In comparison, the inflation rates during the 1974-75 and 1980 U.S. recessions were 11 and 13.5 percent, respectively (89:488-489). In a recent telephone survey of 500 South Koreans, almost half (48.8%) believe the economy will get worse in the latter half of 1992 and more than three-quarters (77.8%) expect further price increases (33:18).

The high inflation rate can be tied to demands by workers for higher wages which have driven prices up. Monthly wages have more than doubled since 1985. According to one author, "average real wages...are increasing faster in Korea than in perhaps any previous industrialization, including that of Japan" (8:51). In many cases, the increased wages came about because of worker strikes fueled by a desire for "a greater share in the nation's economic success" (64:201). The mid-1980's were marked by "several thousand labor-management strikes and disputes and...student rioting on campuses and in congested street areas" (74:419). According to Alice Amsden, the "militance of students and workers has been the main force pushing Korea toward a more democratic political life" (8:53).

Relationship with North Korea. As mentioned previously, both the ROK and the DPRK have always longed for a unified Korean peninsula. This desire was played upon by both the US and the USSR during the Cold War in an effort to gain control of the peninsula for their own political ideologies. With the end of the Cold War between these two superpowers, this outside influence over the conflict has lessened significantly. However, the fact remains, as stated by US Secretary of State James Baker, "the heavily armed standoff on the Korean peninsula is still one of the world's most dangerous flashpoints, a confrontation now intensified by the ominous threat of nuclear proliferation" (11:3).

Some experts believe reunification is a real possibility. They contend that the differences between the two countries are superficial and can be overcome by thousands of years of collective cultural and national heritage (91:10). Others point to the progress made in the last few years by the two countries in dealing with each other, dealings which culminated in two important bilateral agreements which were signed in December 1991 and put into force in February 1992. The first is a non-aggression pact and the second is a nuclear nonproliferation pact (90:37 and 116:275). According to testimony before the Senate Foreign Relations Committee in March 1992, "subcommittees on military matters, political matters, and economics and exchange have already begun meeting under the reconciliation

agreement, and the two sides have formed a joint nuclear control commission ...under the non-nuclear agreement" (116:275). In addition, both countries have been closely studying the events in Europe surrounding the reunification of Germany with the hopes of learning from the German experience (124:126-127).

There are, of course, factors that make the possibility of reunification seem remote. The DPRK "remains the world's most militaristic society" (16:37). DPRK has chemical and biological weapon capabilities and is believed to be near completion of nuclear capability (16:38). While ROK, with the US as their ally, maintains a technological superiority over DPRK, the DPRK has numerical superiority in manpower (1.6:1), tanks (2.5:1), and artillery (2.1:1) (16:37). There is also the belief by some that DPRK has been cooperating with ROK simply to buy time until they complete their nuclear weapons programs (90:37).

Some experts predict that reunification could create a very powerful nation. A unified Korea would have a population of over 70 million, a huge military, and a very strong economy (37:97). Reunification would cost an estimated $10 billion dollars over 10 years, but would result in an estimated annual savings of $7 billion per year in reduced defense expenditures (124:132). In fact, just normalizing relations between the two countries may result in an economic boom. If this situation were to occur, the Korea Institute for Economics and Technology estimates

direct bilateral trade of over $1 billion in the first year, reaching up to $10 billion per year by the end of this decade (124:131).

Relationship with the U.S. The US currently has approximately 41,500 military personnel in the ROK, but has announced its intention to reduce the forces deployed there because of U.S. budget cuts and the loosening of tensions due to the end of the Cold War (16:36). The ROK has already started shouldering more of the burden of defense. ROK's portion of the cost for US forces based in the ROK has risen from $70 million in 1989 to $150 million in 1990 (21:198).

The US does not plan to completely withdraw its forces from the ROK until the threat from the DPRK no longer exists. The importance to U.S. security of the tensions on the Korean peninsula is illustrated by the fact that two of the seven scenarios in the 1994-1999 defense planning guidance involve a DPRK invasion of the ROK (112:8). In the first scenario, "under cover of a peace initiative, North Korea launches a surprise attack aimed at reunifying the peninsula by force" (40:1). The second scenario involves North Korea attacking South Korea while the U.S. is trying to defend Kuwait from another invasion by Iraq (112:8). The long-term US hope is that the ROK and other countries in the region will shoulder more of the responsibility for their own defense. Secretary Baker has said, "guaranteeing stability on the Korean peninsula may increasingly assume a multilateral form" (11:5).

The extent of the current arms trade relationship between the U.S. and ROK is evidenced by the FY 1992 Congressional Presentation for Security Assistance Programs. This document indicates that $300,000 in International Military Education and Training funds were requested for the ROK for FY93 (21:10). In addition, the actual 1991, the estimated 1992, and the estimated 1993 Foreign Military Sales and Construction Sales Agreement figures were reported as $449 million, $3.2 billion, and $250 million, respectively (21:47). Actual and estimated deliveries of Commercial Export License or Approved Under the Arms Export Control Act items for the same three periods were $555.8 million, $1.502 billion, and $901.4 million, respectively (21:51).

The ROK currently "ranks with Australia, Japan and Taiwan as a leading market ... for U.S. exports of arms and military-related equipment" (114:132). It has long been a major recipient of U.S. military aid and technology transfers. The U.S. willingness in the past to extend aid and transfer technology was partly due to ROK's "direct assistance to the U.S. war effort in Vietnam and its longstanding importance in U.S. containment strategy in Asia" (50:25).

Trade in arms represents only a fraction of the total trade between the U.S. and the ROK. In 1990, the ROK exported $14 billion worth of goods to and imported $18 billion from the U.S. In that same time frame, ROK

investment in the U.S. was $1 billion while U.S. investment in the ROK was $2 billion (16:36). The volume of U.S. exports to and U.S. investment in the ROK will probably continue to increase because of the recent loosening of tight ROK controls, allowing more imports and foreign participation in their economy (75:46).

South Korea's Ministry of Trade and Industry is the government agency responsible for monitoring and controlling trade, issuing export licenses and setting import policy. It is considered the second most important ministry after the Ministry of Finance (20:47). United States-ROK trade relationships are defined in the Treaty of Friendship, Commerce, and Navigation, which was signed on November 28, 1956. In this treaty, both nations agree to extend to each other "national treatment" and "most favored nation" privileges (20:40-41). "National treatment" specifies that each country will "treat foreign participants in its economy just as it treats domestic companies" (93:134). "Most favored nation" treatment specifies that "each country will treat the citizens and products of the other country with no less favorable terms than they treat the people and products of third nations" (20:41). Many consider mandated offsets to be a violation of the spirit of free trade on which these principles are founded.

Defense Purchases from the U.S and Offsets. Before 1984, offsets were not mandatory in South Korea. Since 1986, however, the official ROK position on offsets is to

"require a minimum of 50 percent offsets for major purchases of foreign weapons and systems. Since about 1987, though, Korea has unofficially required only 30 percent offsets for purchases from American defense contractors" (117:7-8). These offset guidelines apply to all sales over $1 million (62:35). Actual offsets from U.S. companies to Korean companies from 1980 through 1987 reportedly amounted to 46 percent of the value of the sales (55:53). Table 7 shows how Korea ranks in comparison to other countries in this respect.

