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AN ANALYSIS OF ACQUISITION STRATEGIES  
FOR  
THE TURKISH ARMED FORCES

by

Erdal Ozturk

December 1987

Thesis Advisor

John F. McClain

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FOR  
THE TURKISH ARMED FORCES

by

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Submitted in partial fulfillment of the  
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

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## ABSTRACT

This research was undertaken to perform analysis for alternative acquisition strategies for the Turkish Armed Forces. The main purposes were to determine advantages and disadvantages of each acquisition strategy and to find out the most promising acquisition strategy for the Turkish Armed Forces.

Four acquisition strategies were discussed in the thesis with the emphasis on life cycle support. While each acquisition strategy has its own advantages and disadvantages, coproduction is shown to be the most promising acquisition strategy for Turkey. However, it is further shown that the advantages and disadvantages of each acquisition strategy strongly depends on the conditions of bidders' proposals and specialties of the system to be selected.

The thesis concluded by presenting recommendations and a rating matrix for evaluation of the alternative acquisition strategies.

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## I. INTRODUCTION

### A. GENERAL

Turkey occupies one of the most strategically important locations in the world. Turkey can be seen as a gateway between West and East. It is at the intersection of three continents, Europe, Asia and Africa, and has borders on three different seas. The Turkish Straits connect the Black Sea with the Aegean and the Mediterranean. The European part of Turkey lies in the Balkans, whereas Anatolia, the Turkish heartland, is adjacent to the Middle East and the Persian Gulf area, near the main energy source of the world [Ref. 1]. Turkey is located directly between Europe and Asia. Nearly one-half of its 2620 km (1628 miles) of land frontier is with European states - Greece, Bulgaria and the U.S.S.R.; and the remainder with Iran, Iraq and Syria [Ref. 2].

The original Turks came from Central Asia. The name "Turk" first appeared in written historical records in the sixth century AD, when Chinese annals speak of a powerful empire in Central Asia, founded by a steppe people called Tu-Kiu. It is from this state that the oldest surviving Turkish inscriptions have come. At the beginning of the 11th century the Turks conquered Anatolia [Ref. 2]. In 1299, after the decline of Selcuk's (Seljuqs) Empire, the Ottoman Empire was established. It extended from Hungary, and included the entire Balkan Peninsula, Crimean Island, and the whole of North Africa to include Egypt and the Middle East [Ref. 1].

After the fall of the Ottoman Empire in 1923 the Turkish Republic was established. Today, Turkey maintains the second largest armed forces in NATO, with over 800,000 personnel. This constitutes thirty-seven percent of the standing manpower forces in Europe available to NATO. She defends twenty-seven percent of the land area of NATO Europe and thirty-seven percent of the NATO-WARSAW Pact land frontier. Turkey shares 619 km of land border with the Soviet Union. The Black Sea coastline of Turkey facing the Soviet Union is 1600 km long [Ref. 1].

Today, the capability of peacetime deterrence and mobilization missions depend heavily on the existence of modern weapon systems and military equipment. Without these, modern systems and equipment no armed forces can succeed. This study will focus on the modernization process of the Turkish Armed Forces which is required to enable Turkey to fulfill its vital role in defense of its homeland and NATO.

## **B. OBJECTIVES**

The principle objective of this thesis is to analyze and evaluate alternative acquisition strategies for Turkish Armed Forces with emphasis on the life cycle support aspects of each alternative.

This study will define the current problems and explain the current implementation policy, present alternative policies, identify the advantages and disadvantages associated with each alternative, and propose a process to solve the identified problem.

The subsidiary objectives of this thesis are:

1. To identify Turkish arm sales policy,
2. To determine the results of Foreign Military Sales (FMS) transactions between Turkey and other countries,
3. To examine acquisition strategies for Turkey derived from lessons learned by other nations.

## **C. FOCUS AND SCOPE OF THIS STUDY**

Today, the capability of peacetime deterrence and mobilization missions depend heavily on the existence of modern weapon systems and military equipment. In the author's opinion, without these modern systems and equipment no Armed Forces can succeed. This study will focus on the modernization process of the Turkish Armed Forces. In this process, the current Turkish acquisition process will first be examined; next, alternative acquisition policies will be studied with the emphasis on life cycle support and finally, recommended courses of action will be presented.

There will be an important emphasis on the lessons learned from acquisition strategies of other nations. Acquisition projects which were accomplished by other countries will be reviewed as examples to see their various impacts.

The research is limited to the United States publications or foreign publications and documents which were collected through the Naval Postgraduate School Library.

## **D. METHODOLOGY**

Primary research entailed a literature review of the latest implementations of the acquisition strategies of coproduction, technical data package (TDP), "Life of Type" buy (Buy-out) and licensing. The literature was collected through the Naval Postgraduate School Library, the Defense Logistics Studies Information Exchange (DLSIE), Administrative Science Department Library, and various newspapers and magazines.

Additional data was collected from examination of both U.S. and Turkish directives, instructions, guidelines and written correspondence with personnel in the Turkish Ministry of Defense.

## II. BACKGROUND OF THE PROBLEM

### A. THREAT

Hostility between Russia and Turkey has a long and violent history. Over the course of centuries they have battled each other thirteen times: the first was in the period between 1676 and 1681, and the last in the years 1914 to 1918 [Ref. 3: p. 1]. The treaty of friendship, signed by the Soviet Union and Turkey on March 16, 1921, was the first major international treaty for each. The friendship treaty was renewed in 1925. But shortly after World War II, the Soviets tried to take control of the Bosphorus (Turkish Straits). President Truman's response was to send the battleship USS MISSOURI to Turkey. Following these events, the U.S. military aid to Turkey was begun in 1947. Because of Turkey's geo-strategic position there was a very urgent need to have modern equipment. The U.S. military assistance program played an essential role in preventing Turkey from being swallowed by the Soviet colossus to the north right after the Second World War [Ref. 4: p. 2]. Soviet-Turkish relations remained frozen until the 1960s. The U.S.S.R. had sought normalization but Turkey had abstained. Normalization of relations between Turkey and Soviet Union moved forward steadily after the clash with the U.S. over Cyprus in the summer of 1964. The normalization process was dominated by economic relations [Ref. 5].

Turkey plays an exceptional and critical role as the anchor of NATO's southeastern front in Europe, facing the longest border with the Warsaw Pact of any alliance member. In addition, Turkey secures the Turkish Straits and deters any attempted Soviet movement into Southwest Asia through the Transcaucasus Region. In the Middle East, Turkey also plays a critical role in defending vital sea and land lanes of communication which cross the region, as well as providing a potential barrier to Soviet adventurism in the Middle East region's enormous oil reserves [Ref. 6: p. 30].

Turkey's defense policy is predicated on deterrence and therefore its standing military force is second only to the U.S. in NATO. Turks recognize that their ability to resist intimidation must be grounded in internal resources; in the early stages of a war, they would have to fight alone and could not count on early reinforcements [Ref. 7: p. 440]. Counting the Soviet divisions on their eastern border and the Bulgarians on the west, the Turks today face a total of forty to forty-five Warsaw Pact

divisions [Ref. 8]. Turkey is likely to be the first target in the event of a NATO/WARSAW Pact war [Ref. 9]. However, most military analysts believe that it would be extremely difficult for Turkey to effectively perform its wartime NATO military missions because of its equipment obsolescence and problems with spare parts [Ref. 10].

The war between Iran and Iraq has endured for more than five years, and continually threatens to spill over to neighboring states and to disrupt the flow of oil from the Persian Gulf [Ref. 11: p. 11]. According to author Miroslaw Nincic from the Stockholm International Peace Research Institute, Turkey, of all the NATO nations, would be most rapidly exposed to direct military involvement. There are numerous ways to be drawn into the conflict. Three stand out as particularly likely: 1) Soviet airlift operations toward the Persian Gulf area, 2) Soviet actions against U.S. bases in Turkey, 3) U.S. use of military bases in Turkey for the intermediate basing of some portion of its airlifted troops [Ref. 9: pp. 55-63].

Today Turkey's role in the defense of Europe (and Asia Minor) and its potential role in the security of the Middle East and Persian Gulf regions has become increasingly significant [Ref. 7: p. 421]. Due to Turkey's strategic location in relation to the U.S.S.R. , NATO, and the Middle East, it is one of the largest recipients of U.S. military assistance in the world [Ref. 12]. Although Turkey is one of the largest recipients of U.S. military assistance in the world, most of the Turkish weaponry is out of date.

U.S. editorialist Jack Anderson stated his concerns on this subject as follows:

"What if a full-scale attack came?... Tactically, the best bet would be to fall back on the nearby town of Kars and then to Erzurum, where NATO nuclear weapons are deployed. Retreat would be in order because the Turks' weaponry is antique by military standards. Their principal tank, the U.S. made M-48, dates to the Korean War era... a chemical attack preceding to a Soviet invasion "would wipe the Turks out", according to an American official. "They have hardly a gas mask among them", he explained" [Ref. 10].

In the author's opinion, the best statement of the problem to be addressed by this thesis was made by the Honorable Richard N. Perle, Former Assistant Secretary of Defense for International Security Policy. He stated that:

"...Turkey and U.S. have just signed a new defense and economic cooperation agreement (DECA), which will govern our defense relations and facilities at least to 1991. The Turkish military is saddled with much increasingly obsolete

hardware, some of which is rapidly becoming unsupportable. More important, this obsolete equipment, even if it were supportable, would simply not do the job on the modern battlefield. UNLESS MODERNIZATION OCCURS, FUNDS WILL BE SPENT ON MAINTAINING OBSOLETE WEAPONS SYSTEMS THAT OVER TIME RETURN LESS AND LESS IN DEFENSE CAPABILITIES. Current programs have now reached a level at which the badly needed modernization of the Turkish Armed Forces may proceed, albeit slowly. Nonetheless, to reverse the obsolescence of Turkey's military establishment will require years of greater expenditure and effort. Moreover, from now until the early 1990's Turkey's defense-debt service burden alone will hover above \$300 million annually." [Ref. 6: p. 30]

## B. CURRENT STATE OF THE TURKISH ARMED FORCES

### 1. General

Turkey has received most of its weapons and other military equipment through U.S. and German Security Assistance. The military relationship between the U.S. and Turkey began in 1948. This relationship has been continuous with the exception of the arms embargo in the mid-1970s. Turkey's current spare parts and weapon problems are caused primarily by already obsolete equipment, inflation in weapon costs, the U.S. worldwide shift from grant to loan military aid, the lack of usable U.S. excess defense articles, the costly purchase of some military equipment (during the U.S. arm embargo), and Turkey's domestic economic problems [Ref. 13].

Most of Turkey's military equipment was bought in the 1960s. As a result, Turkish weapons are ten years older than those of most other NATO nations. Turkey's large U.S.-built tank force is more than twenty years old and unless upgraded soon it will no longer be supportable by the normal U.S. foreign military sales logistics systems. All U.S.-built major naval combat vessels in the Turkish Navy are over thirty years old. Most of Turkey's U.S.-built air cargo planes are non-supportable by the normal U.S. FMS logistics system because of their age. Turkey is low on spare parts in all services [Ref. 13: pp. 15, 16]. In May 1979, the Chairman of the U.S. Joint Chiefs of Staff told the Senate Foreign Relations Committee that "at least one half of Turkey's major military equipment was inoperable, and much of the rest was obsolete [Ref. 14: p. 267].

Even though Turkey is one of the largest recipients of the United States military assistance in the world today, the United States government enacted an embargo on Turkey during the Cyprus crisis. That embargo significantly weakened the

capability of the Turkish Armed Forces. Following the U.S. embargo, increased awareness of Turkey's importance to strategic planning led the U.S. to strengthen ties between the two countries. In December 1981 the two governments announced the establishment of a high-level joint military group to improve defense cooperation. The purpose of this initiative is to improve NATO's posture in the region and modernize the Turkish Armed Forces. Included is U.S. aid in building two new air strips capable of handling long-range bombers and cargo planes in eastern Turkey [Ref. 15: p. 160].

## **2. Spending on Arms and Effectiveness Trade-offs**

The equipment received from the U.S. shortly after World War II and the Korean War was relatively new at the time. It was easy and cheap to maintain and support these weapons when they were first received. It can be said that in the early phase of their life cycle, these weapons and military equipment provided high effectiveness and deterrence for the Turkish Armed Forces. Most of this equipment is now at the end or beyond planned life cycles. So, it's very expensive to keep this equipment working since they are no longer in production (See Appendix E for a complete list of Turkey's procured weapon systems). Table 1 shows a sample of this weapon systems being used in Turkey.

In the author's experience during six years of field duty, gasoline requirements of the U.S. built vehicles are almost twice as much as stated in technical manuals. Electronic equipment has lost their sensitivity because of their age. The range of the radios is lower than stated in technical manuals. Because this equipment is so old, it is very costly to support. As a result, Turkish defense budget increases result in very little increase in the effectiveness of the Turkish Armed Forces. It is apparent that Turkey needs to determine an acquisition policy to overcome her continuing military obsolescence.

The effectiveness and cost relationships for the Turkish Armed Forces after the arm sales transactions in late the 1940s and 1950s are shown in Figure 2.1.<sup>1</sup> Figure 2.1A illustrates the relationship between Turkish arm spendings in 1950s and effectiveness of Turkish Armed Forces. Effectiveness can be defined as a function of probability of deterrence. In Figure 2.1B, Turkish arms spendings in 1950s resulted in high deterrence capabilities (steeper curve). The reasons of these would be procurement of modern equipment (mostly through grant aid), high availability,

---

<sup>1</sup>These figures and explanations are used with the permission of Prof. F. Horton, Naval Postgraduate School, Monterey, CA, 1987.



TABLE 1  
SOME WEAPON SYSTEMS BEING USED IN TURKEY

Selected NATO Weapons Systems Strength  
Basic Systems Built by the U.S. Prior to 1964,

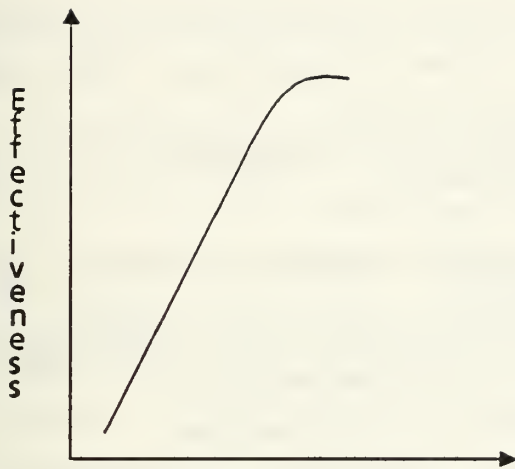
	1 9 7 5 Turkey	Other NATO	1 9 7 8 Turkey	Other NATO	1 9 8 0 Turkey	Other NATO
<b>AIRCRAFT</b>						
F-84 (1946)	32	62 -Greece	-	-	-	-
RF-84 (1946)	20	18 -Greece	-	20 -Greece	8	-
F-86 (1952)	-	25 -Portugal	-	-	-	-
F-100C/D/F (1955)	45	n/a Canada 40 -Denmark	100	8 -Canada 38 -Denmark	100	7 -Canada 32 -Denmark
F-102A (1953)	36	56 -France 16 -Greece	30	-	-	-
C-47 (W. W. II)	20	8 -Denmark 35 -Greece 10 -Italy 16 -Portugal	30	8 -Denmark 25 -Greece	30	8 -Denmark 20 -Greece
EC-47 (W. W. II)	-	-	-	11 -Italy	-	11 -Italy
C-54 (1942)	3	5 -Denmark	3	-	3	-
C-119 (1947)	-	32 -Italy	-	28 -Italy	-	-
<b>TANKS</b>						
M-47 Med. Tank (1951)		124 -Belgium 300 -Greece 700 -Italy 100 -Portugal		52 -Belgium 300 -Greece 650 -Italy 90 -Portugal		62 -Belgium 350 -Greece 620 -Italy 34 -Portugal
	1500		2800		3500	
M-48 Med. Tank (1952)		500 -Greece 38 -Norway		750 -Greece 38 -Norway 23 -Portugal		800 -Greece 38 -Norway

supportability and maintainability and less arms spendings of unfriendly countries. However, this deterrence weakened over time. Figure 2.1C illustrates this trend. "Effectiveness" is a function of "Probability of Deterrence" and "Probability of Deterrence" is influenced by "Defense spending of Turkey (same direction), and "Defense Spending of Unfriendly Countries (opposite direction)". It suggests that the more Turkey spends on defense, the more effectiveness or deterrence she has. The more unfriendly countries spend on defense, the less deterrence Turkey has. In the late 1940s and early 1950s, Turkey got an enormous amount of military aid from the U.S. under the Truman Doctrine. They were inexpensive and modern weapons. High effectiveness resulted from minimal spending, because the marginal effectiveness to cost ratio was very high. The probability of deterrence and defense spending relationships are shown in Figure 2.1C. The probability of deterrence is a function of military assistance received by Turkey, defense spending by Turkey, and the defense spending of advisarial neighbor countries.

Over time, Turkey could not replace those weapons and most of them became obsolete. Now, Turkey spends a lot of money to keep obsolete weapons working. Spare parts expenses, maintenance difficulties and normal wear have already made them less effective. Also, most of the unfriendly countries in the region are spending a lot of money on arms and defense as well as receiving Soviet military assistance. Soviet military sales/assistance and economic assistance have shown enormous growth in the past ten years, especially in the Middle East. Arms spending of unfriendly countries in the Middle East was listed in the top rank among Third World major-weapon importing nations during 1979-1983 [Ref. 9: p. 25]. Five of the nine leading arms importing countries from 1979 to 1983 were located in the Middle East. Of these nine top importers, four were supplied primarily by the Soviet Union. During 1979-1983, Iraq imported \$17.6 billion and Syria imported \$10.5 billion worth arms by itself [Ref. 16]. In contrast, Turkey received only \$11 billion in U.S. aid (Economic \$3.9 bil., Military \$7.1 bil.) during 1946-1984 [Ref. 17].

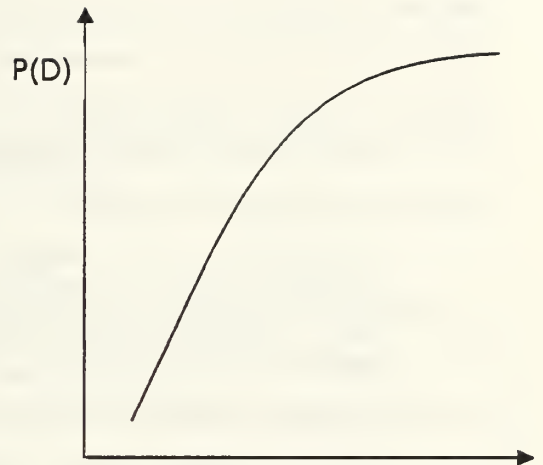
### **3. Alternatives of the Traditional Turkish Acquisition Policy**

The previous traditional acquisition method (FMS) discussed above has resulted in Turkey having only old and unsupportable weapons [Refs. 4,14]. It would appear that the modernization process of the Turkish Armed Forces can not be accomplished with only Military Assistance programs. The annual military assistance budgets approved by U.S. and German Congresses is not sufficient to do this. To



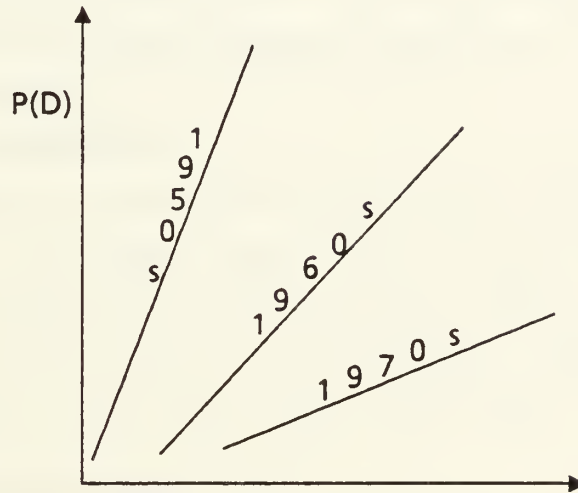
Spending on arms in 1950s

A



Spending on arms in 1950s

B



Spending on arms

C

$P(D)$  = Probability of deterrence

Effectiveness =  $E [ P(D) ]$  ; (Effectiveness is a function of probability of deterrence)

$P(D) = f(\text{Defense spending of Turkey, Defense spending of unfriendly countries})$

(Source: Prof. F. Horton Naval Postgraduate School, 1987)

**Figure 2.1 Cost - Effectiveness Relationship**

achieve modernization of the Turkish Armed forces, Turkey has allocated \$4 billion a year to spend on arms (Defense budget + Defense Industries Fund + \$800 million from U.S. + \$200 million from West Germany) [Ref. 18].

The following four acquisition policies can be thought of as alternative acquisition policies to modernize the Turkish Armed Forces:

1. Coproduction: To produce the military equipment in Turkey through participation with U.S. and other countries.
2. Life of Type Buy: Buy all necessary spare parts of a weapon system which will probably be needed during the life cycle of this weapon system.
3. Licensing: Weapons can be produced under licensing agreements.
4. Technical Data Package (TDP): Turkey can buy the TDP of the weapon systems and have them produced either in Turkey or in other industrial nations.
5. These four alternatives will be examined and discussed in this thesis.

### III. TURKISH MILITARY INDUSTRIAL BASE AND ACQUISITION POLICY EVOLUTION

#### A. TURKISH MILITARY INDUSTRIAL BASE

Contrary to the belief of many, Turkey has had its own defense industries for many years, however, before the 1950s, the major acquisition strategy used was licensing. In 1914, Turkey produced its own infantry rifles and ammunition under license from Mauser Industries of Germany. It has been manufacturing its own field guns and mortars since the 1920s. In 1933, at Kayseri, the Turkish Air Force began to build its own fighter-bomber aircraft under Polish license. Until 1946, Turkey also manufactured a Miles Magister trainer aircraft under British license and shortly after that built its own indigenous twin-engine, small passenger aircraft [Ref. 19: pp. 72-74].

Twenty-two factories will be examined in this section. The first five air factories are not in existence today.

##### 1. Tomtas Aircraft Factory

The structure of the factory looked like many of today's joint-ventures. The foreign participant of the Tomtas Aircraft Factory was the German Junkers Company. In 1925, in cooperation with the German Junkers Company an aircraft and engine factory under the name of Tomtas was built in Kayseri. A repair and overhaul factory was built in Eskisehir. The company produced single-engined Junkers A-20s [Ref. 1: p. 179]. This factory is not in existence today.

##### 2. Kayseri Aircraft Factory (KAF)

The Kayseri Aircraft Factory (KAF) started in 1932 in cooperation with some U.S. experts led to the production of fifteen Curtis HAWK fighters and ten Flething trainers. This was followed by fifteen German GOTHA 145 training and transport aircraft, twenty-two Polish PZI-23 and twenty-five British Miles MAGISTER trainers. The production in Kayseri continued until 1939, at which time the Turkish Air Force took over the repair, overhaul and procurement of aircraft [Ref. 1: p. 179]. KAF is not in existence today.

##### 3. Nuri Demirag Aircraft Factory

In 1936 an aircraft factory was founded in Besiktas (Istanbul) and assembly shop was founded in Yesilkoy. In this factory, fifteen ND-37 trainers developed by

Selahaddin Alan were manufactured and used for pilot training [Ref. 1: p. 179]. They had planned to produce the twin-engine 8-seated ND-38 after producing ND-37. The aircraft was ready for production but work ended when German engineers returned to Germany (because of the World War II). For some time the factory continued to make parts for Westland LYSANDER reconnaissance aircraft but stopped manufacturing in 1943. [Ref. 1: p. 179]

#### **4. Turkish Air League Aircraft Factory**

In the Second World War, Polish engineers emigrating from German occupied Poland came to Turkey. With their cooperation an aircraft factory was founded in Ankara Etimesgut in 1941. At first, sixty FOUGA MAGISTER trainers were produced, and later, under the name of THK, other aircraft and gliders were manufactured. The aircraft factory was handed over to MKEK (Makine ve Kimya Endüstrisi Kurumu) by law in 1953. Following this takeover the Turkish Air Force ordered one hundred aircraft. Only sixty MKEK-4 UGUR aircraft were manufactured. The projects of the MKEK-3 Mehmetcik jet trainer and GOZCU artillery reconnaissance aircraft were prepared but manufacturing stopped in 1959. Repair and overhaul work continued until 1965. Five of the twin-engined THK aircraft were exported to Denmark and three UGUR were given to Jordan as a present. Today, Turkish Air League Administration owns 2 percent of the shares of the TAI (Turkish Aerospace Industry Inc.). It also owns or holds shares of five different production companies. It is composed of five hundred thirty eight branches in the Provincial and County Centers under the General Directorate. It provides aeronautic activities for civilians and students at the Flying, Gliding, Parachuting and Aeromodelling School. In addition, crop-dusting, air-forest fire fighting and transportation activities are accomplished [Ref. 1: p. 179].

#### **5. THK Aircraft Engine Factory**

This factory was founded in 1945 on the basis of a license from De Havilland Engines to produce GIPSY MAJOR engines. Manufacturing started in 1948 but soon financing became difficult and the company became a tractor factory in 1955 [Ref. 1: p. 179].

#### **6. Taskizak Naval Shipyard**

The Taskizak Naval Shipyard, located on the Golden Horn within the present city limit of Istanbul, was founded in 1455 by Fatih the Conqueror. In the following

decades and centuries the Yard built and maintained most of the vessels in the Ottoman Navy.

In the early nineteenth century modernization of the yard started. In 1828 the first steamboat was built and in 1886 the first Ottoman submarine was released. The peace treaty after World War I made Istanbul a demilitarized zone. Taskizak started working mainly on merchant vessels and the majority of machinery and equipment was transported to Golcuk (another military shipyard bordering the Marmara Sea). In 1941, Taskizak was reopened as a Naval Yard on a limited basis employing a handful workers and engineers. A period of growth brought the Yard to its present size, employing 3,000 workers [Ref. 1: pp. 184-187].

The Taskizak naval shipyard is under the technical management of the Turkish Naval Headquarters. The functions of the Yard are:

- New construction: designing, building and outfitting of military and merchant vessels up to 10,000 tons,
- Repair work: the periodic maintenance, overhaul and repair of about 190 ships per year as well as emergency repairs,
- Docking activities: dry docking of the above mentioned ships. Taskizak has two floating docks with lift capacities of 3,000 and 2,500 tons respectively, and a dry-dock for small vessels of about 500 tons,
- Miscellaneous activities: technical and practical assistance to military and industrial establishments in the area.

Taskizak's primary purpose is to constructing fast, modern naval vessels of relatively small tonnage and various types of modern landing vessels. Since 1941 Taskizak has completed about one hundred and twenty ships, large and small. The range of ships includes landing ships, patrol craft, coast-guard vessels, fast patrol boats, tankers and coasters. Some of the most important projects included construction of four DOGAN Class guided missile boats armed with HARPOON, and of a number of 170-ton Type SAR-33 coast-guard boats with very high top speeds [Ref. 1: pp. 184-187].

## **7. Golcuk Naval Shipyard**

The need to dock the battle cruiser Yavuz Sultan Selim (ex-German Goeben) which was handed over to the Turkish Navy (Ottoman) in 1914 was the reason for building the Golcuk Naval Shipyard. The first step in the construction of the Golcuk Naval Shipyard was taken in 1924 by procuring 250 acres area for this project. An important improvement program was started after approval of the U.S. Aid programs

in 1947. Additional facilities were constructed using Turkish funds, and most of the equipment which is in operation today was supplied through these programs.

The turning point for the Golcuk Naval Shipyard came in 1962. A complete submarine overhaul was begun in cooperation with the Bureau of Shipyards and some U.S. specialists. Today, the shipyard has 1,300 major pieces of equipment, 28,000 tons of total lift capacity in floating docks, two slipways with dimensions of 150 × 24 and 80 × 20 metres. The yards has a building capacity for ships up to 30,000 tons and employs 100 qualified engineers and 5,000 workers.

After delivery of three 209 class submarines from HDW of Kiel, (Howaldtswerke-Deutsche Werft AG) Golcuk constructed two which went into service in 1981 and 1983. Another submarine is now under construction. Golcuk is now building two frigates of the Blohm and Voss MEKO 200 design with two others are being built by HDW of Kiel and Blohm and Voss of Hamburg respectively.

During the 1970s Golcuk built two escort destroyers, BERK and PEIK commissioned in 1973 and 1975 respectively. Turkish submarines of the IKL 209/1200 design are currently being built at Golcuk in close co-operation with HDW (under German License). [Ref. 1: pp. 187,188]

#### 8. Makina ve Kimya Endustrisi Kurumu (MKEK)

MKEK is the largest industrial organization in Turkey supplying the Turkish Armed Forces and the private sector. The history of the company dates back to the Ottoman Empire when military factories were erected in 1827 in different bases in Istanbul. These were subsequently moved to Ankara during the War of Independence in 1920 and reorganized under the General Directorate of Military Factories. Today, as a State Economical Enterprise, MKEK reports to the Ministry of Industry and Commerce and its performance is controlled by Parliament. It has 17,850 workers and 700 engineers [Ref. 1: pp. 171-174]. MKE runs twenty-one factories throughout the country and produces:

- Ammunition,
- Plastic anti-tank and anti-personnel mines,
- Hand grenades and fuzes,
- 25 lb practice bombs,
- 500 lb bombs,
- Illuminating bombs,
- Chaff ammunition,
- Demolition blocks,



- Propellant charges,
- G-3 automatic infantry rifle,
- MG 3 machine gun,
- MP 5 submachine gun,
- 81 mm mortars,
- 120 mm mortars (rifled),
- 105 mm tank gun barrel complete,
- 7.56 mm and 9 mm pistols,
- 2.75 inch rocket mortars,
- HAR anti-tank rocket.

The company obtained licences for the German G-3 (infantry rifle) and MG-3 (machine gun) from Rheinmetall and Heckler&Koch, and in 1981 licences from Oerlikon for the 20 and 35 mm anti-aircraft guns, and the MP-5 from Heckler&Koch (Germany). For extended range and APFS-DS ammunition licences were obtained from the American General Defense Corporation. MKEK is ready to implement "Low Altitude Air Defense Rocket" and air defense artillery fire control systems production. In addition, MKEK is participating in the production of STINGER POST and MAVERICK missiles within the European consortium [Ref. 1: pp. 171-174].

#### 9. Aselsan

ASELSAN Military Electronics Industries Inc. was established in November 1975 to supply the Turkish Army with modern electronic equipment. With present capital of about \$17 million, it is owned by the Turkish Ground Force Foundation (70.175%), the Turkish Air Force Foundation (12.4%), the Turkish Navy Foundation (13.5%), Turkish PTT (Turkish Mail-Telephone-Telegram Inc. 1.8%), the Turkish Police Foundation (1.75%) and OYAK Inc. (0.375%). ASELSAN is a very successful company, showing a 164 percent increase in annual sales, 205 percent increase in income and 68 percent increase in assets in 1985 [Ref. 1: pp. 175,176].

The company has 2600 employees of whom 270 are engineers. ASELSAN Inc. started manufacturing in late 1979 with license production of VHF equipment. Today, most of its products are its own design. Some of the current products are:

- 4600 Series VHF/FM Combat Area Radio Family,
- 4200/4500 Series VHF/FM Military and Professional Family (Its own design),
- 4800 Series VHF/FM Simplex/Duplex Synthesised Radios,
- 2400 Series Digital Encryption Equipment (Its own design),
- 2001 Telephone Scrambler (Developed by ASELSAN),

- 7420/Digital Message Device,
- 6500/TBX-Time Division Branch Exchange,
- Computer Controlled Warning Systems (Developed by ASELSAN),
- 1200/Electronic Training Sets,
- Industrial Electronics (DC Motor Control Systems, uninterruptable Power supplies, DC Power Supplies, etc. are designed and produced.

ASELSAN was also involved in the F-16 production program to produce some avionics subcomponents. The first export orders were obtained in 1984, and a year later exports reached \$12.5 million. In 1986 its export sales were \$20 million [Ref. 1: pp. 175,176].

#### 10. TUSAS Engine Industries (TEI)

As a consequence of the selection of the General Electric F110-GE-100 engine to power 160 Turkish F-16 C and F-16 D fighter aircraft, General Electric and its Turkish partners established a joint venture company in Turkey. Delivery of the co-produced engines for the Turkish Air Force began in 1987 [Ref. 1: p. 177].

#### 11. PARSAN Forging & Machining

PARSAN is a hot steel forging plant with special machining facilities for rear axle shafts, front axles, steering, and under carriage parts. It was founded in 1968 [Ref. 1: p. 177].

#### 12. TUSAS Aerospace Industries Inc.

As a result of an inter-government agreement, a \$4.2 billion joint venture to produce 160 F-16 fighter aircraft was formed between TUSAS Aerospace Industries, General Dynamics and General Electric. TUSAS Aerospace Inc. became a legal entity on 15 May 1984 and the agreement included transferring forty-two years of aviation expertise to the Turks. All but eight of the fighters will be built by TAI. In addition to manufacturing and assembling the F-16 for the Turkish Air Force, TAI will manufacture F-16 components for the U.S. Air Force. TAI has a contract with General Dynamics to build 101 aft fuselages, 80 center sections and 69 shipsets of wings. TAI will begin manufacturing components for USAF aircraft six months after the first components are built for the Turkish F-16s. According to Jerry R. Jones, managing director and deputy chairman of TAI, the joint venture company is slightly ahead of schedule and will be the lowest-cost producer of aircraft in the world because of very low Turkish labor rates. General Electric provides the F-110-GE-100 engines for the F-16s. A total of 177 engines are involved in the agreement. Westinghouse

Electric Corp., which builds the APG-68 radar for the F-16, is expected to form its own joint venture company in Turkey by the end of July 1987 [Ref. 20: p. 70].

### 13. OTOKAR

Otokar has established in 1963. It is one of the largest privately owned industrial and commercial conglomerates and owns 119 companies with sales of \$2.4 billion. Otokar produces buses, mini and midibuses, vans, pick-ups and armored security vehicles. It will manufacture both civilian and military Land Rovers locally with production capacity of 2,000 units per year including vehicles for the Turkish Armed Forces. [Ref. 1: p. 191]

### 14. OTOMARSAN

Otomarsan was founded in 1967. 36 percent of its shares are owned by Daimler-Benz of West Germany. At first, buses (Mercedes-Benz) were manufactured by Otomarsan under Daimler-Benz license. Today, it is a leader (77 percent of market share in Turkey) in long distance passenger buses. Otomarsan is an active exporter to the Middle East and North Africa (4,000 passenger buses and spare parts). Otomarsan obtained government permission to initiate the largest automotive investment project in Turkey and the Middle East for the production of commercial vehicles and diesel engines of all kinds. Within the framework of this project, Otomarsan will manufacture UNIMOG (a military field truck) and cross-country vehicles for the Turkish Armed Forces. Its new truck and engine plant in Central Anatolia will be the second important Mercedes concern in Turkey. The plant manufactures 14 to 26 ton trucks, NATO-type military tactical vehicles of 0.5, 1.5, 2.5, 5, and 10 ton capacity, engines for these trucks, road tractors, trailers, and other land vehicles with an annual production capacity of 5,500 trucks and 7,000 engines [Ref. 1: pp. 193-195].

### 15. METIS

The Metis Construction and Trade Company Ltd. is one of the leading companies in Turkey in the field of industrial, commercial and military construction projects [Ref. 1: p. 196].

### 16. TELETAS

Teletas produces telecommunication equipment of its own design and under license to assist in upgrading the telecommunications networks of Turkey. It employs 1,800 qualified workers and 300 engineers [Ref. 1: pp. 196-198].

#### **17. HEMA Hydraulics Manufacturing and Trading Company**

Hema was founded in 1972 in response to the growing demand for hydraulic equipment. Its main products are high-pressure hydraulic gear pumps licensed from Dowty and Plessey, hydraulic steering, mine props and sliding bar units manufactured with the technical assistance of Peine-Salzgitter, and lift covers for Ford, Fiat, John Deere and Tumosan tractors built in conformance with the appropriate U.S. and Italian standards. [Ref. 1: pp. 202,203]

#### **18. HEMA Electronics Inc.**

Its current products includes cruise recorders for land vehicles, intelligent teleprinters, digital message communicators, C3I terminals, on-line crypto systems, and various electronic modernization projects. [Ref. 1: p. 203]

#### **19. HEMA Gear Plant**

This company was registered in 1974 and began mass production in 1980. HEMA's annual capacity is 25,000 truck transmissions and differentials and 65,000 sets of tractor transmissions, differential gears and shafts. HEMA's products include: EATON/HEMA 475 SMA transmissions, EATON/HEMA 542 SMJ, 570 SMS transmissions, EATON/HEMA 16220 series two-speed differentials for heavy duty trucks up to 25 tons GVW suitable for on-and off-road applications. The plant is capable of producing all the EATON-FULLER transmissions, and all ZF type transmissions suitable for use on Mercedes, Chrysler Ford, BMS trucks, and all agricultural tractors. [Ref. 1: pp. 204,205]

#### **20. PROFILO Holding**

The Profilo Group consists of 45 companies and employs 9,000-10,000 people. Activities of the Profilo Group have concentrated on production of household appliances-mechanics, electronics, electro-mechanics, electronic components, electric motors, communications devices, copper wire, aluminium production, ship building, metal construction, prefabricated housing, solar energy, services and trading. [Ref. 1: p. 205]

#### **21. M.A.N.A.S.**

The M.A.N. Truck and Bus Industry Joint-Stock Company was established in 1966. Production in 1986 was 8,000 units (6,000 units in the Ankara Plant and 2,000 units in the Istanbul Plant). M.A.N.A.S. employs 1,225 workers and expects to employ another 8,000 to 10,000. The company produces mainly civilian or military heavy trucks and tractors. [Ref. 1: p. 206]

## 22. Recent Capabilities of the Turkish Military Industrial Base

The Turkish economy is in a transition to industrialization. Industrial product export has increased by 78 percent from 1980 to 1985. This is an indicator of this transition. Today, Turkey has the capability of producing all kinds of light and heavy diesel engines for land vehicles, small size diesel engines for locomotives, engines for all tactical and armored vehicles of the Turkish Army and Navy, and engines up to 700 HP. In 1985, there were 34 companies working under the Manufacturing Industry Regulations and 29 different licenses in the field of automotive production [Ref. 1: pp. 95-206]. Additionally, gears and transmissions, various gear pumps and accessories for hydraulic equipment and control systems, all forged parts and undercarriages of excavators and all the special steel material requirements of the automotive industry are produced in Turkey by the private and public sectors.

One of the important sectors in the defense industry is the iron and steel works. Total crude steel production capacity reached 7.3 million tons per year in 1985, and a capacity of 500,000 tons per year is planned for high quality steel production. Aluminium is also an important metal for the defense industry. The aluminium production capacity of Turkey is 60,000 tons per year. An increase in capacity of 90,000 tons per year is under consideration by modernizing existing plants. The domestic production of all types of aluminium end items is possible in Turkey today. In the aluminium casting industry, mass production of automotive and durable consumer goods and aluminium parts, is being realized in the desired quality and specifications. [Refs. 1,21: pp. 123-202,90-92]

### **B. TURKISH ACQUISITION POLICY FROM LATE 1940s TO 1980s**

The basic acquisition strategy of the Republic of Turkey in this era was to obtain external military assistance. Its main partners were the United States of America and after 1964 the Federal Republic of Germany. The historical development of the security assistance program and the strategy of the Foreign Military Sales (FMS) process will be examined in this section.

The United States of America and the Federal Republic of Germany are the only countries in NATO giving aid under a regular programme to those members of the alliance which cannot afford to adequately equip their forces. Such aid is given in the interest of the alliance in the form of money and material. The conditions and procedures of U.S. and German aid are different.

## 1. U.S. and Turkey Relations

Turkish/U.S. friendship dates to the late eighteenth century and was officially recognized by a treaty in 1830 [Ref. 17]. This close relationship continued with the announcement of the Truman Doctrine on March 12, 1947 [Ref. 22]. This relationship has strengthened both sides militarily. Turkey has gained strong allies and protection against U.S. S. R. while providing for the control of the Dardanelles and the Bosphorus in case of hostilities, a strategic communication and transportation link between Arab oil sources and the West, strategic information about Warsaw Pact military activities and the first line of defense for NATO's southern flank.

The Truman Doctrine signified the formal emergence of the United States as Turkey's chief supporter in the West [Ref. 4: p. 25]. This support by the West was a result of several factors. First, the constant threat of the Union of Soviet Socialist Republics (U. S. S. R.) to gain control of the straits, and second, the desire to have an economically and militarily strong Turkey on NATO's southern flank.