TABLE 7

U.S. OFFSET OBLIGATIONS FOR 1980-1987

| COUNTRY | OFFSETS AS PERCENTAGE OF SALES |
|---|---|
| Britain | 105.3% |
| Canada | 78.1% |
| Egypt | 22.9% |
| Israel | 22.8% |
| NATO group | 48.0% |
| South Korea | 46.2% |
| Spain | 132.5% |
| Sweden | 173.8% |
| Switzerland | 67.0% |

(55:53)

Major past ROK defense purchases from the U.S. which have included offsets in the form of either coproduction or licensed production of U.S.-designed and developed weapon systems include:

1. the assembly of F-5E and F-5F aircraft by an affiliate of Korean Air in collaboration with Northrop;
2. the assembly of MD500 helicopters by an affiliate of Korean Air in collaboration with McDonnell Douglas;

3. the assembly of the 5.56 mm Colt M-16 rifle by the State Arsenal in Pusan, South Korea;
4. coproduction of the M167A1 Vulcan anti-aircraft gun between the Daewoo Corp. and General Electric; and
5. assembly of the U.S. 155 mm and 105 mm howitzers by KIA Machine Tool Corp. (114:132)

Since the early 1970s, the majority of South Korea's requests for licenses to manufacture or coproduce U.S.-designed weapons have been approved. Table 8 contains a list of "weapons produced in whole or in part in Korea as a result of coproduction, licensing, or technical agreements with the U.S. government and U.S. defense contractors" (50:22).

Development of ROK's Defense Industry. The almost total past reliance on U.S.-made arms has prompted the ROK to look at ways to develop its own defense industry. Until the late 1960's, "there was virtually no defense industry in South Korea" (53:965). Since then the ROK has "embarked on a major program to modernize its armed forces and develop an industrial base that can support those forces in the future" (105:176). They are planning development of an indigenous trainer, light transport, and helicopter design capability (9:57).

According to a 1991 report in Jane's Defense Weekly, the South Korean defense industry currently comprises 83 firms with "11 in the infantry weapons sector, nine in ammunition, 10 in mobility equipment and logistics, 12 in communications, six in warship and naval systems, three in aircraft...and 32 in other related areas" (53:965). These

TABLE 8

WEAPONS MADE IN KOREA

**Guns and howitzers**
- M-101A 105mm towed howitzer
- M-109 155mm self-propelled howitzer
- M114A1 155mm howitzer
- M198 155mm towed howitzer
- Vulcan 20mm gun
- 60 and 81mm mortars
- M-60 machine gun
- M40A1 106mm recoilless rifle
- M-16 rifle

**Ammunition**
- M549 155mm projectile
- 8-inch projectile
- 81mm cartridge
- 20, 30, 40, and 90mm ammunition
- 5.62mm, 7.62mm ammunition for M-60 machine gun
- 50 caliber ammunition

**Aircraft**
- H-76 Eagle helicopter
- Hughes MD500 helicopter
- Northrop F-5E/F fighter plane
- McDonnell Douglas F/A-18 fighter

**Missiles**
- Nike-Hercules surface-to-surface missile
- Honest John unguided tactical missile
- Hawk anti-aircraft missile

**Other**
- M-18A1 antipersonnel mine
- M79 grenade launcher
- AN/PRC-77 tactical radio
- various fuzes, explosives, and mines

(50:22)

firms employ about 45,000 people (114:131) and have an average dependency on defense products of 10.85 percent(53:965). This compares with 43 percent dependency for U.S. firms and 45 percent for European firms included in

a Defense News listing of the top 100 worldwide defense firms (28:16).

Like the defense industry in the U.S., the ROK defense industry is dominated by a few large corporations (known as the Chaebol) who manufacture most of the weapons produced in South Korea with many smaller companies acting as subcontractors. The most well-known of the Chaebol include Samsung, Daewoo, Hyundai, and Lucky Goldstar (114:131). The top ten defense industries in Korea account for about 64 percent of the total defense sales (53:965). In the U.S., the top 20 firms "capture around 50 percent of the DOD dollars each year" (39:244). The ROK defense firms "have operated at below 60 percent capacity for most of the period after 1984" (115:112).

The ROK government is closely involved with the production of weapons by these firms and gives special treatment to them. This special treatment includes low interest rate loans, elimination of tariffs and quotas on imports of production items, and exemptions from the military draft for employees. Research and development for weapons is carried out by the Agency for Defense Development (ADD) with the companies producing "prototypes based on ADD designs" (114:131). The ADD is also responsible for "planning, facilitating and quality control" of the ROK defense industry (53:965). The ADD has selected 15 core technologies which are targeted for development. These are

automation, laser, high-sensitivity radar,

> sensors, simulations, ultra-small integrated electronic circuits, advanced propulsion technology, CBR (chemical, biological, and radiological) warfare, optimum design, new materials, remote sensing, special powder, signal reduction, fiber optics, and military integrated information and communications systems. (34:36)

Some of these technologies have also been identified by the U.S. Department of Defense as critical technologies. The eight primary areas selected by DOD are "air-breathing propulsion, composite materials, machine intelligence/robotics, passive sensors, photonics, semiconductors, sensitive radars, and superconductivity" (5:37). According to Alice Amsden, "late industrializers" like South Korea often

> borrow technology from other countries and figure out how to use it more effectively. Small firms study foreign machinery and technical manuals, as well as attend trade shows. Large companies buy technical assistance from equipment suppliers and hire retired former engineers as consultants. (8:48)

Because of this tendency to borrow technology, the ROK emphasizes the level of technology transfer in coproduction and licensed production arrangements.

ROK plans are to build a defense industry which is geared toward both domestic and export needs and is integrated with their overall economic strategies (91:17). The overall economic development strategy includes plans for development of a commercial aerospace industry. According to William Hartung in a 1990 article in The Bulletin of the Atomic Scientists, "military procurement, and the strategic use of offset and coproduction arrangements with foreign

companies, are important components in Korea's drive to create a viable aerospace industry" (50:20). In May 1985, ROK established an Aerospace Industry Development Committee to "promote and guide the development of Korea's aerospace industry" (117:5).

The Republic of Korea air force (ROKAF) has been the driving force behind the modernization of the armed forces. The author of a June 1989 article in Aviation Week and Space Technology asserts that "as more and more emphasis is placed on technological and industrial growth, the level of air force influence in military decision-making also will grow" (38:191). ROKAF 2000, the air force's long-range modernization plan "calls for the production of several generations of fighters, leading up to an entirely indigenous Korea fighter by the year 2004" (50:20). Many experts feel that ROK plans are overambitious but agree that ROK could develop into "a significant producer of aircraft parts and components in the world market" (117:4).

## The Companies and Their Aircraft

McDonnell Douglas and the F/A-18 Aircraft. McDonnell Douglas' (MDC) 1991 revenues were $18.4 billion of which $9.1 billion was in contracts with federal agencies. That made it 1991's top U.S. government contractor "based on prime contracts of $25,000 or more for all federal agencies" (103:18). McDonnell Douglas has held the top spot for five straight years. It also holds the top spot in contracts

with DOD and is number two with respect to the dollar value of foreign military sales (103:67). Approximately 52 percent of McDonnell Douglas' business is in domestic and foreign defense contracts (27:10). Some experts believe that McDonnell Douglas may slip in future rankings because of the cancellation of the A-12 program and the winding down in production of the F-15 fighter, the AH-64 Apache helicopter and the AV-8B Harrier jump jet (102:58-59). Others believe there is no near-term likelihood of another firm supplanting MDC because "the company is involved in three of the main U.S. military production programs planned for coming years, the C-17 strategic transport, the F/A-18E/F attack aircraft and the T-45 trainer" (27:10). It has also recently sold F/A-18 aircraft to Switzerland (34 aircraft) and Finland (64 aircraft).

McDonnell Douglas has an International Business Center which was created in 1980 and which serves as the company's in-house group for implementation of offsets. It is "staffed with experienced professionals and concentrates in several areas: aerospace and electronics, export development, foreign investment work, commercial technology development, and other diversified activities" (111:167-168).

McDonnell Douglas has been involved in many arrangements with foreign customers that required offsets. In the April 1980 selection of the F/A-18 over the F-16 as Canada's new fighter aircraft, offsets played a major role.

In that program, MDC'S offset proposal amounted to about 110 percent of the value of the sale (25:35). The following year, Australia also selected the F/A-18 over the F-16 and the Mirage 2000. Offsets in that program amounted to about thirty-three percent (25:37). In the 1982 sale of the F/A-18 to Spain, MDC and its major subcontractors agreed to offsets equivalent to 100 percent of the value of the sale (25:43). All three of these offset agreements involved foreign licensed production of F/A-18 parts.

The F/A-18 Hornet is a single seat twin-engine, fighter/attack aircraft. It is known as the F/A-18 because the Marine Corps procured it as a fighter under the designation F-18 and the Navy procured it as an attack aircraft under the designator A-18. It entered operational service in 1983 with both the Navy and the Marine Corps (125:247). According to George Sullivan, the author of Military Aircraft: Modern Fighter Planes, it is "exceptionally maneuverable" and can "turn on a dime" (108:59). It is powered by two General Electric F404 low bypass, turbofan engines, each with 16,000 pounds of thrust (108:59). Additional details about the F/A-18 are shown in Table 9.

The configuration offered to the ROK included the AN/APG-65 all-weather radar, the advanced self-protection jammer (ASPJ), and the ASN-139 inertial navigation system (113:45-48).

TABLE 9

F-16 AND F/A-18 FACTS

| Item | F-18 | F-16 |
|---|---|---|
| Wingspan | 40'4" | 32'9" |
| Length | 56' | 49'4" |
| Height | 15'3" | 16'8" |
| Ceiling | 50,000' | 50,000' |
| Combat Radius (miles) | 660 | 575 |
| Ferry Range | 2,303 | 2,415 |
| Gross weight (lbs) | 37,175 | 42,300 |
| Speed | Mach 1.8 | Mach 2 |

(109:57 and 58:413 & 451)

General Dynamics and the F-16 Aircraft. General Dynamics' (GD) revenues in 1991 were $8.8 billion, of which $7.9 billion was for federal contract awards. This made it the number two government contractor for that year. It is number two in DOD contracts and number one in foreign military sales (103:67). Almost all of its business is in defense contracts (DOD and FMS) (114:37). GD expects to cut its workforce from 90,000 to 63,000 by 1994. This reduction is necessary because of the cancellation of the A-12 program, in which GD was MDC's partner and the phasing out of purchases by DOD of the M1A1 tank and the F-16 fighter (102:60).

Like McDonnell Douglas, GD also has its own offset group which was established in 1985. According to Matt Schaffer, the group "often teams with a specially designated person in an operating division to develop offset strategy and to avoid a duplication of effort" (97:45).

Also like MDC, GD has been involved in many business arrangements with foreign countries that include offsets. According to an article in the Winter 1989-1990 DISAM Journal, 87 percent of foreign customers for the F-16 have been "involved in some form of industrial participation as coproducers, suppliers, or indirect offset partners" (110:69).

The F-16 Falcon is produced in single-seat (F-16C) and two-seat (F-16D) configurations. The U.S. Air Force received its first F-16C in July 1984 and its first F-16D in September 1984 (58:412). According to Sullivan, the F-16 "can outfly any other fighter in the world" and is "highly maneuverable at low speed and low altitudes" (108:91). The current Block 50/52 version is powered by a single engine (either General Electric's F-110-129 model or Pratt and Whitney's F-100-229 model). Additional details about the F-16 are shown in Table 9.

The configuration offered to the ROK was based on the Block 50/52 version. It features the Low-Altitude Navigation Targeting Infra-red for Night (LANTIRN) night attack system, the ALR-56M radar warning receiver, the APG-68V improved reliability radar, the ALQ-165 advanced self-protection jammer (ASPJ), the ALE-47 countermeasures dispenser system, the APX-109 advanced IFF, the AGM-65G Maverick missile, the AIM-120 Advanced Medium Air-to-Air Missile (AMRAAM), and the AGM-88 high-speed antiradiation missile (HARM) (56:1).

The Selection Process

Background. In the early and mid-1980's, Northrop, with its F-20 aircraft and General Dynamics (GD), with its F-16 aircraft, were the U.S. competitors for the sale of 120 fighter aircraft to the Republic of Korea. At that time, the program was known as the FX. When Northrop dropped out of the competition in 1986 because of its decision to halt development of the F-20, McDonnell Douglas entered the picture with its F/A-18 aircraft (117:9).

That same year (1986), before a decision had been made on the KFP aircraft, Samsung Aerospace Industries was selected as the prime contractor for the program despite recommendations from the ROK Ministry of Defense to select Daewoo Aerospace (123:1120). In addition to producing a third of the airframe, Samsung will be responsible for final assembly of the aircraft. The company currently "manufactures and assembles the main beam, tailboom, nose, roof and engine cowls" for the Bell model 412SP helicopter (96:217) Daewoo Heavy Industries, which will produce another third of the airframe, began "producing F-16 fighter airframe components in 1984" and currently produces the "center fuselage center section, side panels and ventral fins for the F-16" (17:219). Daewoo also produces parts for the British Aerospace Hawk jet trainer and the Dornier 328 regional transport aircraft (58:182). Korean Air will produce the final third of the airframe. Its Aerospace Division, which was "established in 1976 to manufacture and

develop aircraft...is now a leading aircraft manufacturer in Korea" (58:182). Hyundai is the other main player in the program and along with Daewoo and KAL is responsible for production of components and subassemblies.

Samsung will then complete final assembly on the aircraft (96:215-217) making its overall share of the KFP about 45-50% (98:53). In preparation for the KFP work, Samsung has invested "$200-300 million in additional equipment, land and facilities" (98:53). In addition, Samsung has "added 249,000 sq. ft. of manufacturing space ... at the firm's facilities in the Changwon industrial complex and ... an additional 560,000 sq. ft. is planned, with the construction of a new facility for final assembly and flight testing of FX ... aircraft" (96:217).

During the three years between 1986 and 1989, the ROK evaluated the proposals submitted by GD and McDonnell Douglas. In their evaluations, they considered the capabilities and costs of the aircraft as well as the perceived economic benefits of selecting each aircraft. In August 1989, the name of the program was changed from FX to the Korean Fighter Program (KFP) to "distinguish it from the U.S.-Japan FS-X arrangement" (117:1) which was embroiled in controversy at the time.

The FX program is the first phase in the ROKAF 2000 plan. To achieve their goals in this phase, the ROK sought to "obtain the maximum possible benefit in technology and manufacturing skills rather than a straight sale of off-the-

shelf aircraft" (38:191). ROK originally wanted to purchase only three of the 120 aircraft off the shelf, purchase an additional 20 in kit form, and produce the remaining 97 aircraft in South Korea under license from the U.S. contractor (117:6). In mid-1987, the U.S. DOD "insisted on a program mix of 48 aircraft purchased from the United States (off the shelf and in kits) and 72 produced under commercial license in Korea" (117:13). In the summer of 1989, the final mix (12 off the shelf, 36 in kits, and 72 under licensed production) was decided on in a meeting between the U.S. Secretaries of Defense and Commerce and the Korean Minister of National Defense (117:9).