Describing his doctrine to a Joint Session of the House and Senate on March 12, 1947, President Truman said:

One of the primary objectives of the foreign policy of the United States is the creation of conditions in which we and other nations will be able to work out a way of life free from coercion. I believe that it must be the foreign policy of the United States to support free people who are resisting attempted subjugation by armed minorities or by outside pressures. In addition to funds, I ask the Congress to authorize the detail of American civilian and military personnel to Greece and Turkey, at the request of those countries, to assist in the tasks of reconstruction, and for the purpose of supervising the use of such financial and material assistance as may be furnished [Ref. 23].

After lengthy Congressional debate, an aid agreement was approved by both the House and Senate [Ref. 24: p. 1], and signed by President Truman on May 22, 1947 [Ref. 25: pp. 103-105]. This agreement provided Turkey \$152.5 million as military assistance [Ref. 26: p. 5]. In March 1948, the United States extended \$10 million in credits to Turkey [Ref. 4: pp. 31-32]. This was put into law upon the signing of the Economic Cooperation Act on April 3, 1948 [Ref. 27: pp. 137-158]. As a follow-on to these agreements, a U.S. - Turkey Mutual Defense Assistance Act was signed on October 6, 1949 [Ref. 28: pp. 714-721].

The Korean War provided Turkey its opportunity to join the North Atlantic Treaty organization (NATO). Turkey had joined the United Nations (UN) on August

15, 1945 [Ref. 29: p. 43]. On June 27, 1950 the UN Security Council invited the organization's members to repel the armed attack against the Republic of Korea, which was aided and abetted by the Soviet Union. In response to this request, the Turkish government sent a mixed brigade of 4,500 men to the conflict. This unit was the third largest to participate in this action, after the American and South Korean forces. As a result of their distinguished actions, the Turks were highly praised by the other forces [Ref. 30: p. 37]. In September 1951, both U.S. and Britain proposed full NATO membership for Turkey and Greece. This proposal was accepted by the organization, and on February 18, 1952, Turkey and Greece became full members of NATO [Ref. 4: pp. 41-44].

Cordial relations between the U.S. and Turkey continued until 1974. The relationship between the United States and Turkey continued well except for an arms embargo of Turkey. The embargo was in response to Turkish military action in Cyprus and was lifted in 1977. By the time the embargo ended, Turkish Armed Forces had been severely weakened. General Alexander Haig, the Commander of NATO, indicated in July 1978 that less than half of Turkey's aircraft were operational [Ref. 31: p. 8]. Less than a year later, in May 1979, the Chairman of the U.S. Joint Chiefs of Staff told the Senate Foreign Relations Committee that "at least one half of Turkey's major military equipment was inoperable, and much of the rest was obsolete [Ref. 32: p. 267].

Actually, Turkey's weaponry problem was recognized before the Cyprus conflict. In 1973, Turkey formally established a ten-year plan to provide for reorganization of its military and modernization of their equipment. The program, known as REMO, called for increasing amounts of funds to be dedicated to investment in modern military equipment [Refs. 5,32: pp. 25,256].

During the years of the embargo, Turkey considered different sources for obtaining military equipment and spares. One source considered was domestic production. The other important source was other NATO nations (especially Germany) and some Arab Nations. It can be said that the embargo encouraged Turks to seek better relations with her neighbors, but Turkey never accepted military aid from U.S.S.R. and the other Warsaw Pact nations.

With the lifting of the arms embargo and the 1980 Defense and Economic Cooperation agreement, a vast amount of aid came from the U.S. President Reagan has made it clear that he attaches great importance to increasing military aid to Turkey

while Secretary of Defense Caspar Weinberger has described it as "one of our most urgent priorities" [Ref. 33].

## 2. U.S. Security Assistance Programs

The two traditional goals of U.S. security assistance strategy are:

- To build coalition defenses against Soviet-inspired or other threats to U.S. global and regional interests,
- To enhance regional stability and contain regional conflicts by helping friends and allies to defend themselves.

In addition to these two overarching goals, there are six basic objectives for U.S. security assistance programs. They are:

- Promote Middle East peace,
- Enhance cooperative defense and security,
- Deter and combat aggression,
- Promote regional stability,
- Promote key interests through FMS cash sales and commercial military exports,
- Promote professional military relationships through grant training. [Ref. 11: p. 31]

During the last five years, the U.S. Congress and the Executive Branch together have affirmed the importance of Security Assistance as an element of U.S. foreign policy and defense strategy. Legislative changes to the Foreign Assistance Act and Arms Export Control Act, passed by Congress in 1981 and 1985, have added clarity and flexibility to Security Assistance programs [Ref. 11: p. 1]. Important changes in 1981 included the creation of the Special Defense Acquisition Fund (SDAF) and the clarification of overseas assistance and sales program management. The emergency drawdown authority under Section 506(a) of the Foreign Assistance Act of 1961 (FAA) has increased NATO cooperation in weapons development and procurement [Ref. 11: p. 25].

Today, various security assistance programs include Foreign Military Sales (FMS) credits (treasury and concessional), the Military Assistance Program (MAP), the International Military Education and training Program (IMET), the Economic Support Fund (ESF), and Peace Keeping Operations [Ref. 11]. The ESF program is only one component of economic assistance within the President's overall foreign assistance budget (60 to 40 percent ratio of economic to military assistance). In response to real worldwide needs, overall funding for security assistance grew by 84 percent from 1981 to 1986. Funding for the IMET program increased from \$28.4 million in FY1981 to \$54.5 million in 1986 [Ref. 11: pp. 3,24].



U.S. security assistance is addressed in a statutory sense in the amended Foreign Assistance Act of 1961 (FAA), and the Arms Export Control Act (AECA). The most comprehensive definition of security assistance can be found in Section 502B of the FAA. The term security assistance means:

Military assistance (Foreign Military Sales (FMS), Foreign Military Sales Credit Financing, the International Military Education and Training (IMET) Program, the Military Assistance Program (MAP)), the Economic Support Fund (ESF) or military education and training, peacekeeping operations, sales of defense articles or defense services to or for the armed forces, police, intelligence, or other internal security forces of a foreign country under Section 38 of the Arms Export Control Act [Ref. 34: pp. 2-1 - 2-11].

The U.S. Security Assistance Program actually consists of seven different assistance programs:

*The Military Assistance Program (MAP)* in which defense articles and related services, other than training, are provided to eligible foreign governments on a grant basis. During the 1950s and 1960s, this grant aid-type program involved annual authorizations and appropriations in the billions of dollars [Ref. 34: p. 2-12].

*The International Military Education and Training (IMET) Program* in which training is provided in the United States, in overseas U.S. military facilities, or by mobile training teams to selected foreign military and related civilian personnel. In earlier years, grant aid training of foreign military personnel was part of the MAP appropriation. In FY 1976, the FAA contains a separate authorization for IMET [Ref. 34: pp. 2-12,2-13].

*The Economic Support Fund (ESF)* is authorized by Chapter 4 of Part II of the Foreign Assistance Act. It was established to promote economic and political stability in areas where the United States has special security interests and has determined that economic assistance can be useful in helping to secure peace or to avert major economic or political crises. ESF is a flexible economic instrument which provides support for balance of payment support, infrastructure and other capital and technical assistance development projects. [Ref. 34: pp. 2-13,2-14]

*Peacekeeping Operations (PKO)* is authorized by Chapter 6 of Part II of the Foreign Assistance Act. It was established to provide for that portion of Security Assistance devoted to programs such as the Multinational Force and Observers (MFO), the U.S. contributions to the United Nations Forces in Cyprus (UNFICYP)

and other programs designated specifically for peacekeeping operations [Ref. 34: p. 2-13].

*The Foreign Military Sales Financing Program:* The FMS financing program consists of "direct credit" and "guaranteed loans". The direct credit program involves credit extended directly from Defense Security Assistance Agency (DSAA) to a foreign government. Israel and Egypt are participants in the direct credit program authorized in Section 31 of the AECA.

Some 39 countries participate in the guaranteed loan program. Under this program, a loan is made by the Federal Financing Bank (FFB) to the foreign government. The outstanding balance of the loan is "guaranteed" by a special guaranty reserve established by the U.S. government for that purpose. Guaranteed loans are repaid with interest. [Ref. 34: pp. 2-14,2-15]

*Foreign Military Sales (FMS) and Foreign Military Construction Sales Program* FMS is a program through which eligible foreign governments purchase defense articles, services, and training from the United States Government. The purchasing government pays all costs associated with a sale. In essence, there is a signed agreement (normally documented on a DD Form 1513--Letter of Offer and Acceptance) between the U.S. government and a foreign government. Each DD Form 1513 is commonly referred to as a "case" and is assigned a case identifier for accounting purposes. Under FMS, military items and services, including training, may be provided from DOD stocks (Section 21, AECA) or from new procurement (Section 22, AECA). If the source of supply is new procurement, the U.S. Government agency or military department assigned cognizance for this "case" is authorized to enter into a subsequent contractual arrangement with industry in order to provide the item or service requested.

Foreign Military Construction Sales, as authorized by Section 29 of the AECA, involve the sales of design and construction services to eligible purchasers. The construction sales agreement and sales procedures generally parallel those of FMS. [Ref. 34: pp. 2-15 - 2-17]

*Commercial Sales Licensed Under the AECA* is a sale made by U.S. industry directly to a foreign buyer. Unlike under FMS procedures, the sale transaction is administrated by DOD and does not involve an intra-government agreement. Rather, the U.S. Governmental control procedure is through licensing by the Office of Munitions Control, Department of State. Commercial licensed sales are authorized under Section 38 of the AECA. [Ref. 34: pp. 2-17,2-18]

Prior to 1979, over \$3.7 billion was provided to Turkey under the U.S. Security Assistance Program. Through 1987, FMS and MAP accounted for almost \$4 billion. Turkey is the third highest recipient of U.S. military aid among the 48 nations provided assistance, being surpassed only by Israel and Egypt. U.S. Security Assistance for Turkey reached a high point in the mid-80s with \$715 million provided in FY 1984. Aid dropped to \$700 million in 1985, \$615 million in 1986, and to \$490 million in 1987. While the U.S. Congress is well aware of Turkish requirements, these consecutive reductions reflect Congressional concern over the need for lowering the budget deficit within the United States. Despite these declining trends, it should be noted that there has been a marked increase in MAP grants for Turkey, in both total sums and as a percentage of the annual security aid. Over the past three years, there has also been an increasing amount of FMS credits provided to Turkey at the concessional 5 percent interest rate. In fact, by 1987, the Treasury rate credits were discounted in favor of concessional FMS credits.

This growing trend in grant aid and concessional aid partly offsets the recent overall reductions in security assistance. This type of aid provides a greater "dollar value" than the high interest Treasury rates. In addition, the International Military Education and Training Program (IMET) has enabled over a thousand Turkish personnel to participate in various programs during the past five years. The Economic Support Fund (ESF) is intended to provide balance of payments support, and is designed to help Turkey continue her policy of movement toward a free market economy. This fund is administered by the Department of State, and has followed a trend similar to that of security assistance for Turkey. It has steadily declined from \$300 million in 1982 to \$100 million in 1987. [Ref. 21: pp. 115-117] (See Appendix F for complete list of the U.S. Security Assistance to Turkey)

The majority of the U.S. security assistance package is being used for the F-16 C/D procurement/coproduction program, the M-48 tank modernization program, purchase of anti-tank missiles improved TOW, and TOW2, helicopters and artillery equipment, plus U.S. equipment for the Turkish MEKO frigates and for operational maintenance support of existing U.S.-origin weapon systems [Ref. 21: p. 116].

### **3. German Security Assistance**

Strong military assistance from Germany began in 1964, with a NATO defense donation being provided in 18-month installments. These installments began as 50 million marks in 1964, were raised to 100 million marks in 1969, to 130 million marks

in 1979, and are now \$200 million marks. A total of 930 million marks in aid were received by Turkey in this period under this program alone [Ref. 35: p. 13]. German assistance was especially valued because it was composed largely of grant aid.

German Defense Aid (in early years called "Military Equipment Aid") is given in 18 months increments. Each increment is now 200 million marks and consists of 80 percent new defense material of German origin and 20 percent of refurbished service material. In addition, another fifteen increments (called trances), amounting to 1.45 billion marks are given under the Turkey Special Aid Program. The equipment is subject to bilateral agreement under consideration of the Force Goals agreed with NATO.

In addition to Defense Aid, Germany twice gave surplus material as packages worth 650 million marks. The first section was given in August 1975 and the second, which started in 1979, will be terminated in 1986/87. For example, 12,000 motor vehicles have been given to Turkey.

Within the framework of the European Defense Improvement Program, Germany gave 16 TRANSALL C-160 transport aircraft worth 300 million marks. Four additional aircraft were included in a lot of Defense Aid. Germany accepted the obligation of logistics responsibility. Special Defense Aid amounting to 600 million marks including delivery of 77 LEOPARD 1A3 MBTs (Main Battle Tanks), four LEOPARD recovery vehicles, Milan anti-tank missiles and conversion kits for the modernization of 160 M-48 MBTs were provided between October 1980 and December 1983. Within the framework of NATO Military Aid, Germany has provided:

- Two tank repair installations at Arifiye and Kayseri,
- Plant for production of M-48 spares,
- Equipment for the production of parachutes at Kayseri,
- Establishment of a standards and calibration organization and repair installation for fire control equipment at Yenikent,
- Extension of an optical plant (Zeiss),
- License to produce MTU (Motoren-and Turbinen-Union) diesel engines for the M-48 MBT,
- Establishment of a plant to produce 105 mm gun barrels at MKEK's (a Turkish company) Kirikkale plant (Heckler & Koch with Royal Ordnance as subcontractor) and plans to build a steel plant (Vereinigte Edeltstahlwerke),
- Logistic support of 20 TRANSALL transports,
- Equipment for the two overhaul shops for Rolls Royce TYNE engines in Eskisehir,

- Assistance in modernization of two naval shipyards (Golcuk and Taskizak),
- Construction of two submarines (HDW),
- Material, parts and sections for four additional submarines (HDW),
- FRG Nato Defense Aids partly or completely support these projects.

As the above list shows, the majority of items served to improve or establish maintenance and production facilities in Turkey. This means that military aid has been a means to improve the country's defense industrial capacity [Ref. 1].

Another important feature of the Turkish-German military alliance was that most of the procurements involved coproduction agreements, meaning that some parts of them were produced in Germany and some in Turkey. In 1977, Germany and Turkey agreed to a package which would provide four submarines. Two of these were produced in Germany and turned over to Turkey. One additional submarine, produced partly in Turkey and partly in Germany, was commissioned in 1980. The last was produced fully in Turkey with German assistance [Ref. 36]. There were some additional packages such as Fast Gun Boats coproduction, Leopard tank procurements, up-gunning and dieselization of Turkish M-48 tanks, the delivery of launchers and roughly 5,000 Milan anti-tank guided weapons [Refs. 35,37]. In 1980, Bonn agreed to 600 million marks of special military assistance with grants of 150 million marks every 18 months, supplemented by further aid through December 1982 within the framework of the European Defense Aid Program [Ref. 37: p. 743].

#### 4. U.S. Foreign Military Sales (FMS) Process

As previously stated, U.S. military assistance to Turkey has been significant since the relationship between the two nations was established. In the 1950's and early 1960's, the U.S. military assistance began with large amounts of grant aid, but the emphasis shifted from grants to foreign military sales (FMS) in the late 1960's.

There are three types of FMS cases. These are 1) Defined Order cases, 2) Blanket Order cases (most blanket order cases are for follow-on support materials or services), and 3) Cooperative Logistics Supply Support Arrangements (CLSSA). Under a CLSSA, the U.S. government purchases, stores, manages, and issues spare and repair parts to the foreign customer using the U.S. logistics system. The purpose of a CLSSA is to provide the customer with the same peacetime support as that given U.S. forces having the same priority [Ref. 38: pp. 1-1 - 1-12]. See Appendix C for a more complete presentation of the FMS planning structure and FMS implementation process.

Normally, prior to the receipt of a customer's formal Letter of Request (LOR) for data leading to the sale of a major weapon system or equipment, discussions and informal exchanges of information have already occurred. Sometimes the discussions or exchanges are conducted under the terms of a Memorandum of Understanding (MOU).

DOD policy, with respect to transportation and delivery of FMS material, states that normally these actions will be accomplished by the foreign government. The initial point of shipment is the point of origin. The point of delivery is the point where responsibility for the physical movement of the FMS material passes from the U.S. Government to the foreign government. Shipment of classified and certain hazardous materials are made within the Defense Transportation System (DTS). The DD form 1513, Letter of Offer and Acceptance (LOA) is the primary document used to convey the estimated FMS case price to the foreign government. In addition, this document identifies the conditions and terms of sale, and the accompanying type of assistance codes which indicate the payment schedule; whether the sale is to be financed on a cash or credit basis [Ref. 39].

As the administrator of the FMS program, DOD has the responsibility for pricing defense articles sold. In general, material offered for sale through an FMS case will be priced following the same cost principles used in pricing defense articles for DOD use. Surcharges are added to ensure:

- Recovery of all cost incurred by DOD components,
- A reasonable contribution to cost incurred in RDT&E and establishing the production facilities for the article,
- An administrative charge for use of the DOD logistics system. [Ref. 40: p. 7-3]

In addition to the broad objectives of Security Assistance Programs previously presented, FMS has many benefits to the seller. The Security Assistance Program, through cash and financed sales, supports as many as 650,000 jobs in the U.S. and thus has a very positive economic impact [Ref. 11]. It provides military benefits in the form of base rights. The Military Facilities Agreements gave the U.S. permission to build military bases on Turkish soil. FMS has lowered per unit production costs as a result of economies of scale and increased production experience. This in turn lowers weapons costs to the U.S.. By selling weapons to foreign customers, the number of units produced increases and that lowers the unit cost of the weapon. The recovery of research and development costs are the most direct source of savings. Perhaps the most expensive and risky part of the weapon system acquisition is the research and development phases. With FMS, the foreign purchaser shares a part of these costs.

Once initial orders are satisfied, it may become necessary to close production facilities and to later reopen them when additional orders are required. Both the closing and reopening of production facilities involve expenses which add to U.S. procurement costs. If foreign orders for these items can be interspersed with U.S. orders, production is maintained and the closing and opening costs are saved. Many defense industries, the aerospace industry in particular, have come to depend on FMS to remain solvent (especially during the post-Vietnam era). During the Vietnam era, the U.S. military required large amounts of military equipment and the U.S. military industry flourished. After the war, domestic needs for weapons declined rapidly and many U.S. defense arms sold their excess capacity outside the U.S..

There are other benefits of FMS to the seller as well. FMS promotes friendly ties from which good trade relationships can be built. It frequently provides the opportunity for increased sales of nonmilitary items to recipient nations. Generally speaking, weapon exporting countries are highly industrialized while recipients are developing countries. FMS and friendly relations may provide a chance for recipients to import their other non-military needs. The sale of domestic products to a foreign purchaser generates a significant indirect flow of funds to the treasury.

There are also real benefits to Turkey as a result of FMS. It creates political and military support. The U.S. is a key ally for Turkey . Shortly after World War II the Soviets tried to take control of the Bosphorus. President Truman's response was to send the battleship USS MISSOURI to Turkey. Military assistance provides Turkey with new technology capabilities and weapons with high technology (e.g., F-16 aircraft project). It helps Turkey's economic development. The Economic Support Fund has a direct positive effect on the Turkish economy. Local production by coproduction and licensing agreements create job opportunities for Turkey. It also helps to create a stabilizing influence in the area. Weapons acquired from FMS provides Turkey with military deterrence.

But FMS is not without disadvantages to the seller. Once delivered, the U.S. has limited control over FMS material whether it be technology, weapons or information. FMS allows other countries to gain high technologies which had previously been exclusively held by the U.S.. Technology may not be the only loss with co-production and licensing agreements. These agreements also result in a loss to U.S. labor, assuming the countries involved would buy directly from the U.S. if no co-production or licensing alternative were available. Additionally, there are increased

manpower cost associated with the many personnel for the administration of the foreign military sales by DOD and the U.S. Army, Navy and Air Force.

There are also some disadvantages to Turkey in the FMS process. Turkish foreign debt has grown in the last several years. The proportion of the military debt in relation to general foreign debt has increased in recent years. Another economic problem that Turkey has is the foreign currency problem. Repayment costs of foreign military sales has increased after the shift from grant sales to loan sales. Repayment costs for past FMS loans were equal to nearly half of the total new FMS credit program in 1980 [Ref. 5]. Another disadvantage is the long lead time involved in FMS. The time between sending the MOU (memorandum of understanding) and receiving ordered material is relatively long because of FMS procedures and the distance between Turkey and the U.S.. This is an acute weakness in the event of war. Finally, the dependency on foreign governments for defense needs results in no indigenous capability and can lead to having old weapons systems. Turkey is one of the largest recipients of U.S. military assistance in the world. However, with the exception of recent agreements, most Turkish weaponry is not current, front line systems.

### C. TURKISH ACQUISITION POLICY IN 1980s

Having already discussed FMS in detail, this section will examine the present acquisition policies and strategies of Turkey.

Due to the state monopoly, Turkish private industry had not been able to enter the defense industry until 1985. On the other hand, the Turkish defense industry giant MKEK and several other publicly owned companies have been suffering from financial difficulties and have not been able to realize new investment opportunities. Investments by foreigners in this area had been prohibited or strictly regulated. After the adoption of the new economic policy, Turkish authorities applied a more liberal policy toward establishment of a modern defense industry in Turkey. This was done with the help of the Turkish private sector in collaboration with foreign technology and capital. The instruments of this new policy have been brought by Law No. 3238 (See Appendix D) enacted in November 1985 [Ref. 41].

Current defense procurement activities can be divided into two different categories. First, annual procurements by the Ministry of National Defense (MND) which are a short term business opportunity in the sense that it will be a one time sale



contract. The second category is long term procurements realized by the newly founded Defense Industry Support and Development Fund Administration (DIDA). These procurements are long term business opportunities.

Military mission needs and requirements are determined by the Turkish General Staff (TGS), and take into consideration current developments related to present enemy threats. TGS examines deficiencies and technical opportunities. These needs and requirements are translated into a Five Year Plan for Strategic Goals (FYPSG). This plan is subject to annual review and is also referred to as a Rolling Plan. Annual procurement programs within the plan are implemented by either MND or DIDA. The plan indicates the amount of material to be procured, the procurement schedule and their related financial source. The financial sources of defense expenditures are:

- Annual budget of Ministry of National Defense(MND),
  - Accumulated funds of DIDA,
  - Accumulated funds of the Army, Navy, Air Force foundations,
  - Credits and grand aids from the NATO allies,
  - Commercial credits from countries that are in defense cooperation with Turkey.
- [Ref. 21: p. 90]

The guiding principle in today's Turkish Armed Forces' modernization drive is to strive for self sufficiency through local production. Therefore, a special law set up DIDA with the objective of "development of modern defense industry and modernization of the Turkish Armed Forces" according to the law's preamble. This law instituted a number of tax levies on sales of cigarettes, alcoholic beverages, lotteries and gambling, on all imported goods, and on income taxes, and resulted in approximately \$1 billion in revenues for DIDA. In addition, the procurement share of the defense budget now comprises one fourth of all government spending. Combined with security assistance of \$800 million annually from the United States and \$200 million per year from West Germany, these revenues mean Turkey now has some \$4 billion a year to spend on arms [Ref. 18].

The Financial Planning and Programming Department of the Turkish General Staff (TGS) is responsible for the coordination of these financial sources for procurement purposes for the current fiscal year. In accordance with Law No. 1325, MND is responsible for the procurement of defense material for the Turkish Armed Forces (See Appendix D; Law Concerning the Establishment of DIDA).

According to the related annual procurement program, weapons procurement is carried out either through in-country expenditures or international procurement. In all cases, State Tender Law No. 2886, State Accounting Law No. 1050, and Supreme Accounting Court Law No. 832 are applicable (See Appendix D). Law No. 2886 is the basis of procurement in Turkey for in-country defense businesses and no action can be taken which is not in accordance with it.

For the implementation of annual procurement programs, a Department of Economy and Technology was founded within the organizational structure of MND. The head of this department is also the Deputy Undersecretary of MND (See Figure 3.1). Although the Minister of National Defense is the sole authority for the utilization of the MND budget, the budget is shared among the three forces and TGS. The Gendarmerie comes directly under the Ministry of Internal Affairs. For the implementation of any procurement project, the related force is expected to transfer the necessary financial funds to MND.

The technical specifications for a procurement project are prepared by the force command concerned. For a specific procurement project the specifications are made available at MND. If a tender or proposal does not fulfil the technical specifications in all aspects, it will not be considered valid during the evaluation phase. When applicable, MND sends a Request for Proposal (RFP) to selected firms. The proposal should meet all the conditions of the request format. Proposals which are not submitted on time or which are untidy or incomplete, are not considered by the Evaluation Committee. For each specific procurement project, a separate Evaluation Committee is assigned. During the evaluation phase, only the Evaluation Committee can initiate specific and detailed questions in writing to the firms. The requests of firms for a briefing or demonstration cannot be taken into consideration.

All evaluations are made by mathematical and scientific and engineering methods. These activities are regulated by MND Directives L-11, L-12, L-13. During the first part of the evaluation phase, the Committee does not make price comparisons. At the end of the second phase of the evaluation, which takes into consideration the technical specifications and prices, the firms are sometimes called in for a final price reduction. According to procurement regulations, competing firms can be invited to provide a demonstration or field trials in order to show the performance of their products. If the specific procurement requires investment and coproduction in Turkey, the project is transferred to DIDA for a further evaluation of the industrial, economic

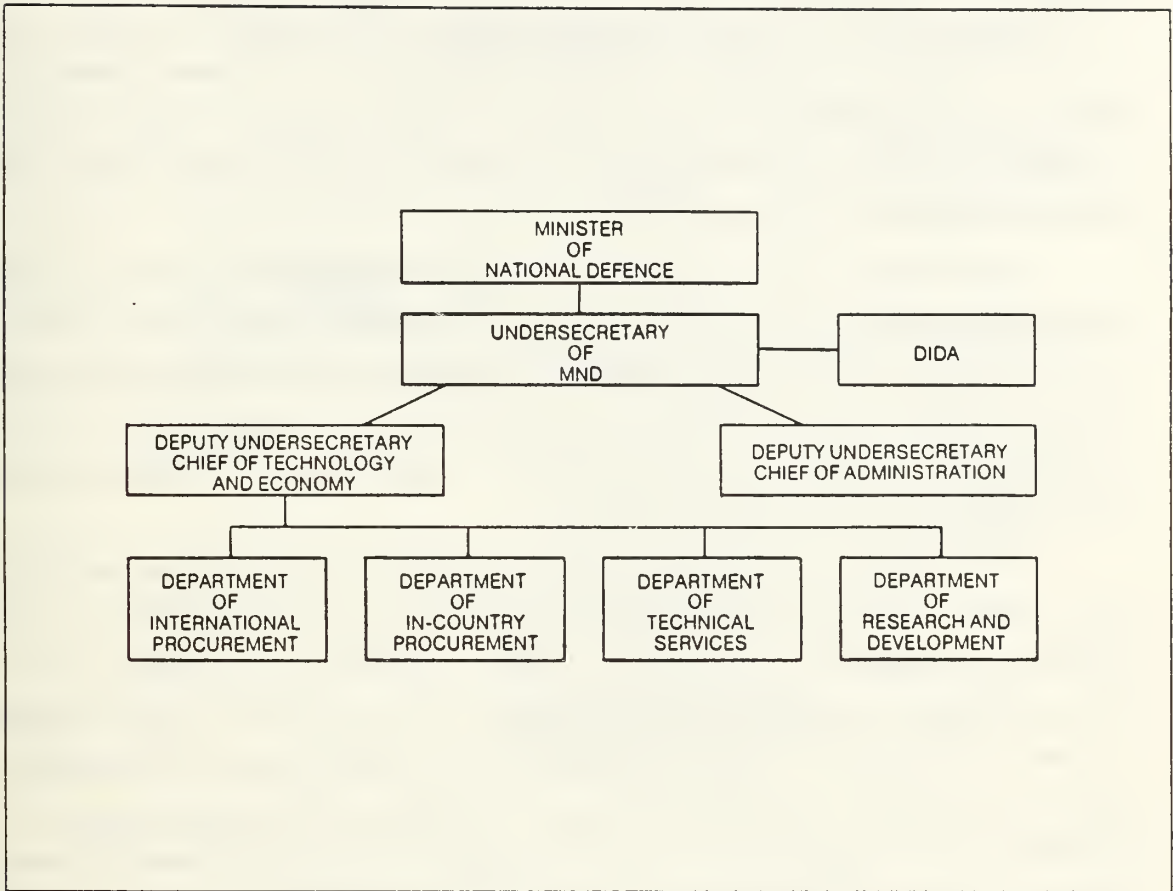


Figure 3.1 Organization Chart [Ref. 21 : p. 90].

and financial aspects of the investment. Such a procurement project could also start with DIDA from the beginning.

Turkish defense equipment procurements can also be carried out by the Federal Procurement Office (BWB) in the Federal Republic of Germany (FRG), on behalf of the Turkish MND. In this case, MND sends the technical specifications and makes a request for procurement in the FRG. After the draft contract between the selected German firm and BWB is approved in Ankara, procurement procedures are finalized by BWB in Koblenz, FRG. In such a case, the procurement projects could be financed either by the Turkish national budget or by German Defense Aid Funds. In the latter case, German procurement regulations would be used.

Quality control during the production phase and final acceptance tests is executed by quality control experts of MND at related facilities. If the production takes place in a NATO country, MND can send a written request for STANAG

(Standardization Agreement in NATO) 4107 and 4108 to be utilized for quality control. In this case, quality control will be carried out by that country's military quality control experts on behalf of the MND. When the procurement phase of the acquisition is completed, further logistics functions such as storage, distribution, operation and maintenance as well as, and more importantly, product improvement and modernization of equipment follow.

The Defense Industry Development Administration (DIDA) plays an important role in the long term project of the modernization of the Turkish Armed Forces. Law No. 3238, enacted in November 1985, determines the conditions by which this fund (defense industry support fund) will be utilized and, consequently, the fund administration, DIDA, has been established. The structure of DIDA, was also determined by this law (See Appendix D).

Law No. 3228 also established a two-tier decision making mechanism including the Defense Industry Supreme Co-ordination Board and the Defense Industry Executive Committee (Committee). DIDA receives the directives for the implementation of defense industry projects from the Defense Industry Executive Committee (Committee) which is responsible for the final decision on determination of the ways and means of procurement programs, financial and economic incentives to be provided to the manufacturers, long term orders and essential issues of financing through the fund. This committee is chaired by the Prime Minister and the Chief of General Staff and the Minister of National Defense are members of the committee. Above the Committee there is the Defense Industry Supreme Coordination Board (Board), which is also chaired by the Prime Minister and its members consist of the Chief of General Staff, the Minister of National Defense and the Force Commanders. One of the important functions of this board is to determine the type of procurement; i.e. direct purchase, investment and in-country production, coproduction with a foreign partner, and government involvement of a procurement project in Turkish industry. Within this context, the board observes the plan for strategic goals which was discussed at the beginning of this section. A flow chart of the decision making mechanism for a long term procurement is shown in Figure 3.2.

In order to offer sound cooperation opportunities to foreign investor industrialists and Turkish private industry, the Committee is authorized by law to give decisions in accordance with the directives of the Supreme Coordination Board on the following:

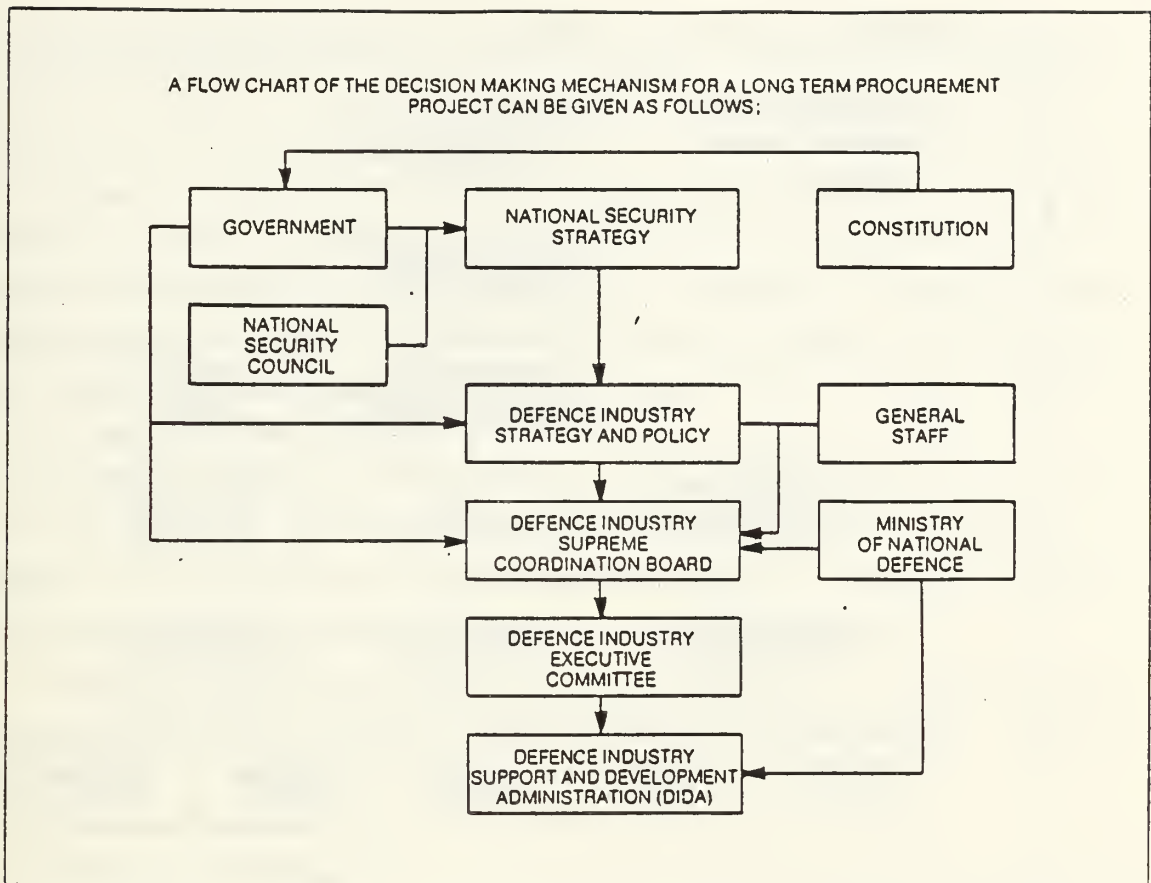


Figure 3.2 Decision Making Process [Ref. 21 : p. 91].

- Implementing procurement plans and programs that are to be determined in the Plan for Strategic Goals,
- Developing a modern defense industry in Turkey, which will incorporate the private and government sector industries through foreign investment, high technology transfer and Turkish Government involvement for investment and finance,
- Organizing and coordinating industrial research and development and prototype manufacturing,
- Making advance payments and financing multi-year procurement projects,
- Determining economic and financial promotions and exemptions for industrial investments.

The inter-relationship of the Board, Committee and DIDA and the utilization of the Defense Industry Support and Development Fund by DIDA is shown in Figure 3.3.

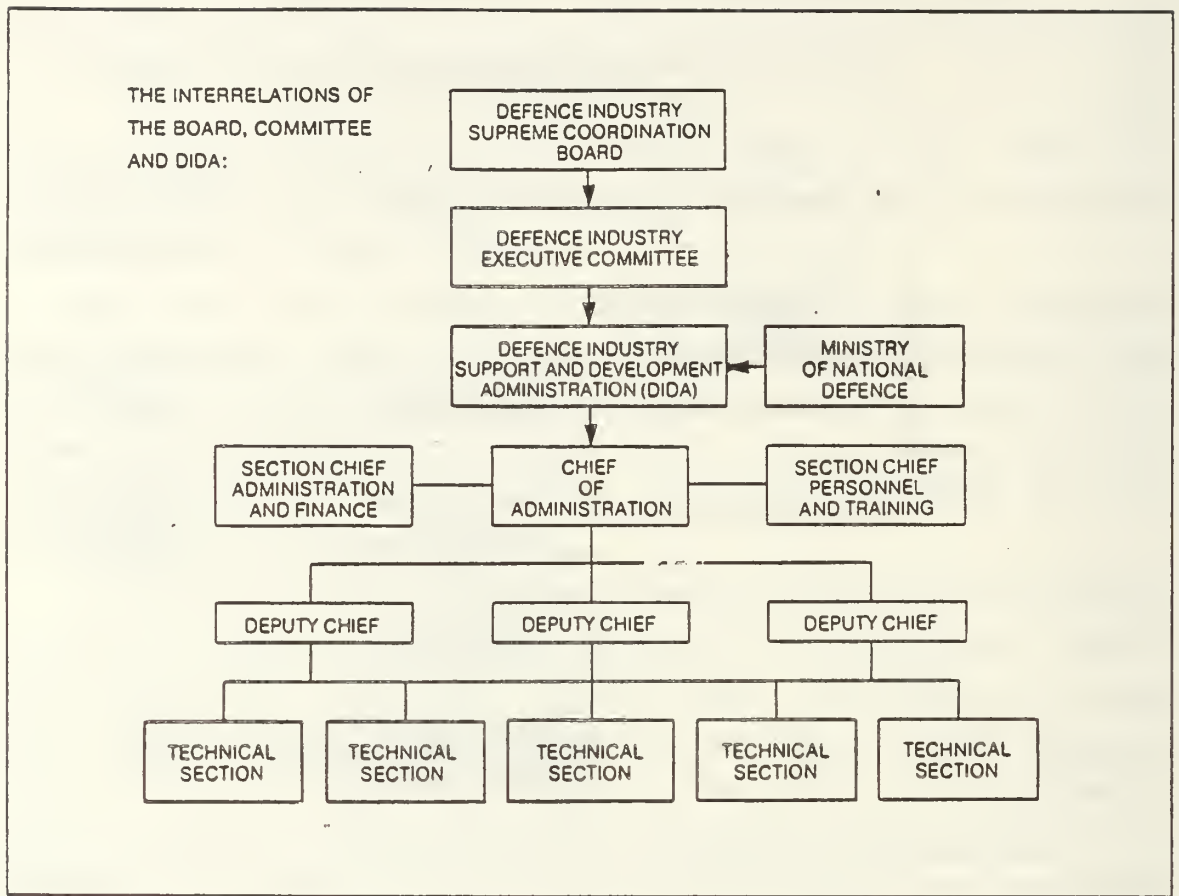


Figure 3.3 Interrelations of the Board, Committee, and DIDA [Ref. 21 : p. 90].

DIDA is the organization responsible for all the ground work of this system. Its responsibilities start after the point where the planned requirements of the Turkish Armed Forces are determined and extend up to the point when the weapon, material or equipment is taken out of use by the Turkish Armed Forces. During this long and complicated process, DIDA conducts strategic evaluations; issues requests for proposals; calls for tenders; makes technical, economic, financial and management evaluations and submits the final appraisal reports of the projects to the Committee. After the decision of the Executive Committee, the implementation of the programs are carried out by the Administration, including contracts and quality and technology control work. DIDA is also the authority to evaluate or to coordinate evaluation studies of all investment or production proposals for defense-related industrial products to be manufactured within Turkey.

The chief executive officer of the Administration is called the president and also serves as the Secretary of the Executive Committee. He is assisted by three vice-presidents and seven heads of departments. The studies of project appraisal are carried out by experts in special working groups. The law obliges ministries and all other government and military organizations to support the Administration with personnel and expertise when necessary. The Administration is organized to accomplish its task with the least possible bureaucratic limitations. General Accounting Law No. 1050, State Tender Law No. 2886 do not apply for the contracts and expenditures of DIDA. It is also exempt from certain taxes.

The Defense Industry Support Fund is an accumulated resource of financial power, not limited by the fiscal year. The fund can be used for the purpose of unlimited advance payments and credit loans in financing multi-year industrial investments. By special arrangement, the fund provides extra incentives.

Turkey also offers several incentives to defense projects in the framework of the foreign capital law (Law No. 6224 "Encouragement of Foreign Capital"). Some of these are:

- Customs exemption,
- Investment allowances,
- Low interest domestic and foreign investment credits,
- Importation of used plants,
- Exemption from building construction taxes,
- Allocation of foreign exchange,
- Exemption from taxes, duties and fees on medium and long term credits involving export commitments,
- Source utilization support premium,
- Leasing,
- Incentive premium for domestically obtained machinery and equipment,
- Postponement of Value Added Tax for investment goods.