The next phase in the ROKAF 2000 plan is development of "an advanced technology, multirole fighter-the FXX-also to be produced in Korea...between 1998 and 2003" (38:199). The final phase in the plan is the development of a completely indigenous fighter-the FXXX-by 2004. The ROK will undoubtedly seek support from either U.S. or Western European contractors in both of these phases.

Selection of the Aircraft. On December 20 1989, the ROK announced the selection of the F/A-18 based on its dual-engine design, its maritime capabilities, and its greater potential to counter the threat from North Korea's MIG-29 Fulcrum aircraft (12:35). An unnamed representative of the Ministry of National Defense, quoted in a January 1990 article in Flight International, implies that there were also non-military reasons for the choice. He says that

"considering future growth, local industrial impact and aerospace industry development, the F-18 is the better choice" (98:5).

In October 1990, the ROK Ministry of Defense reopened the competition and ordered a complete reevaluation of the F-18 program which was to include "the acquisition method, the number of planes to be purchased, the extent of the technology transfer, and even the model" (94:14). At the time, the reason given for the reevaluation was a rise in the unit cost of the F/A-18, reported by some to be as much as 35% (98:53). In a November 1990 article in Flight International, a McDonnell Douglas representative confirmed that there had been a price increase but dismissed reports that it was as high as 30% (106:4). McDonnell Douglas and the South Korean companies reportedly submitted several options to reduce the program cost and stay within South Korea's budget constraints.

Despite these attempts by McDonnell Douglas to reduce the cost of the program, the ROK announced in March 1991 that they were reversing their earlier decision to buy F/A-18 aircraft in favor of GD's F-16 aircraft. The reasons given for the change are varied. The higher unit cost of the F/A-18 probably was at least partially responsible for the decision. Several publications cite a difference of $1 billion between the two bids (94:14 and 10:30). William B. Scott, the author of a March 1992 article in Aviation Week and Space Technology, says the decision was also influenced

by the "increased maturity of the F-16's Block 50 version, particularly its capability to engage beyond visual range targets" (98:53). An article in the October 28, 1991 Countertrade Outlook, says that the "real" reason for the switch was "the discontent among 14 ROK contractors ... (who) failed to obtain the level of technology transfers from MDC that they believed to be indispensable for developing their own aerospace manufacturing capabilities" (69:4).

Once the F-16 had been selected, the next decision required by the ROK was the selection of an engine to power the aircraft. The choice was between General Electric's F110-129 and Pratt and Whitney's F100-229. From the beginning the Pratt engine was the reported favorite for two reasons. First, the F-16 aircraft already operated by the ROK are powered by P&W F100-220 engines (18:4). Second, Samsung Aerospace, ROK's prime contractor for the program has been involved in a joint venture with P&W since 1985 to repair and overhaul F100 engines. In August 1991, the ROK announced their decision to procure 132 (120 installs and 12 spares) F100-229 engines. The reasons given for the decision were the Koreans' prior experience with the F100 engine and "Pratt's commitment to assisting the Korean aerospace industry" (60:27).

U.S. Government Involvement. From very early on, there were indications that Congress would carefully scrutinize the FX program because of perceived similarities with the

Japanese FS-X program. The most vocal Congressional opponent was Senator Alan Dixon from Illinois, who had also opposed the FS-X project. In July 1989, he and Senator Heinz introduced a resolution asking for a review of the program to include a General Accounting Office (GAO) report (73:11). Senator Dixon was later quoted in a November 1990 article in the Bulletin of the Atomic Scientists as calling the agreement a "sucker deal" and "a first step toward once again surrendering U.S. technology and expertise to be used against us" (50:19). A McDonnell Douglas official said in an article in Aviation Week and Space Technology that there were important distinctions between the KFP and the Japanese FS-X. First, the KFP does not include any development work in Korea. Second, the economic returns to the U.S. are expected to be higher. Third, there was a more fully integrated (between DOD and Commerce) U.S. negotiating position on the KFP than on the FS-X. On 4 April 1990, in testimony before the Subcommittee on Investigations of the House Armed Services Committee, Joseph E. Kelley from GAO's National Security and International Affairs Division, concluded that at that point the ultimate effects of the technology transfer and economic effects of the offsets could not be determined (117:16). Following that testimony the GAO issued a classified report which raised "serious concerns about the technology transfer issues and U.S. estimates of industrial base effects" (13:30) associated with the F/A-18 program.

The debate about similarities to the FS-X continued after the ROK switched from the F-18 to the F-16. In April 1991, in response to a request from the Defense Technology Security Agency (DTSA), the F-16 System Program Office issued a report comparing the level of technology transfer for the two programs. The report concluded that the programs differ in four essential ways. First, the FS-X will include Japanese developed avionics system while there will be no development of components or subsystems in the KFP. Second, the Japanese will be developing a new airframe, while the Koreans will simply be using existing manufacturing technology and processes to build an established airframe. Third, the Japanese were provided software development tools which the Koreans will probably not receive. Finally, the Japanese were provided with engine/aircraft integration data which the Koreans will not receive (2:2-4).

In July 1991, the MOU for the F-16 program was sent to Congress for their review (3:31). On August 1, the House Foreign Affairs subcommittees on Arms Control and on Asian and Pacific Affairs met in a joint session to discuss the program. During the hearings, House Majority leader Richard A. Gephardt expressed concern about the level of technology transfer. Several months earlier, he had requested that the GAO investigate the program (42:2191). At this hearing, Joseph Kelley presented the results of the GAO investigation.

In his testimony Kelley discussed five major issues. First, he said that "delays in negotiating the program, price increases, and political factors contributed to the Koreans' reevaluation of the original decision to select the F/A-18. The price and possibly other factors led to the selection of the F-16" (118:2). Second, he stated that there were problems with the methodology used in a USAF report which estimated the impacts of the program on the U.S. defense industrial base. Third, he indicated that there was interagency coordination on the MOU between the "Departments of State and Commerce, the Defense Technology Security Administration, and DSAA...and Commerce Department" (118:6-7). Fourth, he indicated a concern with the amount of foreign content in the first 48 aircraft. Because of prior commitments to the European partners in the F-16, the planes will certainly contain some parts from Europe and might include parts from other countries as well. Kelley stated that General Dynamics "could not guarantee that the first 48 planes would contain only U.S. and European parts" (118:11). Finally he acknowledged that "more U.S. jobs will result with the sale than without the sale" (118:3).

In addition to the Congressional scrutiny of the actions in this program, there was unprecedented involvement by the U.S. Department of Defense (DOD) both in limiting the maximum allowable offset percentage and controlling the content of the offset proposals. As stated earlier, DOD has maintained a hands-off position towards offsets since 1978.

From the outset of the negotiations, "Korea, intent on developing an indigenous aerospace industry" was "looking for offsets worth up to 60 percent of the package" (73:11). Korea's written policy at the time was to require 50 percent offsets. However, the DOD intervened in the summer of 1989 and advised the South Korean "Minister of National Defense and the two U.S. prime airframe contractors that it could not support a sale involving excessive offsets" (117:14). Consequently, Korean Minister of Defense Lee Sang Hoon sent a letter to Secretary of Defense Cheney advising that ROK would "take special measures to apply the bottom line of 30% [offset] with a view to helping relieve US businesses of offset burden to a reasonable extent" (82:8).

In February 1988, because of concerns about the technology transfer issues, DOD provided to the ROK "a tentative list of items on both aircraft that could not be produced in Korea and must be purchased through FMS channels. This was called the FMS-Must List" (117:11). The list included the "APG-65 radar, electronic warfare equipment, classified computer software and other avionics" (12:34) as well as the "inertial navigation systems ... engine hot section" and "other sensitive technologies" (50:20). Despite these restrictions, most knowledgeable observers believe that the KFP will enable the ROK to meet their "industrial development goals to some extent" (117:1-2).

In addition to the involvement in the KFP by Congress and the DOD, there was also involvement by the U.S. Department of Commerce. Since May 1989, Commerce has been involved in program discussions, coordinated on the draft Memorandum of Understanding between the U.S. and ROK governments, and been involved in setting the U.S. negotiating position. The participation of Commerce is partly due to legislation enacted in September 1988 which requires DOD to "consult with the Secretary of Commerce on MOUs with potential impact on the U.S.defense industrial base" (117:10).

ROK Government Involvement. There are multiple agencies within the ROK government which play major roles in offsets in general and in this program in particular. The Korean Defense Logistics Agency (DLA) is responsible for managing the contracts with the U.S. and Korean contractors and the Letter of Offer and Acceptance with the U.S. Government. This agency, which falls under the Ministry of National Defense, also has a separate branch which manages offsets (100). DLA also signed the overall offset memorandum of agreement (MOA) for the KFP. This MOA provides the basic terms and conditions under which the parties will operate throughout the life of the KFP contract. Annexes to the MOA include a shopping list of projects from which the ROK can select those they wish to pursue. The projects selected from this list require specific agreements and export licenses (41).

General Dynamics also has negotiated memorandums of understanding with the ROK implementing agencies with which they will be doing business. To date these include the ROK Agency for Defense Development which was discussed earlier in the section on development of South Korea's defense industry, the ROK Air Force (ROKAF), Samsung Aerospace (SSA), and the Korean Institute of Machinery and Metals (KIMM) which falls under the Ministry of Trade and Industry which was also discussed earlier (41).

Offset Proposals. Before discussing the content of the proposals, several points need to be made about information of this type. First, it is difficult to obtain information about details because of the reluctance of the parties to release information that is considered to be commercially sensitive. Second, it is much easier to obtain information about "winning" proposals because numerous meetings are held where details are discussed and because agreements become public as export licenses are applied for. Second, agreements on work content tend to be dynamic rather than static. Projects are added, deleted and changed throughout the process. Thus it is difficult to specify the details at a particular point in time.

The General Dynamics proposal included both direct and indirect offsets. Bob Trice, who was Director of Business Development for GD and who currently works at MDC, defines a direct offset as "any reciprocal business activity that relates specifically to the products or services sold to a

foreign country" (111:162). He defines an indirect offset as "any directed business activity on the part of the manufacturer that benefits the purchaser but is not directly related to the product or services sold" (111:162). Thus, in GD'S proposal offset projects directly related to the F-16 are direct and those unrelated to the F-16 are indirect.

The ability of GD to offer direct offsets in this program or any future program is limited because of prior commitments to the EPG consortium countries. Under that program, General Dynamics is committed to providing the consortium offsets of 15% of the value of all third country F-16 sales. Therefore, the direct offsets are primarily in the areas of development of F-16 depot capability, training and software development. In the area of development of depot capability, GD intends to do a depot capabilities/cost-tradeoffs study and to assist the ROKAF in establishing the capability to repair and overhaul F-16 airframe, skin, structure, and selected components and subsystems. In the area of training, GD plans to provide generic training in management, engineering and manufacturing disciplines. In regards to software development, the plan is to assist ROKAF in learning how to maintain software using equipment purchased through the FMS agreement. GD also plans to assist Korean industry in obtaining repair and overhaul work for non-ROKAF aircraft in the Pacific region. The indirect portion consists of plans

to assist in develo[illegible] the KTX-2 advanced trainer aircraft and to assist [illegible] industry in enhancing their capability to manufacture precision castings and forgings. The assistance in the development of the KTX-2 requires an MOU between GD and Korea's Agency for Defense Development. The assistance with the casting and forging work requires and MOU between GD and the Korean Institute of Machinery and Metals (41).

The McDonnell Douglas proposal also included direct and indirect offsets although there were not good clear guidelines about the distinction between the two. Approximately 10 percent of the total offset obligation was to be liquidated through manufactu[illegible]ng work on the F/A-18 (65). Korean firms already produce airframe parts for the F/A-18 (114:33). The remainder of the offsets was in the area of commercial aerospace work. According to one author, MDC "already spends $30-40 million [illegible]n Korean-made parts each year, and expanding this business will be the easiest way for the company to fulfill its offset commitment" (50:20). This expanded business reportedly included "equity participation in a joint venture to produce the MD-12, a priority commercial jetliner project" (114:135).

Additional assistance from MDC was to include "a joint, long-range study to develop a strategic plan for Korean industry, the development of an F/A-18 logistics support base, advanced systems research, a share in the work on the firm's ultrahigh bypass commercial transport program and

joint development of an entire advanced military trainer system" (38:195). Also included was training for ROK engineers at McDonnell Douglas facilities and on-site assistance by MDC engineers at ROK firms involved in the project (114:136). When the F/A-18 was originally selected, many said that the capability of the aircraft was only one of the reasons for the selection. Another, perhaps more important reason was that "the government at that time viewed McDonnell Douglas as better suited to assist South Korea's aerospace industry than GD" (114:135).

Conclusion

This chapter has covered some background on the Republic of Korea, its defense purchases and defense industry, and an overview of the events leading up to the selection of the F-18 aircraft to fulfill the ROK needs for a new fighter. It has also included a discussion of the reevaluation of the selection decision and the decision to purchase F-16 aircraft instead. Finally it has addressed the offset offers made by both McDonnell Douglas and General Dynamics in their competition for the sale.

## VI. Success Factors and the Korean Fighter Program

### Chapter Overview

This chapter will discuss the success factors identified in chapter IV in terms of General Dynamics' and McDonnell Douglas' offset proposals for the Korean Fighter Program. As stated earlier, the approach taken by the researchers is that proposals are divided into successful and unsuccessful categories based on whether or not they are implemented. Therefore, the General Dynamics proposal is categorized as a successful one and the McDonnell Douglas proposal is categorized as an unsuccessful one. The discussion in this chapter will be presented in the same order as the factors were presented in chapter IV - buyer, seller, contract, and technology.

### Factors Related to Buyers

Because the analysis in this research effort centers on a single buyer, namely South Korea, there will obviously be no distinctions between the two proposals in terms of buyer characteristics. However, for the sake of completeness in the analysis, the factors related to the buyer will still be discussed.

The first two factors related to the buyer, International Experience and Offset Experience are concerned with the amount of experience the buyer has in business arrangements with firms in other countries and more

specifically with the amount of experience with offset deals. In both cases, South Korea has considerable experience. As can be seen in the discussion on the development of its defense industry in Chapter V, South Korea has a great deal of experience with U.S. companies in producing components for military systems. They also have experience with offsets on many programs. These include the Colt Industries' M-16 rifle, the Northrop F-5E/F fighter and the earlier purchase of the General Dynamics' F-16 fighter.