In defense investments, Turkey desires to make the optimal use of existing public and private sector capacity, which is believed to be the best way in order to save time and money. Therefore, the idea of utilization of existing state-owned industrial facilities, either in the form of in-kind capital contribution or by means of leasing and similar arrangements, is open for negotiation. [Ref. 41]

The approach for a possible cooperation in Turkey in the defense field is an important factor in establishing healthy relationships. Irrespective of whether a long-term or a short-term procurement project is condoned, the project initiation is either by a call for tender or by the issue of a request for proposal by MND, (not by DIDA in this case). This will be made official by declaration in the daily Official Gazette. As discussed before, after initial evaluation is completed, the whole project will be transferred to DIDA for the further evaluation of the selected proposals within industrial investment and financial parameters. Demonstration and field programs are carried out by a group of experts under the coordination of DIDA.

Product improvement and equipment modernization projects are also large scale business opportunities in Turkey. Current equipment modernization projects operational in Turkey are:

- Tank modernization,
- APC modernization,
- Artillery modernization,
- Frigate modernization,
- Shipyard modernization,
- REMO-II project of the Air Force,
- Fighter aircraft modernization.

The Armored Combat Vehicle procurement project is an example: Military design specifications based on minimum tactical requirements were detailed by a group of experts at MND. Proposals, as requested and delivered, were evaluated, taking into consideration the technical, tactical and performance characteristics of the proposed systems. After this phase, an order of preference was prepared by the mixed Working Group at MND. The outcome of the evaluation study was presented to TGS for approval. The whole study, as well as the order of preference, was sent to DIDA. Evaluation studies of the economic, financial and size of the investment aspects are currently continuing at DIDA. At this stage, the results of the field trials and the reliability of the Turkish partner play an important role in the final decision for the selection of the system.

In the case where the nominated Turkish partner was a government owned body, or where a major holder is one of the Foundations, MND is permitted by law to make a request for proposal directly through this body, provided that the product, subject to the proposal, has already been selected by MND. The selection mechanism has



already been discussed. In such a case, the foreign partner will sign a license and/or coproduction agreement with a Turkish partner, before the submission of the proposal to MND by the Turkish Partner. In these cases, DIDA can take on the role of MND, thus being able to benefit from the exemptions granted to DIDA, in order to function more flexibly in dealing with the private sector. [Ref. 21: p. 116]

#### **D. SUMMARY**

An embryonic Turkish national defense industry had been started around 1925. State owned and private aircraft factories began to manufacture aircraft under licenses from several European countries. Licensed production thereby developed aircraft design capabilities within the country. In the mid-1930s, an aircraft of domestic design had been realized. At the same time, weapons, ammunition production and shipbuilding capacity had been developed. By the end of World War II, industry was geared to a war economy and more than half of the national budget was allocated to defense.

By 1945, there existed some potential for further growth in the Turkish defense industry. However, economic development assumed a higher priority, and U.S. military assistance removed the incentive to develop defense industries further. Since the late 1940s, FMS has been the major acquisition strategy for Turkey.

Today, Turkish military needs can be expressed in the billions of dollars. These urgent military needs are considered an opportunity to lower the high domestic unemployment rate and to balance foreign trade.

The lessons learned from previous traditional acquisition strategies are that more emphasis is required on the life cycle cost phenomenon. Acquisition decisions should be made after initial planning on logistics supportability . It should be determined if the system can be economically supported throughout its programmed life cycle. This is logistics support analysis. Life cycle cost is the major parameter in this analysis. In the evaluation of alternatives, the life cycle approach must be considered. Life cycle cost (LCC) involves all costs associated with the system life cycle, to include:

- Research and development (R&D)cost,
- Production and procurement cost,
- Operation and maintenance cost,
- System retirement and phase out cost.

[Ref. 42]

There should be a reasonable trade-off between LCC and system effectiveness. This is expressed as the performance, availability and dependability of the system. Alternative acquisition policies must be evaluated by using life cycle cost and long term system effectiveness and supportability not only procurement cost. The next chapter will discuss alternative acquisition policies which can be used now and in the future by Turkey and which consider the long term cost and support of systems.

## IV. TECHNOLOGY TRANSFER AND ALTERNATIVE ACQUISITION POLICIES

### A. INTRODUCTION

#### 1. General

In this chapter, four acquisition strategies will be examined in order to support the determination of which is the best alternative to meet Turkey's objective of obtaining modern, supportable weapon systems. These strategies are: coproduction, technical data package, licensing and buy-out. The main purpose of this chapter is to explore advantages and disadvantages of the acquisition strategies, however, before beginning that discussion a fundamental knowledge of technology transfer is required.

#### 2. Technology Transfer Process

Technology transfer is the process of transferring, from the industry in one country to another or between countries, technical information relating to design, engineering, manufacturing and production techniques for hardware systems using recorded or documented information of a scientific or technical nature. Technology includes intellectual property (IP). Intellectual property covers a broad range of managerial and technical knowledge and expertise, and includes inventions, patented or not, trademarks, industrial designs, copyrights and technical information including software, data, designs, technical know-how, manufacturing information and know-how, techniques, technical data packages, manufacturing data packages and trade secrets. Intellectual property rights (IPR) has been defined as "the rights to use or have used IP, and include rights derived from patents, trademarks, trademarks, copyrights, industrial designs, contract clauses, disclosure in confidence techniques, or other means of control of IP." [Ref. 34: pp. 13-18 - 13-30]

A patent is a grant of certain monopoly rights conferred by a government on an inventor by virtue of his invention and enforceable for a certain period of time, and only within the territorial limits of the country in which it was granted. The monopoly granted to the patentee excludes others from making or using the invention by enabling the patentee to bring suit for infringement. In this sense, a patent cannot prevent infringement, but it does provide for redress.

The other major right usually granted in a technology transfer is know-how. Know-how is a generic term, embracing everything necessary to implement the transfer

objective exclusive of patents and trade marks. Included may be trade secrets, manufacturing process and techniques, specifications, charts, formulae, drawings and blueprints, marketing techniques, and professional advice. The list is exhaustive. Essential to the value of know-how is that it not be readily known or available to the public.

*a. U.S. Technology Transfer Process*

Technology transfer is involved in many acquisitions in Turkey today. The main partners of Turkey on technology transfer issues are the Western allies (especially the U.S. and Federal Republic of Germany). The U.S. has the most public (and probably most carefully reviewed) policy process of any nation supplying arms technology as well as a strongly moralistic tone to its policies [Ref. 43: p. 3]. Most technology-source nations stress only their own domestic situation and diplomatic goals when considering technology transfer opportunities; one Reagan administration official said the major Western allies of the U.S. "approach arms sales primarily as a commercial matter" [Ref. 44]. But the U.S. decides not only how the potential transfer affects its security, but also if it is the "morally right" thing to do. The U.S. also considers whether the country can actually absorb the technology in a useful way. [Ref. 43: p. 3]

In 1969, the "Nixon Doctrine" or "Gaum Declaration" was the first policy on transferring technology in the U.S.. This doctrine held that the United States should establish regional security by persuading countries in the developing world (especially in the Far and Near East) to become "clients" of the United States. These countries would receive material aid from the U.S. government, although they essentially would be on their own in terms of maintaining their defense. Consequently, the U.S. would be providing these countries with weapons and production know-how. [Ref. 45: pp. 660-681]

Carter's policy directive (PD-13) espoused traditional American ideals and gave an explicitly moralizing tone to U.S. arms technology transfers and arms sales. Carter wanted to limit arms and technology transfers. The directive also banned most coproduction agreements with the Third World. His declaration however, was not followed (e.g. there were still massive arms sales to Iran) [Ref. 46: pp. 40-47]. President Reagan renounced the moralistic Carter doctrine on arms sales. Technology transfer in general is a major concern of the Reagan administration. [Ref. 43: p. 8]

Under the Export Administration Act of 1965, as amended by the Equal Export Opportunity Act, the U.S. Department of Commerce has licensing jurisdiction over commodities and unclassified technical data except for certain specified items by the U.S. National Disclosure Policy, International Traffic in Arms Regulation, Arms Export Control Act, Export Administration Regulation and other statutory or administrative policies. Some factors that are considered concerning technology transfer and information disclosures are:

- Releasability of classified information,
- Releasability of sensitive advanced technology,
- Arrangements and agreements for handling intellectual property rights.

When these factors are not resolved early on, they can be expected to result in problems with technology transfer.

The U.S. National Disclosure Policy provides that classified military information is a national security asset. The basic disclosure policy was issued in 1971 by the National Security Council with Presidential approval. Under the policy, the Secretaries of State and Defense are jointly responsible for controlling the disclosure of classified military information to foreign entities. The basic policy governs the disclosure of military information. Such military information is information under the control of, or primary interest to, the DOD and its departments or agencies and which requires protection in the interest of national security. In this context, disclosure refers to a foreign government or an international organization, such as NATO. The most important aspect of the policy is that classified military information is a national security asset, an asset that must be conserved and protected, but which may be shared with foreign governments and international organizations. However, this asset is shared only when there is a clearly defined advantage to the U.S. . Before deciding to disclose classified military information, five objectives must be satisfied:

- The first is that the disclosure must be consistent with the U.S. foreign policy toward the recipient nation or organization,
- The second objective is that the disclosure must not seriously jeopardize the military security of the U.S.,
- The third policy consideration is the assessment of the foreign recipient's ability to give the information substantially the same degree of security projection that the U.S. gives it. This is designed to reduce the risk in sharing information. The DOD is responsible for negotiating these agreements, which it does through the U.S. Embassies,

- The benefits to the U.S. must be at least equivalent to the value of the information disclosed,
- The last consideration is whether the information to be provided is sufficiently limited only to that which is necessary to accomplish the purpose of disclosure. [Ref. 34: pp. 13.18-13.30]

The first step in the technology transfer process is often the licensing agreement which generally provides for a technical data package (TDP) and technical assistance for the licensee to produce a portion or all of the system to the performance standard achieved by the licensor. Licensing agreements, involving the export of hardware and technology, may require approval by the appropriate government agencies. The Mutual Security Act of 1954 dealing with the export of ammunition and implements of war, Export Administration Acts of 1965 and 1979 applying to exports not covered by the Mutual Security Act and establishing the requirement for the Militarily Critical Technologies are applicable.

The International Traffic In Arms Regulations (ITAR) is a State Department regulation which implements the Mutual Security Act. Section 414 of this Act provides that the President is authorized to control the export and import of arms, ammunitions and implements of war, including the technical data relating thereto. The Act further specifies that all persons engaging in such trade must register with the appropriate Government agency. The munitions list is contained in the ITAR and includes twenty-two categories of articles such as firearms, artillery and projectiles, and ammunition. If an item is on the munitions list, an export license is required for its sale, for the granting of the rights to manufacture the item and technical assistance pertaining to it, and for the export of technical data related to it. An export license may cover all or some of these categories. As such, the export licensing on a particular program may involve a single license or a series of licenses.

Military industrialization technology can be obtained from the U.S. in any of four ways:

- Commercial Transactions,
- Government-to-government transfer,
- Transfer of ostensibly civilian technology (dual-use military and civilian),
- "High politics". The U.S. will offer technology to a developing country, usually in conjunction with a head of state's visit or as an incentive to take a difficult diplomatic step. [Ref. 43: p. 11]

Figure G.1 (See Appendix G) illustrates the general process of U.S. technology transfer.

To obtain a license for an item on the munitions list, the Turkish Government should apply to the U.S. State Department. The State Department request DOD formally comment within 20 days on the advisability of granting the license. An application for export of a U.S. Munitions List article follows the sequence depicted in Figure G.2 through G.7. (See Appendix G).

***b. Technology Transfer Policy of West Germany***

Federal Republic of Germany is one of the two most important arms trade partners of Turkey. Most of the Turkish naval vessels and army weapons are being produced under German license today. Even though German arms trade statistics show low figures, this is mainly due to the fact that West German arms producers, in response to legal restrictions on arms exports, have characteristically sought to set up production facilities in developing countries. Since the 1970s, West Germany's role in the world arms sector has been a supplier of know-how and technology. This coincides with wishes of most developing countries to establish their own arms industries. [Ref. 43: pp. 53-67]

***c. Technology Transfer Policy of France***

France today is the world's third largest arms exporter, and certainly one of the leading countries exporting arms technology to developing countries. The French government decided that exports were necessary to build and then maintain the greatest possible range of domestically produced armaments. Today, France's arms industry is highly dependent on export sales. France's technology transfer policy is very liberal. Most of the arms producing developing countries received highly sophisticated military technology from France. [Ref. 43: pp. 23-41]

**B. COPRODUCTION**

**1. Definition**

According to *The Management of Security Assistance (MSA)* published by Defense Institute of Security Assistance Management (DISAM); coproduction is a method whereby product manufacture and assembly are shared between the U.S. and foreign producers. A coproduction project may be limited to the assembly of a few items with a small input of domestic parts, or may be a major manufacturing effort requiring the buildup of capital industries. Coproduction enables an eligible foreign government, international organization, or designated foreign commercial producer to

acquire the technology to manufacture or assemble, repair, maintain and operate, in whole or part, a specific weapon, communications or support system, or an individual military item. [Ref. 34: p. 13-5]

A second definition differentiates the difference between coproduction and licensed production. With licensed production, the foreign nation builds its own orders only. Coproduction contracts allow the foreign nation a share of partner nation's orders, domestic production and third party sales [Ref. 47: p. 124].

Another definition, from the Rand Corporation states that: coproduction includes any international collaboration during the production phase of a major weapon system acquisition program. Most of these collaborative arrangements fall into three major classes:

- Fully integrated production, in which each participating nation purchases the same system and produces parts of each other's units,
- Foreign production, under license, of a U.S. design,
- U.S. production, under license, of a foreign design [Ref. 48: pp. 1-2].

A fourth definition is that coproduction is an agreement between governments that permit a foreign government or a producer to acquire the technical information to manufacture all or part of a U.S. origin defense article overseas. It includes government-to-government licensed production. It excludes licensed production based upon direct commercial arrangements by U.S. manufacturers [Ref. 49].

In this thesis coproduction is defined to be the result of government-to-government agreements; a contract which is signed by two or more nations' firms that allows the foreign nation to share the other government's orders, domestic production and third party sales. The terms of coproduction may include industrial collaboration, work sharing and offset agreements. A nation purchasing a foreign system may obtain some production work, usually on its own aircraft or weapon. For example, many European states have been involved in an industrial collaboration program which provided them with some of the work for their jointly produced AWACS aircraft. Similarly, the British purchase of 170 U.S. F-4 Phantoms in 1965 incorporated a work-sharing arrangement whereby United Kingdom (UK) industry was allocated about fifty percent of the value of its national order. Finally, nations purchasing a foreign aircraft might negotiate an offset under which the original manufacturer will offer to allocate an agreed proportion of work to the buyer, usually sub-contract business which could be on a completely different project [Ref. 47: pp. 124,125]. Joint or collaborative



ventures involve two or more nations agreeing to share the development and production costs of a new project. Collaboration is undertaken where independence is regarded as "too costly", usually because of the scale of R & D required (or "too risky" in the case of civil projects). Consideration of the range of collaborative ventures provides an indication of the scale and type of project which some nations can no longer afford to undertake alone (supersonic airlines, space satellites, complex strike aircraft etc.). Such joint projects enable a nation to retain its domestic defense industry and reap the benefits of continued involvement in high technology work. In this form, collaboration resembles a club, with a small group of nations combining to purchase a set of benefits (e.g. technology, weapons, jobs) which each would be unwilling to finance independently. [Ref. 47: p. 140]

## 2. Advantages of Coproduction

### *a. Technology Transfer*

Coproduction agreements would provide Turkey with modern military technology through technology transfer. Technology transfer is the process of transferring, from the industry in one country to the industry of another, technical design information, engineering, manufacturing and production techniques for hardware system. Engineering and management experience and expertise gained through coproduction could have an important impact on the Turkish defense industry. This may be the most important reason why coproduction is preferred over the technical data package (TDP) approach. In coproduction, technology transfer takes place face-to-face with the original system developer. With the technical data package technique, Turkey cannot expect any direct consultation with the originator. For example, if Turkey had intended to accomplish the F-16 project with TDP, it would have been impossible for Turkey to produce the aircraft because of lack of aircraft production knowledge and experience within the Turkish industry.

### *b. Unit Cost Savings*

Because of the increase in real weapon costs and limited defense budgets, new weapons purchased by nations decrease year by year. Even in the United States, purchases of tactical aircraft have declined from some 3000 per year in the 1950s to about 300 per year in the 1970s [Ref. 47: p. 31]. This results in fewer opportunities for economies of scale in production. Weapon costs vary depending on the production quantity. Two participant countries' orders and third party sales can create enough production capacity to have economies of scale. Economies of scale are one of the

major sources of cost savings, resulting in reductions in unit production cost when a firm is able to increase in size by varying all its factors of production. Economies of scale arise from technical factors associated with larger scale plants, such as the division of labor and specialization; centralization of plant and machinery or from economies in management, R & D, marketing and finance [Ref. 50]. Once scale economies are exhausted, unit cost cease to fall and this point defines the optimum size of the firm. Standard economic theory predicts that further expansion of firm size beyond the optimum will encounter dis-economies of scale and rising unit cost [Ref. 47: pp. 43,44]. Figure 4.1 illustrates the economies and diseconomies of scale using the economist's traditional U shaped long-run average cost curve.

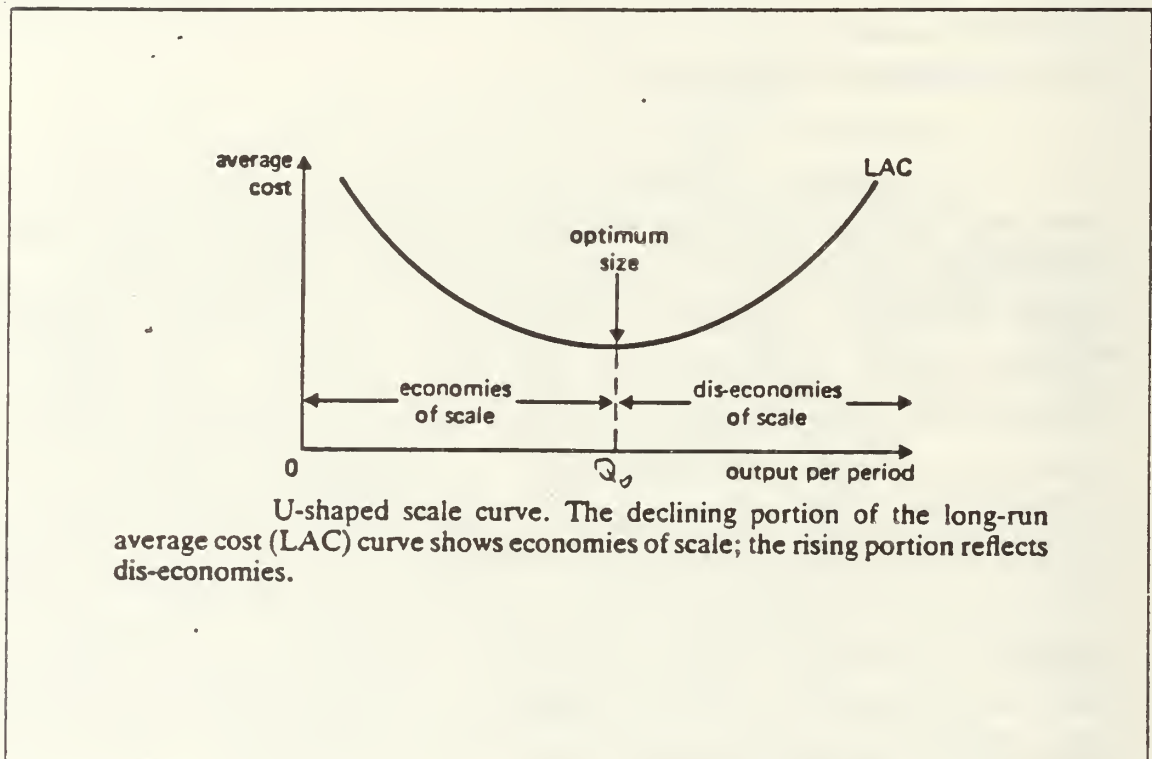


Figure 4.1 Average Cost Curve and Economies of Scale [Ref. 47: p. 4].

In reality, the scale curves (resulting from studies in the U.K., Western Europe, and the U.S.) are L-shaped, sloping downwards at first and then tending to become horizontal. The point at which the curve becomes horizontal defines the minimum optimum or efficient scale (MES). See Figure 4.2.

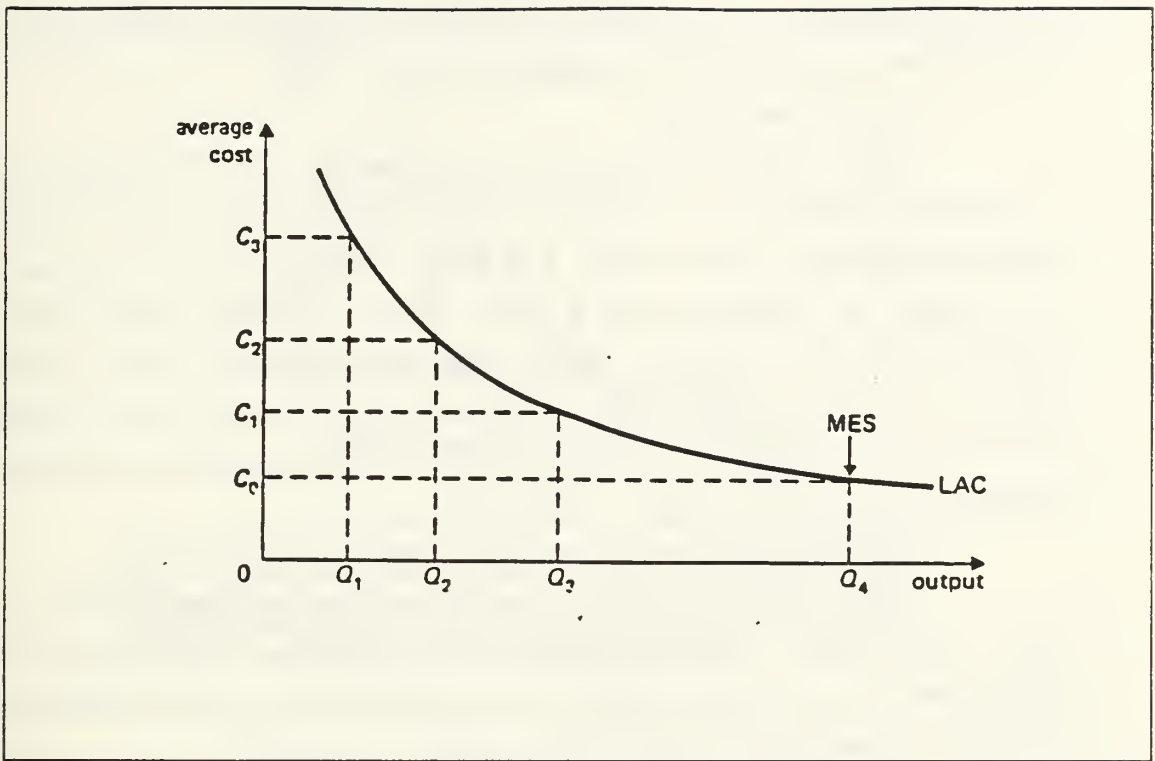


Figure 4.2 Economies of Scale in Reality [Ref. 47: p. 45].

Beyond the MES there are relatively few further cost savings. For example, consider various nations operating at different points on the scale curve in Figure 4.2. In the case of aerospace, output  $Q_1$  approximates the requirements of such European states as Belgium, Italy and Norway (100 units each), while  $Q_2$  could be Britain, France, Germany (200-400 each), with  $Q_3$  representing the U.S.A. (1000+ units) and  $Q_4$  might be the U.S.S.R. and the Warsaw Pact (5000+ units). Operating in the range  $Q_1$  to  $Q_2$  results in considerably high costs compared with producing at  $Q_4$ . In this example, the factors of production for the nations are assumed to be identical [Ref. 47: pp. 44,45]. Turkish aircraft production is now less than  $Q_1$  in Figure 4.2. Thus, the average cost of a Turkish F-16 will be higher than any other European country's aircraft. Therefore, if Turkey increases production capacity, it will create economies of scale and will lower the average weapon cost.

In general, coproduction unit cost is expected to be lower than independent production. A case in point, Japan-U.S. coproduction of F-104J aircraft were estimated to cost thirty to one-hundred percent higher than the U.S.-produced aircraft due to the higher cost of certain items in Japan; however, Japanese coproduced F-104J

costs have been about ten percent less than U.S.-produced aircraft because of low labor cost and some learning advantages [Ref. 51].

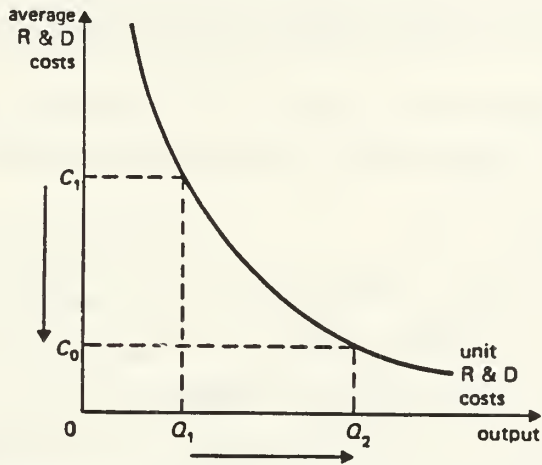
*c. R & D Cost Savings*

Costs savings from Research and Development (R & D) projects is another advantage of coproduction. Average R & D costs show a similar pattern with a larger production resulting in lower average R & D cost (See Figure 4.3). Coproduction will also prevent the duplication of R & D efforts. Different nations may spend considerable amounts of money on the same R & D projects. With coproduction nations can share the R & D costs. In Figure 4.4, coproduction is also cheaper at  $C_3$  per unit since the buyer is assumed to save on R & D cost compared with independent production. [Ref. 47: pp. 93-96]

*d. Standardization*

One of the purposes of coproduction programs among North Atlantic Treaty Organization (NATO) nations is to realize the NATO Rationalization, Standardization, and Interoperability (RSI) program [Ref. 52]. Coproduction activities will create standardization among NATO nations. In addition to its benefits in NATO military operations in the field, standardization is believed to offer reductions in the unit costs of weapons. Cost savings from standardization may be in reduction of duplication and overlap in R & D work or savings from production costs through economies of scale. These two sources of savings were discussed above (cost savings from duplication and overlap in R & D work, cost saving from economies of scale).

Another advantage which could be gained from standardization would be trade benefits, if NATO countries lifted their quota restrictions. The benefits would be that each NATO member would specialize in those parts of the weapons development and production process in which it has a comparative advantage (i.e. what it does best). In this way it would reap the gains from international specialization and mutually advantageous trade and exchange. In this situation it is necessary to determine the relative position of the cost curves between nations to find which NATO countries have comparative advantage for which weapons and what are the possible magnitudes of such cost differences. Some other issues become relevant to answer these questions. They are determining minimum efficient plant scale for each kind of weapon, labor rates and productivity in different countries, and prices of other major sources. [Ref. 47: pp. 45-67]



Unit R & D costs. R & D costs are fixed; hence an increase in output means that such costs are spread over a greater volume, so reducing *unit* R & D costs. This assume a *given* R & D cost curve, which remains unchanged after 'wasteful duplication' (competition?) has been eliminated. The expected reductions in unit R & D costs might not occur if monopoly is associated with inefficiency (i.e. a shift to a higher cost curve).

Figure 4.3 Unit R & D Costs [Ref. 47: p. 45].

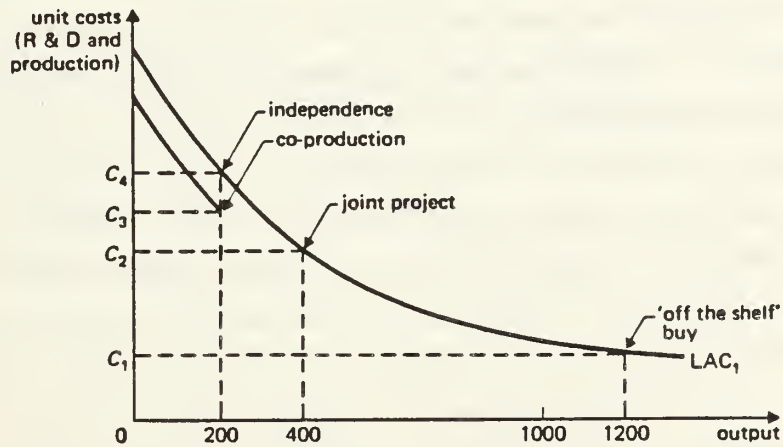


Figure 5.1 The costs of alternative policies: a simplified example. This simple example is based on a single cost curve, with unit cost differences reflecting variations in the scale of output - i.e. spreading of R & D costs and scale economies, plus learning.

Figure 4.4 The Costs of Alternative Policies [Ref. 47: p. 94].

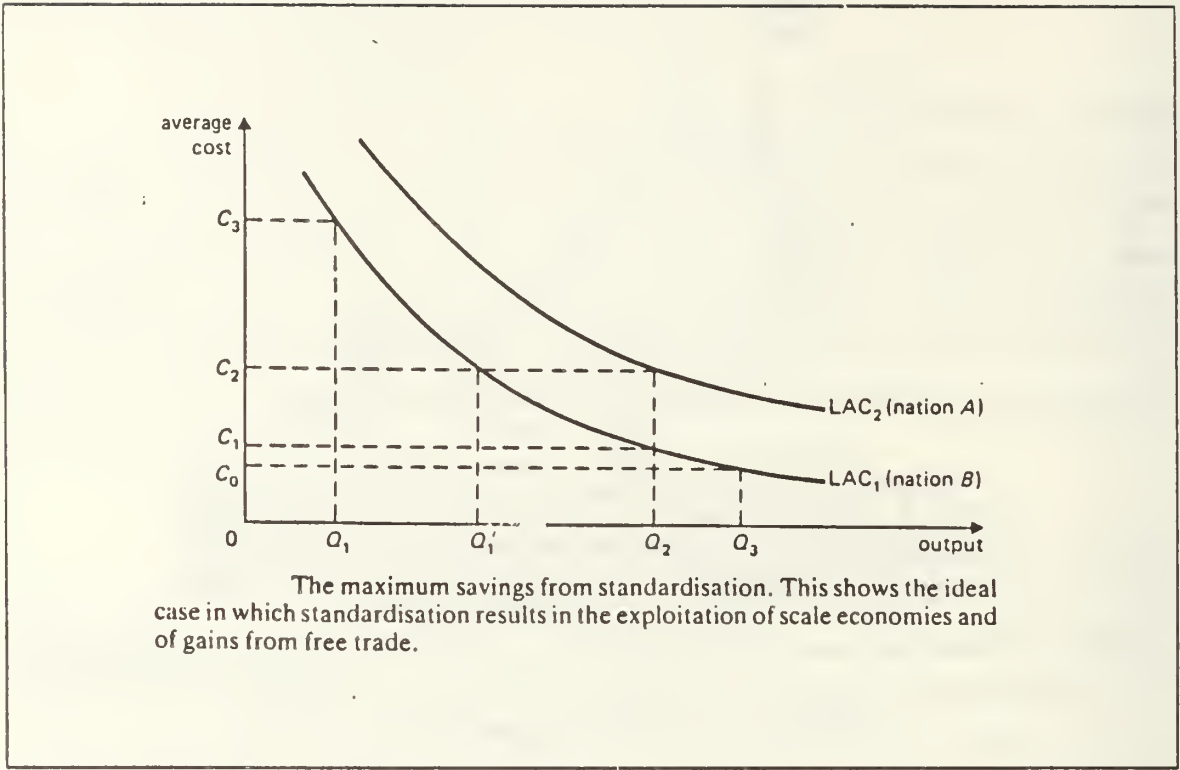


Figure 4.5 The Maximum Savings from Standardization [Ref. 47: p. 47].

Figure 4.5 illustrates the maximum savings from standardization. In Figure 4.5, there are two nations: nation A (assumed the U.S.) and nation B (assumed Turkey). The Long Run Average Curve (LAC) of nation A is represented by  $LAC_2$ , and the LAC for nation B is represented by  $LAC_1$ . International differences in productivity and wage rates determine a nation's LAC. If nation A's productivity is twice nation B's but its wage rates are three times as great, then unit costs will be lower in B. For illustration purposes, it is assumed that Turkish labor rates are one third of the U.S. rates, and that the U.S. productivity rate is twice the Turkish productivity rate. Labor rates, cost of living in the U.S. and in Turkey, labor unionization, productivity, devaluation of Turkish Liras against the dollar and some other social factors are considered to make this assumption. Initially, nation A (the U.S.) is at the cost-output position  $C_2-Q_2$  on  $LAC_2$ , while country B (Turkey) is at  $C_3-Q_1$  on  $LAC_1$ : country B is the lower cost supplier and can produce  $Q_2$  at  $C_1$ . If B specializes and produces both  $Q_1$  and  $Q_2$ , equal to  $Q_3$ , its unit costs will be  $C_0$ . There are potential unit cost savings for B of  $C_3 - C_0$ , and for A of  $C_2 - C_0$ . Figure 4.5 also shows that under independence, nation B can achieve the same unit costs as A at

output levels lower than  $Q_2$  (i.e.  $Q_1^1$ ) gives unit costs of  $C_2$  for country B. [Ref. 47: pp. 46-47]

Studies by economists Keith Hartley concluded that weapons procurement standardization in NATO could result in unit cost savings of 20-30 percent [Ref. 47: p. 67].

#### *e. Defense Industry Benefits*

Defense industries are characterized by high technology (e.g. aerospace, electronics, shipbuilding, vehicles, etc.). High technology is a continuous process. Buying abroad disrupts the accumulation of knowledge and creates a technology gap which is costly to remove if ever the nation wishes to re-enter the field. Basically today's Turkish aircraft production problems stem from this phenomena. A domestic defense industry will contribute to the balance of payments through import savings and export earnings. It also provides a national source of supply which contributes to increased security and some independence in foreign policy. Dependence on a foreign monopoly can be avoided, which otherwise might lead to higher prices of equipment and spares, as well as weapons not designed for national requirements. Further benefits from a domestic industry include greater control over a project and its continuation, as well as freedom to export to the rest of the world [Ref. 53: pp. 4-49].

#### *f. Offset Benefits*

Coproduction agreements generally provide offset benefits to the recipient country. These offset benefits would have significant impact on the Turkish economy. The term offset refers to a range of industrial and commercial compensation practices required as a condition of sale for military-related exports [Ref. 49: p. 187]. Offsets can be direct or indirect. Direct offsets allow for compensation in related goods, permitting a foreign country to produce in country certain components or subsystems of a weapon systems it is buying from a U.S. supplier as a condition of the sale [Ref. 54: p. 54]. Indirect offsets are associated with goods unrelated to the defense item being sold. The supplier agrees to purchase a certain dollar value of the buyer's manufactured products, raw materials, or services as a condition of the sale [Ref. 49: pp. 183-188]. Many countries are using offset agreements to encourage economic growth, industrialization and gain domestic political support.

#### *g. Job Opportunities*

The most important benefit of coproduction and other kinds of national arms production is to provide job opportunities for the nation. Since the Turkish

economy may be confronted with major unemployment problems during the 1980s, it is likely that the job opportunities might dominate decisions about domestic production. If the purchase of weapons from a Turkish supplier or joint venture had the effect of reducing the level of Turkish unemployment, the net cost to Turkey of buying more expensive domestic equipment (i.e. the price of the equipment, additional tax payments, social benefits saved...) could well be less than the net cost associated with the purchase of cheaper foreign equipment. In these circumstances, the government should, in comparing the cost of domestic and foreign weapons before buying, add to the price of the foreign equipment a premium (like a tariff) whose size would depend on assessments of the Turkish labor market because, if the weapon were produced in Turkey, it would decrease the Turkish unemployment rate.

The opportunity cost for labor of buying weapons from outside is:<sup>2</sup>

$$\text{Opportunity cost for labor} = N * M * D * C$$

where N is the total direct employment per year if the weapon were produced in Turkey, and M is the employment multiplier to allow for direct and indirect employment effects. D is the number of years or duration of the project, and C is the annual Exchequer cost<sup>3</sup> of unemployment [Ref. 47: pp. 71-86]. As an example, assume that a Turkish buy creates 10,000 jobs per year; that the employment multiplier is about 2; that project duration is ten years; and that the Exchequer costs of unemployment are \$1,000 per person per year (1987 prices). The estimate of unemployment costs includes lost tax receipts and insurance contributions, retirement contributions, rent and rates rebates and administration costs. As a result, the estimated opportunity cost of labor is \$200 million. This means Turkey would lose \$200 million due to not buying arms from domestic suppliers. Accordingly, the European F-16 coproduction program is often justified in terms of its jobs and technology benefits. The original European choice of the F-16 was partly based on a certainty of 29,000 man-years of work in Europe. There is a probability of additional employment depending on export sales. Assuming a six year program, the guaranteed 29,000 man-years of work provided about 5,000 jobs between 1979 and 1985 [Ref. 47: pp. 134,135].

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<sup>2</sup>This formula and its explanation was adapted from Keith Hartley, and D. Greenwood.

<sup>3</sup>Indirect social cost of unemployment



#### *h. Maintenance and Operational Support Benefits*

Domestic production simplifies maintenance and operational support of military equipment and assures a war time supply. For example, European industry often claims that U.S. aerospace equipment sold abroad is cheap, but "you pay for the spares". Some U.S. firms readily sold aircraft abroad but raised the prices of spares on later orders, 15-20 percent higher than for sales to the American government. The explanations for this policy were diverse. They included the search for higher profit rates, the fact that exports involve greater risks, or specific requirements which are costlier due to shorter runs, or because foreigners often buy spares at the end of production run, or require them urgently, and a U.S. government policy which imposes a levy on foreign military sales [Ref. 47: pp. 116-120]. Domestic production of spare parts will contribute to a high maintainability, reliability and availability level for Turkish equipment at a lower cost.

#### *i. Political Benefits*

Coproduction strengthens the relations between governments. According to a Rand Corporation's report for the U.S. Air Force (U.S.A.F.), coproduction has often been credited with strengthening ties within NATO [Ref. 48: p. 4]. Some people argue that what the United States gets from coproduction is allies [Ref. 55].

#### *j. Military Benefits*

Coproduction has many military advantages. Most of the military analysts believe that in the event of war, operational and logistics support would become a nightmare without standardization in NATO [Refs. 56,57: pp. 12,627]. Coproduction makes operational and logistics support easier by creating standardization among nations. Another military advantage of coproduction is security. Coproduction increases the security of the United States and its allies by encouraging multinational acceptance of strategic and tactical concepts and doctrine through the utilization of common military material [Refs. 57,58: pp. 196,220]. Another military advantage of coproduction is that nations procure better quality products because coproduction draws on the combined skills of several nations.

Among the military advantages of coproduction, standardization and interoperability are considered the most important [Refs. 59,60,61,: pp. 7,1-7,1]. In the author's opinion, the most important military advantage of coproduction from the Turkish point of view is that coproduction will make Turkish Armed Forces less dependent on foreign sources for materials and support. Thus the Turkish response

capability and individual sustainability and surviveability as a nation will be strengthened.

### 3. Disadvantages of Coproduction

#### *a. Military Technology and National Economy Trade-offs*

There are many advantages of technology transfer such as to create indigenous defense industries, to enhance economic development and to improve employment opportunities, etc. However, it does have its disadvantages. Most military technology is non-productive, that is, it contributes relatively little to the overall national economy of nations. While some of the equipment of military forces is adaptable to civilian uses, much of it is not. The growth of military forces and accompanying increases in domestic military expenditures may stimulate growth through increased demand, but may also add to inflation. [Ref. 53: pp. 15-48]

#### *b. High Initial Investments and Total Cost*

The high initial investments for coproduction facilities and machinery may require considerable amounts of foreign credit, and this means additional external debt and hard currency problems. This may worsen the Turkish foreign trade deficit problem. All coproduction arrangements which involve transfers of technology and having modern technology are not without cost. On the surface, the cost of acquiring technology for production is the contractual license fees, or royalties. These fees generally cover acquisition of technical data, some engineering assistance, and the production rights. However, there are some additional costs incurred by the transferee in preparing for full-scale production of the licensed item. These additional costs generally fall into five categories: (1) data transfer, (2) design adaptation due to requirements differences, (3) parts selection and qualification, (4) changes due to differences in manufacturing methods, and (5) testing. [Ref. 48: p. 54]

#### *c. Increased Military Pay and Technology Absorption Problems*

In order to operate and maintain modern military equipment special skills are needed. These skills often require expensive training and technical experience. These military technical skills are readily transferable to the civilian economy. As a result, Turkey may be unable to hold these highly trained military personnel without significant pay increases. This would mean increased government expenditures and further inflation.

The common solution to this problem is to hire foreign technical representatives. However, this is a temporary solution and does not make any lasting contribution to the national economy, labor force, or military infrastructure.