The next buyer-related factor, Buyer Not Viewed as a Competitor, is related to the perception by the U.S. seller that the foreign buyer is already a competitor or has the potential of becoming a competitor in the future. Based on responses to interview questions and published information, neither General Dynamics nor McDonnell Douglas representatives believe that the Koreans will be able to reach their goal of producing an indigenous fighter aircraft by 2010 (65 and 38:199). Therefore, neither company views the Korean industries as capable of becoming serious competitors in the near future.

Technical Experience of the Buyer was the fourth buyer-related factor identified. This factor pertains to the degree to which the foreign company has experience with the relevant technology. In this case, the relevant technology is production of component parts and assembly into a complete aircraft. As discussed in Chapter V, the Korean companies have proven track records in producing aircraft

parts and doing some assembly work. However, Joseph Kelley from the General Accounting Office, testified before Congress in April 1990 that "acccrding to U.S. government officials, these companies have limited experience compared to the level of manufacture and production line management contemplated under the KFP" (116:5). This lack of experience can be at least partially compensated for by training and on-site assistance to be provided by General Dynamics.

The next factor related to the buyer, Sufficient Financial Resources, is concerned with the ability of the buyer to meet its financial obligations under the agreement. There are some signs that the 10% growth rate which the ROK economy experienced in the years between 1987 and 1991 is slowing down. However, there is still considerable growth forecasted for the future. Gross national product (GNP) has risen from $2.3 billion in 1962 to $273 billion in 1991 and it is expected to rise to $493 billion by 1996 (1:357 and 99:60). During the four years between now and 1996, the ROK plans to spend approximately 4.5% of its GNP on defense. Thus there does not appear to be any problem with the ROK meeting its commitments of $5.2 billion for this program.

The final buyer-related factor, Stable Environment, is related to the internal economic, political and social stability of the buyer's country and the threat from external forces. Each of these elements needs to be addressed separately before making an overall assessment of

the stability factor. The first element, economic stability, is related to the overall economic conditions in the country. As stated earlier in Chapter V, the current financial indicators for the ROK do not look promising and some ROK citizens are pessimistic about the economy. However, the problems are not insurmountable. There are indications that the government is taking action to improve the situation by easing restrictions on exports (29:21), and limiting wage increases (30:23). The second element, political stability is related to the nature of the electoral process and the degree to which groups within the society other than the ruling group can influence decisions. As discussed in Chapter V, members of three major political parties hold seats in the National Assembly and share votes on major issues. The third element, social stability, is related to the amount of internal unrest in a country. The social unrest that prevailed in the mid-80's has calmed down. However, there is always the potential for it to recur because this is an election year in Korea and there is a history of "upheavals at the end of every presidency" (4:118). The final element, threats from external sources is related to the perception by citizens that there is a threat of hostilities from outside the country. The threat of military aggression by North Korea remains a concern for the citizens of South Korea. Although there has been some progress in normalizing the relationship between the two Koreas, there are still divisive issues between the two.

The South wants the North to halt its nuclear weapons program and the North wants all U.S. forces withdrawn from the South. All of the above elements could represent future destabilizing forces for South Korea. However, at the present time the environment appears to be stable. The past social unrest has settled and democracy appears to be working.

Factors Related to Sellers

The first seller-related factor is Compatible Goals. This factor relates to the extent to which each party can accomplish its goals without hindering the ability of the other party to meet its own goals. From the beginning of negotiations on this program, the Koreans had two stated goals. First, they needed to purchase fighter aircraft to replace aging fighters in their fleet. Second, they wanted to enhance the capabilities of their aerospace industry. The goal of both MDC and GD was to win the sale and make a profit. There is nothing inherently incompatible with these buyer and seller goals. Incompatibility would only occur if the sellers were unwilling to transfer technology, make investments or otherwise provide support for development of South Korea's aerospace industry or if the ROK made excessive offset demands that would limit the ability of the sellers to make a profit on the sale. Neither of these conditions occurred for this program. Both GD and MDC offset proposals reportedly included assistance for development of Korea's aerospace industry and the ROK was

prevented from making excessive offset demands by U.S. government intervention. Therefore, the goals in this program could be considered to be compatible.

Proactive Strategy, the second seller-related factor is related to attempts by the seller to anticipate and plan for offsets and to actively seek out projects which could be used to fulfill current or future offset obligations. As stated in Chapter V, GD has an offset group that works to develop offset strategy and MDC has an organization that works on export development and foreign investments.

The third seller-related factor is an In-House Offset Group. As stated earlier in Chapter V, both General Dynamics and McDonnell Douglas have in-house offset groups which are responsible for developing new offset proposals and implementing existing ones.

The fourth and fifth seller-related factors are International Experience and Offset Experience. Both General Dynamics and McDonnell Douglas have substantial experience in both areas. McDonnell Douglas has sold F-15 aircraft to Saudi Arabia, Israel and Japan and F/A-18 aircraft to Canada, Australia, Spain and Kuwait. All of these sales involved some form of offsets except for the sale of F-15s to Saudi Arabia and the sale of F-18s to Kuwait. General Dynamics has sold F-16 aircraft to Belgium, Denmark, Netherlands, Norway, Israel, Egypt, Korea, Pakistan, Venezuela, Turkey, Greece, Singapore, Thailand,

Indonesia, and Bahrain. Offsets in some form were included in all of these sales except Thailand and Venezuela.

The next seller-related factor which was identified is the Size of the Seller. A company which is large in size is more likely to have success with offsets than a smaller company. Both MDC and GD are large companies. In a 1991 ranking of the top 100 worldwide defense firms, MDC was first based on defense revenues of $9.5 billion. GD was fourth with revenues of $7.5 billion (28:6).

Commitment to the Project is the next seller-related factor. It relates to activities which show that the seller is actively interested in the successful completion of the project. This factor will be discussed with respect to the two phases of the project discussed earlier - negotiation/implementation and execution. The commitment by both sellers in the first phase can be seen by the length of time the companies were involved in KFP negotiations. General Dynamics was involved from the early 1980's until December 1989 (when the F-18 was selected) and again from October 1990 (when the ROK decided to reevaluate the decision) until the present. MDC was continuously involved from 1985 until March 1991 (when the F-16 was selected).

The commitment by GD in the second phase can be seen in several ways. First, an executive steering committee has been established to supplement standard program management structures (56:1). Its members include GD, Samsung, the Korean program manager, and USAF and ROKAF officials. Its

charter is to provide overall program direction and top level resolution of implementation issues. Second, General Dynamics has sent management personnel to Korea to assist in preparing for the licensed production phase of the program. Third, GD has agreed to provide free of charge services in some areas (41).

The meaning of the final seller-related factor, Top Management Support, is self-explanatory. Although the researchers could not find direct evidence of support for the KFP by top level mangers at GD and MDC, such support can be inferred from the length of the negotiations and the approach by both companies to offset proposals.

Factors Related to Contract

The first contract-related factor, Transferability of Obligations, is concerned with the right of the seller to transfer his offset obligations to third parties. There is no limitation for either seller in transferring obligations to subcontractors.

Dual Contracts is the second contract-related factor. It relates to the negotiation of separate contractual instruments for the original purchase and the offsets. Because the original purchase is through the Foreign Military Sales program, separate contracts are mandated by DOD policy.