Because modern military weapon systems generally require high technological skills, Turkey may experience some technology absorption problems. It either may become dependent upon large numbers of "white-collar mercenaries" to maintain and operate new weapon systems, or may send large numbers of trainees to supplier nations. These are expensive solutions to the problem, and may cause domestic political and economic difficulties [Ref. 53: p. 44]. A phenomena such as the brain drain<sup>4</sup> may also become a problem. Some skilled and trained personnel would have job opportunities in developed countries and they would then become a loss for Turkey. The Turkish government should replace these personnel with foreign experts to overcome losing its skilled personnel.

*d. Suppliers Concerns*

Military technology has peculiar security aspects. From the point of view of the technology providing country, the transfer of sophisticated equipment to developing countries may become a risk. The supplier country may want to restrict its partner country's arms sales or technology transfers to embargoed nations. Suppliers may hesitate to provide the means to create such an indigenous and therefore independent capacity [Ref. 53: p. 44]. In the case of coproduction in Turkey however, this situation might become a weakness for the nation which provides technology transfer to Turkey. Because the technology providing nation has the capability of being able to produce coproduced weapons on its own, this may result in an unwillingness of that nation to enter into coproduction agreements. For example, the U.S. Army's concern of being dependent on foreign sources is illustrated by their willingness to use the European-developed Roland only if it is produced in the United States. The reason for this is that "it would be militarily unacceptable for the Army (U.S. Army) to be forced to rely on a foreign producer; in the event of war it might be deprived of crucial deliveries" [Refs. 57,60: pp. 665-669,46].

There are also some problems transferring the data. In reality, potential licensors have historically provided very limited data on the system of interest before a license agreement is signed. The restraint stems largely from a concern that premature disclosure could enable the potential licensee to produce an improved version of a design without formally entering into a licensee arrangement. Licensors have generally tried to provide licensees enough data to enter a paper design competition and make preliminary cost estimates, but not enough to produce the design. Such samples of

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<sup>4</sup>Transferring highly trained personnel from one country to another.

technical data (usually of block diagrams and functional descriptions) rarely reflect the quality and size of the entire data package. For example, original Roland program plans called for about 25,000 documents to be delivered within 30 days; in all, the process involved about six times as many documents (many delivered out of sequence) and took well over four years to complete [Ref. 48: pp. 54-55].

*e. Overall Appropriateness*

There is the important question of the overall appropriateness of the weapons themselves in regard to their military capability and technology. Do they really add to the military capability, or are they just prestige weapons to produce? When the production project is finished, is it still an appropriate military technology or is it obsolete already? [Ref. 53: p. 45]. For example, if Turkey could produce an aircraft to replace its aging aircraft in its inventory, an objective would be to ultimately have more modern and capable aircraft. If the aircraft to be produced (say F-104) is already obsolete at the time of delivery (say 1995), this weapon is inappropriate even if it is 100 percent Turkish. So, at the time of delivery, coproduced weapons should be still modern and there should be enough international demand to be able to export these products.

*f. Opportunity Cost*

The opportunity cost of coproduction is another disadvantage. The resources used to produce weapons could be used in the civilian sector. The development of arms industries often detract from general industrialization by diverting investment, skilled personnel, and other resources. Once devoted, these resources can not be converted to the civilian sector. The opportunity costs of retooling, retraining, and so on, would be as excessive as they were originally when the defense industries were created [Ref. 53: pp. 22-47]. However, because of the high unemployment rate in Turkey, the opportunity cost of labor will be lower. Turkey's already obsolete equipment requires replacement or at least modernization, therefore, the money that Turkey should spend on this equipment can be accepted as a sunk cost.

*g. International Market Considerations*

To operate economically, indigenous defense industries must seek export markets to subsidize high initial costs and to lower the individual end-item cost for their own forces. This means that there will be a continuing proliferation of arms suppliers in an already crowded and highly competitive marketplace. Many countries borrow military sales credits whenever it is possible because of the financial leverage

that borrowing provides. Thus, most of the arms transfers are carried out on a credit or loan basis [Ref. 53: pp. 20-48]. Turkey has already had hard currency or credit problems, so it is difficult for Turkey to compete against big arms suppliers. This may lead Turkey to find its markets in oil-producing, embargoed, or pariah states who can afford to buy its arms in cash. This is in conflict with the Turkish traditional foreign policy and Turkey's political commitments to its allies.

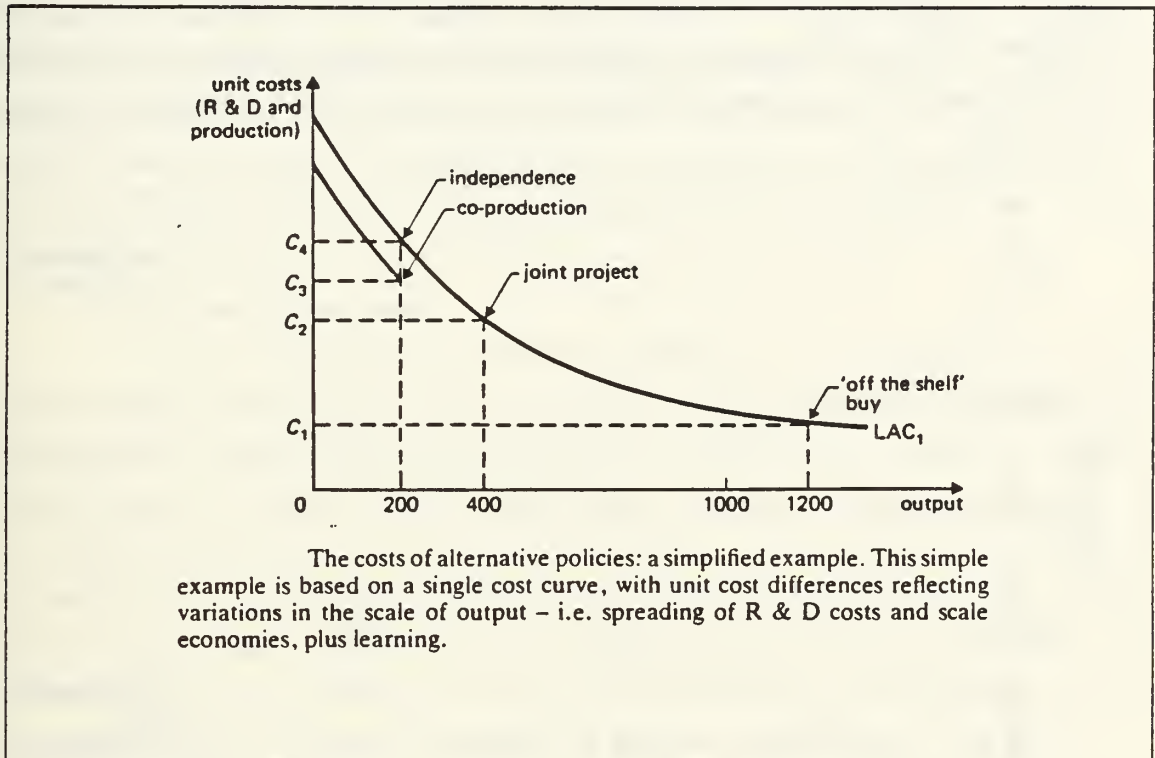


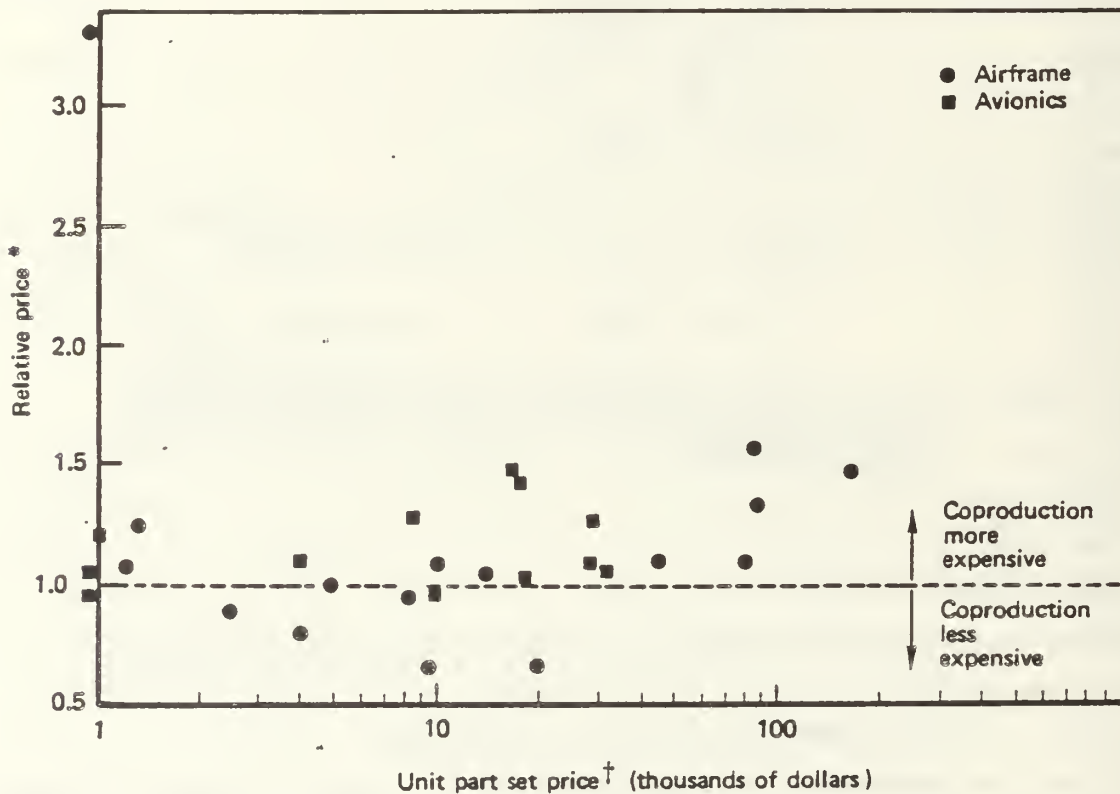
Figure 4.6 The Costs of Alternative Policies [Ref. 47: p. 94].

#### *h. Higher Unit Cost than those of "off the shelf"*

It is believed that coproduction results in higher costs than if the weapons had been purchased directly "off the shelf" from the original manufacturer. Higher costs for coproduction might result from shorter production runs and loss of learning economies, duplicate tooling and the costs of transferring technology. As an illustration (See Figure 4.6), assume that two (or more) coproduction partner nations have a given and identical cost curve with unit cost differences reflecting variations in the scale of output. R & D and production costs are represented by the long-run average cost curve,  $LAC_1$ . A nation requires 200 units of an aircraft. Coproduction is

cheaper than national production. Collaboration with equal sharing and a total output of 400 units would involve unit costs of  $C_2$ . In contrast, a purchase of 200 units from an existing production run of 1200 (e.g. an "off the shelf" buy from the U.S.) will result in unit costs of  $C_1$ .

One study has estimated that the F-16 coproduction program costs the European nations eighteen percent more than if they had purchased the aircraft directly from the U.S.. It has also been estimated that, as a result of coproduction, the U.S.A.F. will pay some 3-8 percent more for their F-16s. Under coproduction of the European F-16, the European F-16 has higher cost than acquiring F-16s directly from the U.S., but is still cheaper than any independent program by a European nation (see Figure 4.7).



\* Ratio of average price to USAF, current 998 aircraft coproduction program, to average price to USAF, hypothetical all-domestic 650 aircraft program. Value greater than 1.0 denotes part set that is more expensive when coproduced.

† Average price to USAF, hypothetical all-domestic program (1975 dollars)

Figure 4.7 Unit Costs of European F-16's Parts [Ref. 48: p. 107].

*i. Military Disadvantages*

There are some military disadvantages to coproduction through creating standardization among NATO nations. In some cases, standardization might make it easier for the U.S.S.R. to counter NATO capabilities than it would a variety of different systems [Ref. 62: pp. 35-36]. Also, systems will often fall short of individual operational requirements since it is sometimes difficult to reach agreement on requirements among all the countries. Some fear that collaboration will produce systems so distorted by negotiations and compromise that they represent no one's first choice [Ref. 56: pp. 12,22]. Lastly, it is expected that products will generally take longer to field as a result of partnerships, more subcontractors, more production lines, more requirements, and more schedule slippage as well as conflicts over system specifications delaying the start of the program [Refs. 56,63: pp. 12,17].

*j. Program Management*

Generally speaking, coproduction programs do proceed slowly. The main reason for this is because more than one nation is included. Each nation has its own national goals to satisfy and its own requirements. Almost every collaborative military aircraft program has begun with the establishment of a new program arrangement. It takes considerable time to prepare these arrangements. The uncertainty surrounding the beginning of collaborative programs can actually extend far into a program. The Roland program is an example of this. The flow of documents from Europe to the U.S. early in the program slowed until negotiations among the three countries (the U.S. France, Germany), could resolve the problems [Ref. 64: pp. 46-47, 89].

Making decisions using multinational committees require more time. Sometimes three-way or two-way negotiations may cause further delay in coproduction program. Perhaps the most vexing and time-consuming issue facing multinational committees is the distribution of the design, development, or production work, the means by which the individual program participants seek to achieve their diverse industrial and economic objectives. Delays can come from four sources: (1) difficulties in identifying qualified contractors; (2) difficulties in negotiating the distribution of work or work packages among the program participants to fulfill program objectives; (3) inefficiencies in design, development, or production introduced by collaborative work packages; and (4) the occasional need to transfer work across national boundaries to satisfy program equity considerations. The severity of the delays depend in great part on the program structure and the objectives of the program participants. [Ref. 48: pp. 45,46]

Another reason for slow coproduction is that collaborative programs commonly involve the production of systems having different configurations to satisfy the needs of each participating country. Production of systems having different configurations can require additional tooling and fabrication and assembly procedures. Interleaving of systems having different configurations on assembly lines can reduce production learning and complicate the introduction of modifications on the assembly line. Past experience illustrates the desirability of the governments specifying the type and degree of standardization being sought before a technology transfer program gets underway. Therefore different delivery requirements of nations is another reason for slow delivery. Nations might want procurement schedules as soon as possible or they might also alter their procurement plans after programs get underway for the budgetary or other reasons [Ref. 48: pp. 42-43].

### C. TECHNICAL DATA PACKAGE (TDP)

#### 1. Definition

Before defining technical data package (TDP), technical data should be defined. Technical data are recorded information used to define a design and to produce, support, maintain or operate items of defense material. These data may be recorded as graphic or pictorial delineations in media such as drawings or photographs; text in specifications or related performance or design type documents; in machine forms such as punched cards, magnetic tape, computer memory printouts; or may be retained in computer memory. Examples of recorded information include engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. [Ref. 65]

Technical data package is a collection of technical data products (items) which is complete for a specific use. The term also generally refers to the category of intended use where the item, with modifications, is one planned for multi-year usage and will involve several supply production contracts. Generally, full design disclosure data<sup>5</sup> and procurement data<sup>6</sup> are required. [Ref. 65: p. 56]

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<sup>5</sup>**Full Design Disclosure Data** is information complete to the extent necessary to support a procurement or permit manufacture without additional design effort, and without recourse to the original design activity.

<sup>6</sup>**Procurement Data Package** is a collection of all necessary for procurement of the items which it pertains, e.g. engineering drawings, specifications, manufacturing information essential to production, and test procedures.



Technical data package is a technique of establishing a second source for production. This method involves utilization of a stand-alone technical data package (TDP) to solicit proposals from manufacturers who may not have been involved in the initial development of the system or in initial production. This method assumes that the data package alone is sufficient to allow production of the system by alternative manufacturers. [Ref. 66: p. 13]

The Government should procure the technical data package from the original developer in order to reproduce an end item or to have second sources produce it. This involves technology transfer either from foreign sources or domestic sources. An adequate TDP defines the following aspects of the end item:

- Specific requirements of the product in terms of detailed physical and performance characteristics within the operational environment for which the product is intended,
- Quality assurance provisions, including sampling plans and acceptance criteria, acceptance inspection equipment, examinations, and tests to be conducted,
- Preservation, packaging, and packing to ensure adequate and economical preparation for delivery and protection of the product from the time of production to time of deployment,
- Manufacturing instructions and descriptions to ensure that contractors in the general field of capability can expeditiously initiate production of the item covered by the TDP. [Ref. 67: p. 2-5]

In this thesis, the technical data package term is defined as any collection of technical data which is sufficient to allow production of the system by alternative manufacturers in Turkey or outside of Turkey for Turkish Armed Forces orders.

## 2. Data Rights

Data Rights are a relevant issue in the application of the TDP methodology. A definition of data rights from the *Acquisition Strategy Guide (Defense System Management College)* states that data rights are the limitations placed on the government in using technical data delivered as part of a contract. There are two basic forms of data rights:

- **Unlimited Rights:** The right to use, duplicate or disclose technical data in whole or in part in any manner and for any purpose whatsoever, and to direct or permit others to do so.
- **Limited Rights:** The right of the government, or others on behalf of the government, to use, duplicate, or disclose data, but not outside the government without written permission.

The government has a legitimate need for data to support such functions as operation, maintenance training, standardization, and logistics support. Of primary concern is the purchase of data to provide the capability to produce the item by sources other than the original manufacturer which is usually called a technical data package (TDP). [Ref. 68: p. 5-18]

### **3. Advantages of Technical Data Package (TDP)**

#### ***a. Competition***

Using a TDP, a government can establish more than one production source. The obvious advantage of this is achieving the potential for competition for out-year buys [Ref. 68: p. 5-19]. A TDP can be used repeatedly in maintaining a competitive atmosphere throughout the production phase of the acquisition [Ref. 66: p. 14]. Once the complete TDP is procured, the Turkish Government can use second sourcing techniques to create competition among domestic sources and foreign sources. Competition can also provide an incentive for contractors to reduce unit costs, and improve the quality and performance levels of their systems.

#### ***b. Reduced Dependence on a Single Manufacturer***

A second advantage lies in reducing dependence on a single manufacturer for equipment, spare items, training, overhaul, and other activities for which detailed design and production might be important [Ref. 68: p. 5-19].

#### ***c. Elimination of Original Source***

Once the TDP is validated and has proved adequate for production of the system, the mechanics of second sourcing are relatively simple. There need not be any contract between production sources and it is even possible to eliminate the original source altogether. [Ref. 66: p. 14]

#### ***d. Defense Industry Benefits***

Once the TDP is proved adequate for production and production of system can be accomplished, it will create job opportunities for Turkey. This will contribute to the balance of payments through import savings. By using domestic production sources, maintenance and operational support of the system produced will be easy and economic.

### **4. Disadvantages of Technical Data Package (TDP)**

#### ***a. Most Hazardous Second Sourcing Methodology***

Although theoretically sound, the TDP method is perhaps the most hazardous of all the second-sourcing methodologies. It is not well-suited for use in

highly complex systems or systems with unstable design or technologies. Experience has shown that drawings and specifications alone are often insufficient to secure effective transfer of manufacturing technology in these instances [Ref. 66: p. 14]. The Turkish Government may have a lot of difficulties in obtaining a complete and accurate TDP that is free of defects and that, when followed, will yield a qualified product. Even if the TDP is accurate, it is extremely difficult to transfer complex technologies. Transfer of technologies are often impossible without the benefit of engineering liaison between the sources of production. The reason for this would be that some critical factors such as "craftsmen's skills", indigenous processes, etc., cannot be easily documented. [Ref. 66: p. 14]

*b. Technological Differences*

Technological differences between companies (like different process methodologies) may be such that the second source does not have the capability to perform in accordance with the data package [Ref. 66: p. 14].

*c. Legal Difficulties*

Once the data package has been accepted from the developer, the government effectively guarantees its accuracy to the second source. If the second source discovers some defects in the TDP, as is usually the case, the second source may have the basis for a claim against the government. Some methods of minimizing this particular problem include requiring the producer of the data package to certify its adequacy, preproduction evaluation by the second source, and the use of latent/patent defects clause in the contract with the second source. Even if the original source of the TDP is domestic, this puts the government in a precarious legal position in the event of subsequent claims [Ref. 66: p. 14]. In the case of Turkey, most TDPs will probably be taken from foreign developers. The complexities of international laws will require Turkish Government to think twice before buying TDP.

## **D. LICENSING**

### **1. Definition**

There are two kinds of licensing application. First, licensing agreements are used as a technology transfer methodology. This can be accomplished by government-to-government agreement or government-to-foreign company or Turkish company-to-foreign company agreements. Secondly, directed licensing can be used to create competitive production sources within the country.