The third contract-related factor is related to the size of a sale. Because of the amount of time and effort

involved in negotiating, implementing and administering an offset proposal, large sales are likely to be viewed by the parties as more successful than smaller ones. In this case, the size of the sale is quite large regardless of which aircraft is involved. The value of the F-16 sale is approximately $5 billion. Sources disagree on the final value of the F-18 sale but all would agree that it exceeded $5 billion.

A Long Payback Period is the next contract-related factor. It is related to the amount of time the seller has to fulfill his offset obligations. In a 1990 report, OMB reviewed sales involving offsets for the years 1980-1987 and found that the average payback period for all countries was 11 years but that the average for ROK programs was only six years (84:36). The payback period agreed to by GD is 10 years (41). The planned payback period in the MDC proposal was 15 years but based on ROK preferences it was later changed to 10 years (65). Thus the payback period is less than average when compared to all countries but greater than average when compared with the past history of offsets with Korea.

The final factor related to the contract is Low Penalties. This factor is related to the penalty that must be paid by the seller if offset obligations are not met. The Koreans mandated a 10% penalty (65). The ten percent penalty in this program falls within the average range of five to ten percent discussed in Chapter IV.

Factors Related to Product

The first product-related factor is Mature Technology. This factor can be looked at both in terms of the product being sold and the technology being transferred in the offset agreements. Both the F-18 and F-16 have been on the market for a number of years and thus both can be considered mature in terms of airframe design. However, the General Dynamics F-16 is the older and therefore more mature of the two aircraft.

Both companies market their aircraft worldwide and have often competed against each other for sales. Most of the resulting sales have included offset agreements in which at least a portion of the production was to be accomplished in the purchasing country. The amount of technology transferred in these sales has varied with the particular circumstances under which the sale was made. In the KFP, the level of technology transfer permitted by either seller was limited by the U.S. government's FMS must-list of state-of-the-art components which must be purchased through FMS channels. Therefore although state-of-the-art technology is included in the aircraft, development capabilities for this technology are not being transferred in the offset agreements. According to the GD Fort Worth general manager who was quoted in an article in the Dallas Morning News in June 1992, "the F-16 technology transferred in both the Korean and Japanese fighter programs has been available for years" (59:D-1). The same is true of the F-18.

The second product-related factor is Complexity. This factor relates to the complexity or uniqueness of the product being sold. As stated above, both aircraft have been in service for a long time (the F-16 since 1977 and the F-18 since 1979) but their configurations have evolved continually since their first flights in terms of avionics and weapon delivery capabilities. In addition, the configuration of both aircraft changed during the competition. The F-16 Block 50/52 entered production during the competition and the F-18 went from Lot 14 to Lot 16 configuration.

The aircraft have similar capabilities but also possess unique characteristics. Both aircraft are capable of carrying AMRAAM and HARM missiles which the ROKAF consider to be essential to meeting their mission. Both were also to have been equipped with the same radar and advanced self-protection jammer. The F-18 is lighter and has a larger combat radius while the F-16 is faster and has a wider ferry range. The F-18 is designed for a maritime mission which is critical to the ROK. It also has two engines which enhances its safety. From early on, the ROKAF indicated that either aircraft would meet the mission needs but that the F-18 was superior operationally. Although their capabilities differ somewhat, both aircraft are complex.

The third product-related factor is High Visibility. This factor relates to both the visibility of the end product within the purchasing country and the visibility of

the selection process. From the end product viewpoint, this factor probably favored General Dynamics in the competition because the ROK Air Force already possessed 36 F-16s from an earlier buy.

From the selection process viewpoint, the program was highly visible within the ROK government from the start of the competition. A high level committee known as the Aerospace Industry Development Committee (headed by the Deputy Prime Minister and with members from Ministries of National Defense, Trade and Industry, Finance, and Science and Technology) was responsible for making a selection recommendation to the Korean Blue House who was to make the final decision. The Korean Blue House is the equivalent of the Office of the U.S. President and his staff (117:6). The program was also highly visible to Korean industry. Three of the major Korean corporations and many smaller companies stood to profit from involvement in the proposed offsets. Therefore, the selection process was very visible both to ROK government and corporate worlds.

Conclusion

All of the success factors identified in Chapter IV were present to some degree in the KFP offset environment. South Korea, as the buyer, met the conditions specified in the buyer-related factors. Both of the sellers met the conditions in the seller-related factors. The contract-related conditions were also met. Finally, the only area

where there were any distinctions between the proposals was in the product-related factors. Although the products (F-16 and F-18) are similar in many respects, the F-16 had higher visibility within the ROK because the ROKAF already flies F-16s.

# VII. Findings and Recommendations

## Chapter Overview

This chapter summarizes the results of the research effort described herein and offers conclusions based on the facts presented. To this end, each specific investigative question posed in Chapter I will be addressed in light of the information presented in Chapters III through VI. Next, the findings will be addressed in the overall context of offset agreements and their impact on the U.S. economy and the defense industrial base. Finally, recommendations for further research will be presented.

## Findings

Each of the investigative questions and related findings are discussed below:

Investigative question #1. **What are the characteristics of buyers which might impact the implementation of offset proposals?**

Six buyer-related factors were identified as having possible impacts on the implementation of offset agreements. These factors include the buyer's international experience; the buyer's experience with offset agreements; the potential for the buyer to be viewed as a competitor to the seller; the buyer's technical experience; the buyer's access to sufficient financial resources; and a stable environment within the buying country.

Investigative Question #2. **What are the characteristics of sellers which might impact the implementation of offset proposals?**

Eight seller-related factors were identified as having a possible impact on offset agreements. These include compatible goals; a proactive strategy; the existence of an in-house offset group; the seller's international experience; the seller's offset experience; the seller's size; the seller's commitment to the project; and top management support for the proposal.

Investigative Question #3. **What are the characteristics of related sales contracts which might impact the implementation of offset proposals?**

Five contract-related factors were identified as possibly impacting the offset proposal. These include the transferability of the offset obligations; the use of dual contracts; the amount of money involved; the length of the payback period; and the penalties assessed if the obligations of the offset are not fulfilled.

Investigative Question #4. **What are the characteristics of the technology which might impact the implementation of offset proposals?**

Three technology or product related factors were identified as having potential impact on offset agreements. These include the maturity of the technology; the complexity of the technology; and the visibility of the product.

Investigative Question #5. **Were these factors present in the Korean Fighter Program (KFP)?**

As discussed in the previous chapter, all twenty-two factors identified in Chapter IV appeared to be present in the competition between General Dynamics and McDonnell Douglas.

Investigative Question #6. **What impact, if any, did they have on the outcome of the competition?**

The offset proposals themselves undeniably had an impact on the competition. The ROK had two goals in the KFP. The first, of course was to acquire an aircraft capable of fulfilling their national security needs. The second goal, as embodied in their ROKAF 2000 plan, was to maximize the technological and manufacturing knowledge transferred to their own contractors. Due to this goal, which may have been the more important of the two, failure to propose an adequate offset would likely have doomed any sale. Both McDonnell Douglas and General Dynamics were well aware of this and aggressively attacked the offset question.

As stated in the discussion of investigative question #5, all of the factors identified by this research appear to be present in this competition. The actual impact of each of these factors on the selection process, however, is unclear. The problem encountered by the researchers in determining the impact of each factor stemmed from the situation which existed in the competition. Each of the

broad factor categories and the analysis problems encountered will be addressed in the following paragraphs.

The six buyer-related factors were evaluated in terms of the Republic of Korea as a buyer in the Korean Fighter Program. Since there was only one buyer extant in this program it was not possible to adequately determine the impact of these six factors on the outcome of the competition or to extrapolate these factors to other potential sales involving different buyers.

The two sellers involved in the KFP competition, General Dynamics and McDonnell Douglas were evaluated in terms of each of the seller-related factors. All of these factors appear to apply to both sellers. As a result of the similarity of these two companies it was difficult to determine the role played by the seller-related factors in the outcome of the offset agreements.

The contract-related factors could only be realistically applied to the General Dynamics proposal because it resulted in a final offset agreement while the McDonnell Douglas proposal did not. Four of the factors appear to have been mandated by the buyer and the fifth (dual contracts) was required because of the mix between FMS and commercial arrangements. Therefore, any final offset agreement with McDonnell Douglas would have been similar to that reached between ROK and General Dynamics. Once again the existence of only one buyer and the similarities between

the two sellers makes it difficult to analyze the true impact of these contract-related factors.

Product-related factors are the only factors where there are any differences between the two competitors and which may have had an impact in the final decision to acquire the F-16. Of the three factors in this category, there were distinctions between the aircraft only on the high visibility factor. The high visibility of the product factor favored the F-16 because the Koreans already owned F-16s and manufactured a number of F-16 parts under a previous offset agreement. Thus the F-16 and its related offset proposals had proponents with the ROK government and industry who had previous involvements with the F-16.

Another product-related factor, which was not identified in the framework, but which appeared to have a major impact on the selection of the aircraft was price. Although there is some disagreement among authors about the exact magnitude of the price difference between the two aircraft, all agree that the F-16 is substantially less expensive. It is also less expensive to operate and maintain. It appears that price increases on the F-18 pushed it out of the range of the ROK program budget.

Investigative Question #7. **Did the existing U.S. government policy and U.S. government actions impact the offset negotiations in the KFP?**

The U.S. government's intervention in the negotiation process played a major role in the selection process. The

agreement between the U.S. government and the ROK government to set the offset percentage at 30% and the inclusion of a number of items on the FMS Must-List effectively tied the hands of the two companies vying for the sale by reducing their room for negotiation on the proposed offsets. If these limits had not been set by the U.S. government, the offset percentages might have escalated and the amount of work being performed by Korean industry might have been significantly higher.

This intervention, therefore, limited the impact of the offset agreements by leveling the playing field between the two competitors. This led to the vast similarities between the two proposals which, as a result, kept the offset proposals from being the deciding factor in the sale. The actions by the U.S. government might not have been as effective if there were serious competition from a non-U.S. manufacturer or if the ROK were not as interested in developing a long-term relationship with the U.S.

Impact of the KFP Program on the U.S.

It is not possible to precisely quantify the impacts of the KFP on employment in the United States. Most would agree that more U.S jobs will result with the sale than without the sale. The sale reportedly prevented the furlough at General Dynamics of "500 to 1,000 employees who otherwise would have lost their jobs in 1994 or 1995" (51:D4). It also will allow "Pratt to keep the F100

manufacturing line open past the planned close of the U.S. F-16 line in 1993" (60:27). Workers at General Dynamics disagree that the sale is a good deal. In June 1992, speakers in a demonstration at GD "accused the U.S. government and defense contractors of giving away jobs and technology to foreign competitors through deals such as...General Dynamics' Korean fighter assembly program" (59:D-1). The ultimate effects may never be known.

Additional Research

To adequately address the applicability of the factors included in the framework developed in Chapter IV, a wider range of offset proposals/agreements needs to be analyzed. Any future research regarding this factors framework should focus on different buyers, sellers, and products to test the applicability of the factors.

In addition, the research described herein raised a number of questions which were beyond the scope of this research. These include the impact of the offset agreements on U.S. trade, balance of payments, and the defense industrial base, as well as, the proper role of the various government agencies in overseeing offset agreements.

## Appendix A: Definitions of Terms

BARTER -- A form of countertrade which involves a one-time transaction only, bound under a single contract that specifies the exchange of selected goods or services for another of equivalent value.

BUY-BACK -- A form of countertrade in which the original exporter agrees to accept as full or partial repayment products derived from the original exported product.

CHAEBOL --Giant conglomerates that dominate South Korean industry.

COPRODUCTION -- Overseas production based upon government-to-government agreement that permits a foreign government(s) or producer(s) to acquire the technical information to manufacture all or part of a U.S. origin defense article. It includes government-to-government licensed production. It excludes licensed production based upon direct commercial arrangements by U.S. manufacturers.

COUNTER-PURCHASE -- A form of countertrade in which the initial exporter agrees to buy (or to find a buyer for) a specific value of goods (often stated as a percentage of the value of the original export) from the original importer during a specified time period.

COUNTERTRADE -- All forms of trade in which goods and/or services are exchanged for other goods and/or services.

DIRECT OFFSETS -- Any reciprocal business activity that relates specifically to the products or services sold to a foreign country.

INDIRECT OFFSETS -- Any directed business activity on the part of the manufacturer that benefits the purchaser but is not directly related to the product or services sold.

INTERNATIONAL COOPERATIVE PROJECT -- A project for development and/or production of military hardware which involves parties from more than one country and in which costs, risks, and responsibilities are shared by the parties.

INTERNATIONAL JCINT VENTURE -- An arrangement which involves two or more legally distinct organizations (parents) which share in the decision making activities of the jointly owned entity and in which at least one parent is headquartered outside the venture's country of operation.

LICENSED PRODUCTION -- Overseas production of a U.S. origin defense article based upon transfer of technical information under direct commercial arrangements between a U.S. manufacturer and a foreign government or producer.

OFFSETS -- A range of industrial and commercial compensation practices required as a condition of purchase in either government-to-government or commercial sales of defense articles and/or defense services as defined by the Arms Export Control Act (AECA) and the International Traffic in Arms Regulation (ITAR).

OVERSEAS INVESTMENT -- Investment arising from the offset agreement, taking the form of capital invested to establish or expand a subsidiary or joint venture in the foreign country.

SAEMAUL -- A South Korean rural development movement which provided subsidies to farmers to help them become more self-reliant and conquer poverty.

SUBCONTRACTOR PRODUCTION -- Overseas production of a part or component of a U.S. origin defense article. The subcontract does not necessarily involve license of technical information and is usually a direct commercial arrangement between the U.S. manufacturer and a foreign producer.

TECHNOLOGY TRANSFER -- Transfer of technology that occurs as a result of an offset agreement and that may take the form of research and development conducted abroad, technical assistance provided to the subsidiary or joint venture of overseas investment, or other activities under direct commercial arrangement between the U.S. manufacturer and a foreign entity.

YUSHIN -- Constitutional changes instituted in South Korea under President Park Chung Hee. They were designed to insure political stability and socioeconomic progress under a strong centralized government.

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This study sought to develop a framework of factors which impact the suceess of offset agreements. These agreements have impacts on the U.S. defense industrial base, employment, the balance of trade, and the ability of the U.S. to protect its technology. Consequently, their study is important. A framework of twenty-two factors was developed through an extensive literature review and then tested against the offset proposals in the Korean Fighter Program (KFP). In the KFP case study, only one of the factors, high visibility of the product, appeared to differentiate between the two proposals and have an impact on the final outcome. The researchers also sought tp determine the imact of the U.S. government's involvement in the negotiations. It was found that negotiations between U.S. government parties and Republic of Korea representatives and the U.S. restriction of certain components to Foreign Military Sales channels had an impact on the KFP offset proposals.

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