*a. Licensed Production (As A Way of Transferring Technology)*

According to "Management of Security Assistance" published by DISAM, licensing, which is the oldest method of international production, is the production technology developed in a particular country, transferred to a foreign manufacturer under a formal licensing agreement which authorizes the use of the developer's data and manufacturing technology to produce the same weapons system [Ref. 34: p. 13-15].

Another definition distinguishes the difference between licensing and coproduction. With licensed production a nation may build its own orders only while coproduction contracts allow a nation a share of another nation's orders, domestic production and third party sales [Ref. 47: p. 124].

Another definition is from General Research Corporation:

"Licensed production is production made possible by agreements under which developers of military hardware provide data, patent rights, technical assistance and whatever else is necessary to enable production of the desired hardware by a source in another country. The developer is usually compensated by licensing fees and/or royalties on sales and various other means". [Ref. 69: p. 1]

*b. Directed Licensing (As a Second Sourcing Methodology)*

The term directed licensing appears frequently in domestic acquisition literature. Licensing, as a second source methodology, creates competitive production sources. The following definition is from the U.S. General Accounting Office (GAO):

"This method proposes a clause for insertion in the early development contract allowing the government to reopen competition for subsequent or follow-on production, select the winner, and appoint him as licensee. It is aimed at obtaining competition in the procurement of technological hardware, which is ordinarily very difficult to achieve. In return for royalty and technical assistance fees, the licensor would then provide the winner with manufacturing data and technical assistance to help the licensee produce successfully". [Ref. 70: p. 2-3]

According to this definition, the Turkish government has the right to select the licensee, and accordingly the licensor has no say in this selection process. Some reasons for this strategy are a government's desire to have more than one production source and to create competition on price and quality of the product. Of course, the licensor expects to receive a fee for providing technical assistance to the licensee and a royalty payment for each final product delivered to the government.

Another definition is from Rand Corporation:

"Directed licensing consists essentially of having the government obtain from a weapon system developer, at the time of the development contract, a contractual commitment for rights to production data and an agreement to license whomever the government designates to produce the weapon system during any or all production runs, following the initial production by the developer. The basic idea of directed licensing is to bring competition to bear after the uncertainties of R & D and early production have been resolved. The developer would agree to provide a data package and such technical assistance as may be required to get the new contractor into production. The development contractor would be compensated for his efforts by fees and royalties agreed upon at the time of the initial commitment". [Ref. 71: pp. V-VII]

Another definition is from the U.S. Defense Acquisition Regulation (DAR):

"A special provision included in a contract with the developer source that specifies a firm requirement that the developer license the production of later quantities to another source" [Ref. 72: p. 4.702.4].

The following definition summarizes the previous definitions of licensing:

"Under a licensing approach to competitive production, the system developer, in exchange for a royalty fee, grants permission or license to another firm to produce an end item of proprietary interest to the developer. In addition, the system developer may provide technical assistance to the second source or licensee in exchange for engineering fees." [Ref. 67: p. 12-1]

In this thesis, there will be two licensing terms to distinguish licensed production and directed licensing. The term "Licensing" or "Licensed Production" will be used for government-to-government, government-to-firm or firm-to-firm international agreements to produce a military equipment in Turkey. The term "Direct Licensing" will be used for the acquisition strategy to establish competitive production sources in Turkey. When government-to-government, Turkish government-to-foreign company or Turkish company-to-foreign company is considered, licensed production means: to transfer the technical data and right to produce an item for Turkish orders only. With licensed production, Turkey builds for its own orders only. No foreign orders are involved in licensed production. In directed licensing agreements, the Turkish government can include a clause in the domestic developer's contract enabling the government to conduct competition for production quantities, select a winner and

appoint him as a licensee. The developer or licensor is directed by the government to provide technical assistance and manufacturing data to the licensee in exchange for royalties or fees [Ref. 67: pp. 2-13, 12-1 - 12-13]. If a licensing technique is employed, the system developer retains rights to proprietary data and maintains system responsibility. The developer grants permission to manufacture the system to the licensee through a license agreement which normally restricts use of the technology to the specific program [Ref. 67: p. 2-13].

## **2. Advantages of Licensed Production**

### ***a. Technology Transfer***

With licensed production agreements, Turkey can get modern military technology, engineering, technical design, manufacturing and management experience and expertise not available from domestic sources. Licensing involves not only the transfer of data from the developer to the second source, but also provides for the transfer of manufacturing know-how. Under license, Turkey can get this technology transfer face-to-face with the original developer. This is the most important advantage of licensing over the TDP. There is less risk involved in manufacturing since manufacturing technology can be implemented under the assistance of original developer.

### ***b. Standardization***

Licensed production is another way of achieving standardization among NATO Nations. As mentioned before, this program is called the NATO Rationalization, Standardization and Interoperability (RSI) program.

### ***c. Defense Industry Benefits***

Turkey can achieve some domestic defense industry benefits through licensed production. A domestic defense industry will contribute to the balance of payments through import-saving and offsets benefits. The domestic defense industry also provides a national source of supply which contributes to increased security and some independence in foreign policy. Offset benefits would result in lowering Turkish trade deficits.

### ***d. Job Opportunities***

Licensed production will create job opportunities like coproduction. (See pp. 63-64).

*e. Maintenance and Operational Support Benefits*

(See p. 65).

*f. Military and Political Benefits*

(See pp. 65-66).

*g. Lessened Suppliers Concerns*

Transferring technology through licensed production has less problems relative to coproduction. This is because licensed production is limited to national orders. Transferring technology has some security concerns from the point of view of the technology providing country. However, in licensed production agreements, the supplier has the least concern because the licensee has no right to transfer the technology to other countries.

*h. Delivery Schedule*

Licensed production can have a better delivery record than coproduction because only one nation is involved. Slow delivery schedules are a disadvantage of coproduction (See pp. 71-72).

### **3. Disadvantages of Licensed Production**

*a. High Unit Cost*

With licensed production, Turkey can build its own orders only. Turkish domestic needs don't allow it to achieve economies of scale. Consequently, the average cost of Turkish licensed production would be higher than the average cost of any other acquisition strategy. In Figure 4.1 theoretically, Turkish licensed production would be probably somewhere between 0 and  $Q_0$ . This means that the average cost of licensed production would be higher than the optimum average cost ( $Q_0$ ). In reality, scale curves are L-shaped curves, (See Figure 4.2) sloping downwards at first and then tending to become horizontal. The point at which the curve becomes horizontal defines the minimum optimum or efficient scale (MES). Beyond MES there are relatively few further cost savings. For example, in Figure 4.2 output  $Q_1$  approximates the Turkish domestic requirements with an average cost level of  $C_3$ ; while output  $Q_2$  shows a coproduction output (which includes units for other countries) with an average cost of  $C_2$ . In this case, licensed production has higher average cost than average cost of coproduction.

*b. Military Technology and National Economy Trade-offs*

(See p. 66).

### *c. High Initial Investment*

(See p. 66).

## 4. Advantages of Directed Licensing

### *a. Competition*

The most important advantage of directed licensing is to provide domestic competition between sources. The benefits of production competition would be a reduction in unit procurement costs, leading to overall program savings, increased equipment quality and industrial productivity. Competition may provide an incentive for contractors to improve the quality and performance levels of their systems. Furthermore, it has been suggested that in a competitive environment contractors are more likely to propose cost-reducing, rather than cost-increasing design changes. Thus, control of cost growth also has been identified as a potential benefit of competition [Ref. 73].

Competition during procurement is a new phenomena for Turkey. The main reasons for this may be past governmental restrictions on the private sector in production of military equipment, limited public sector's industrial capability (generally one state-owned firm for production of each kind of equipment) and lack of experience.

### *b. Industrial Base*

An enhanced industrial base is another potential benefit of competition. Establishing two prime contractors may provide increased surge and mobilization capacity, while lessening the potential for program delays. It also provides a second source in case of losing one of the production sources. It is also argued that competitive production contractors may improve their productivity and have an advantageous competitive position for further contracts-government and commercial, foreign and domestic [Ref. 67: p. 1-16].

### *c. Little DIDA Involvement*

The directed license approach enables domestic technology transfer to be achieved with little DIDA involvement. Thus, the administrative burden associated with directed licensing will be lower than other acquisition techniques [Ref. 67: p. 2-14]. DIDA can establish a second source without buying a complete data package.

## 5. Disadvantages of Directed Licensing

### *a. Increased Costs*

Having competitive sources is not without cost. The acquisition authority (DIDA) should recognize that production competition also involves additional costs.



The most recognizable cost to DIDA is the increased initial funding necessary for solicitation of a second source, technology transfer, procurement of tooling and test equipment, and qualification testing. Furthermore, the competitive split buy may lead to excess capacity [Ref. 67: p. 1-18]. Without export capabilities, this excess capacity may cause high unit costs. Turkish Armed Forces' orders can not use two production sources on an efficient scale. In addition, the use of royalty fees increases the cost of second source's end items and may preclude the second source from attaining competitive prices [Ref. 67: p. 2-15].

*b. Slow and Limited Technology Transfer*

The system developer holds the right to control the technical data. This may complicate selection of the licensee, since the full data package can not be released. Furthermore, there may be restrictions to other projects. Thus, under a licensing technique, technical transfusion is slower than under other techniques where the government procures unlimited data rights [Ref. 67: p. 2-15].

*c. Quality Variations*

Because of different sources, there are variations in the quality between competitive products.

*d. Time Delay of Fielding*

The licensor will spend time educating the second source. This can delay fielding the systems.

*e. Developer Reluctance*

If there are significant alternative uses for the system, the original producer will probably create barriers to second sourcing to maintain their competitive advantage in those other markets. Sometimes it may be difficult to achieve the necessary degree of cooperation between alternative production sources, and the licensee may have little recourse against half-hearted cooperation on the part of the licensor. Contractors sometimes may bid on projects simply to obtain proprietary information on other producers' design. [Ref. 66: pp. 14,15]

*f. Learning Curve and Economies of Scale*

Dividing the production quantities among two or more sources reduces the beneficial effects of the learning curve and eliminates some economies of scale. However, if effective price competition is established, the result will be a downward shift and/or an increase in the slope of the learning curve. [Ref. 66: pp. 14,15]

## E. 'LIFE OF TYPE' BUY (BUY-OUT)

### 1. Definition

This strategy is the one-time purchase of enough items to completely support the system for the remainder of the system life. Frequently referred to as a "life-of-type buy" or simply "buyout" it generally results in buying a sufficient quantity to meet all anticipated production requirements. This type of acquisition is generally used when faced with losing manufacturing sources. [Ref. 74]

The definition from DOD instruction 4115.40 states that a life-of-type buy is the one-time purchase of enough items to completely support the weapon system for the remaining life of the system. It is more commonly referred to as a "buyout" [Ref. 75].

For the purpose of this thesis, buyout is defined as the one-time purchase of enough components for the systems to prevent them from being unsupportable. A system may become unsupportable due to the loss of sources of supply. The life-of-type buy includes:

- A one time buy of enough components to completely support the system for the remainder of the system's life,
- A one time buy of enough items until the system is redesigned,
- Procurement of enough semi-finished product (components) with the intention of contracting for final assembly as needed. [Ref. 74: p. 6]

In the United States, when a weapon system or end item of equipment reaches the end of its usefulness, it is declared obsolete, and over a period of time, removed from the inventories. As that system or equipment disappears, its unique spare parts and various kinds of support material disappear also. However, foreign governments which have previously purchased the item may not be prepared to either replace it or have the item lose its usefulness due to a lack of spare parts. The resolution of this conflict lies in the execution of a System Support Buy Out (SSBO). [Ref. 38: pp. 13-1 - 13-5]

SSBO consists, essentially, of notifying customers who have previously bought a system or equipment that the item and its unique support are going to be dropped from the U.S. inventory systems and that, if the customer wants to participate, he has an opportunity to have final procurement of spare parts in sufficient range and depth to support the customer's system or equipment for its projected remaining useful life and "Buy Out" the remaining on hand stocks of repair and spare parts which are unique to the system or equipment.

Once the notification is made, if the customer elects to participate in the SSBO, he does so by means of an already existing FMS case and normal FMS procedures. Therefore, SSBO helps the customer to be able to maintain some degree of support into the future, while "clearing the shelves" of the U.S.. [Ref. 38: pp. 13-1 - 13-4]

This acquisition strategy is very much related to the short term solution of the Turkish Armed Forces' current military equipment obsolescence. The previously discussed three acquisition strategies (coproduction, TDP, licensing) offer long term solutions to the problem. However, life of type buy is not only limited to solutions of the current military equipment obsolescence. In contrast, a loss of production problem might be the case in the future. Production sources (contractors and subcontractors) might discontinue production. They may notify the government that they will no longer be a source of supply for such reasons as, obsolete technology, financial problems, uneconomical production rates, change in business mix, change in profit, growth and investment opportunities etc.. Regardless of the reasons, the government should consider the possibility of losing production sources. In addition, the government should consider this method as an alternative strategy for its production facilities. Domestic military equipment factories involve various degrees of assembling activities. Some components of the system come from foreign sources. Life of type buy might be considered a proper strategy to have economies of scale and continuation of production in production facilities. This section will discuss resolving the current Turkish military equipment obsolescence problem with life of type buy.

## 2. Advantages of Life of Type buy

### *a. Elimination of Reliance on Production Sources*

The most important advantage of the life of type buy is to provide components always ready to use. For domestic assembly and production activities, it provides sufficient items to avoid production shutdown. This eliminates reliance on foreign (or domestic) production sources [Ref. 74: pp. 19-32]. The program manager may have the responsibility of having the required components all available at the time of need to sustain local assembly or production. From the program manager's point of view life of type buy will solve the continuation of production problem.

### *b. Low Life Cycle Procurement Cost*

One of the urgent needs of the Turkish Armed Forces is secondary item requirements of its aging equipment. Some of these spare parts are not in production

today which requires the start up of a production line to produce the items. These start up costs can be high. By using life of type buy, Turkey can utilize the economies of scale of buying spares in high order quantities during initial or existing production. This results in lower spare part costs.

*c. Continuation of the Same Configuration*

Life of type buy provides capability of continuing the same configuration [Ref. 76: pp. 59-62].

**3. Disadvantages of Life of Type Buy**

*a. Difficulty of Estimating the Quantity to Purchase*

The life of type buy is generally pursued when other more economical alternatives to a material shortage or manufacturing phase-out have been completely explored. Quantities to purchase are difficult to estimate for such reasons as the lack of comprehensive end item application data and the difficulty in predicting equipment life [Ref. 74: p. 19]. The quantity to be purchased depends on the equipment's life or reproduction time. The first difficulty is in the prediction of this time period. This is hardly possible for Turkish military equipment. Most of the equipment needs to be replaced or at least modernized. However, limited budget and slow improving domestic production capabilities make difficult to predict remaining utilization time of the equipment. This may be coordinated with the long-term military acquisition plan. para The second difficulty is in predicting the quantity of necessary components for the predicted remaining life of the equipment. One should determine the demand for each kind of component. That can be calculated from mean time between failure (MTBF) or failure rate of each component. According to the typical failure curve (bath-tub phenomena) there is an increasing failure rate during the "wearout" phase of equipment<sup>7</sup> which is mostly the case for Turkish military equipment. Consequently, that requires highly complicated and less reliable quantity prediction. This calculation will result in considerable amount of component needs for remaining utilization time of the equipment. If the system is considerably complex, estimation of the number of components will be more difficult and less reliable.

*b. Storage Difficulties*

Life of type buy or buyout generally requires highly sensitive components to be bought and stored. This generates storage problems because components may be stored for several years before using them. The inventory will be subject to the

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<sup>7</sup>For more detailed information, see Benjamin S. Blanchard, *Logistics Engineering and Management*, Prentice-Hall, 1981.

problems of deterioration and damage. Special problems, such as controlled environment for the storage of microcircuits, may be encountered [Ref. 74: pp. 18-20]. The inventory also requires quite large and suitable storage buildings. Proper storage conditions are necessary for good care of the components. They might also be subject to physical damage from fire, sabotage etc. which may result in losing components.

*c. Increased Storage Costs*

Because life of type buy requires the purchase of a considerable amount of components, it is necessary to have a controlled environment for the storage to keep items usable. That results in increased storage costs and consequent high maintenance costs.

*d. Immediate Needs of Foreign Currency (High Short Term Cost)*

Supply sources of Turkish military equipment are mostly foreign. At the time of buy, the Turkish government would need a considerable amount of foreign currency or it must search for credit possibilities. Having current foreign currency difficulties or high foreign debt might make life of type buy infeasible for Turkey.

## V. CONCLUSIONS AND RECOMMENDATIONS

The researcher, drawing on the literature and his analysis, culminates this thesis with several conclusions and recommendations.

### A. CONCLUSIONS

- I. As discussed in Chapter II, the Turkish Armed Forces face a military equipment obsolescence problem today. Four alternative acquisition policies were offered to solve this problem. In Chapter III, the Turkish military base was discussed and the advantages and disadvantages of the four acquisition policies were covered in Chapter IV. However, these solutions should be considered and compared to each other under some special circumstances. The following are components of the actual environment of the problem:
  - a. **Threat:** Because of Turkey's geo-strategic position and its missions in NATO, Turkey faces a significant threat. In the early stages of a war, it would have to fight alone and could not count on early reinforcements. Therefore, its ability to resist intimidation must be grounded in internal resources.
  - b. **Economic Conditions:** The Turkish economy is in a transition to industrialization. It is obvious that the degree to which a country is industrialized strongly affects its ability to undertake an arms production program. The civilian industry can, in certain areas, be rapidly adapted to defense production. This area of overlap, called dual-use technology, seems to be one of the easiest paths to a domestic arms production program for Turkey. There is a highly sophisticated automotive industry in Turkey. Automotive production lines could be readily adapted to produce armored personnel carriers, military trucks and tanks. For example, Brazil has restructured its Volkswagen assembly lines to produce tanks. Electrical equipment industries can manufacture aeronautical and naval electrical systems and hydraulic mechanisms for gun systems. Household appliance, food processing and textile industries, which are the most sophisticated Turkish industries, are readily adaptable for making military logistical equipment. However, the economy is experiencing unemployment and inflation and labor rates are very low relative to Western countries. There is a trade deficit and foreign currency difficulties.
  - c. **Political Conditions:** There is a nationwide support for domestic arms production. The Turkish Government is quite eager to establish a domestic defense industry. Domestic arms production is considered an alternative policy to lessen the unemployment rate and the trade deficit. The Government has set up a Defense Industry Development Fund and Administration to establish, manage and control the defense industry

through acquisition strategies. DIDA has some four billion dollars a year to spend on arms without any approval of the Turkish Grand National Assembly. Acquisitions are not limited with an annual budget. Multi-year funding is possible. There is a highly effective two-step decision mechanism to start a new program and strong incentives and tax exemptions are being offered to attract foreign capital and technology.

2. Turkey is at a go/no-go point for most of its military equipment acquisition. Acquisition strategies must be examined carefully to make the best decisions. Each acquisition alternative must be examined on a number of aspects such as, life cycle cost, system performance, delivery schedule, national economy benefits, contribution to national and NATO defense capabilities, applicability of the approach in Turkish industry, international market considerations etc.. Each acquisition strategy must be examined on all of these aspects as well as procurement cost and performance and capability of a system. Decision variables affecting selection of an acquisition model and their comparisons are as follows:

a. **Life Cycle Cost:** Total system cost includes all future costs associated with the acquisition, utilization and subsequent disposition of the system/equipment. If one assumed zero disposition of the system cost, total cost consists of R & D costs, investment costs (initial investment + procurement cost) and operation and maintenance costs.

(1) **R & D Cost:** R & D cost includes all costs associated with conceptual feasibility studies, basic research, advanced research and development, engineering design, fabrication and test of engineering prototype models (hardware), and associated documentation. It also covers all related program management functions. Coproduction seemingly occupies the most advantageous position of the strategies because of participation of at least two nations and these costs would be shared. In the TDP and licensing methods, R & D cost would be included in the cost of the arrangement for the TDP or licensing agreement. This cost would therefore be borne in part by Turkey. The degree to which Turkey must pay this cost would be dependent upon the specific purchase.

(2) **Investment and Tooling Costs:** Investment and tooling costs include all costs associated with the acquisition of systems and equipment. Specifically, this covers initial investments, manufacturing, manufacturing management, system construction and initial logistic support. Life of type buy has no investment cost. However, depending on the item, it generally requires a controlled environment for storage and maintenance of items. All other strategies require high initial investment costs for production. However, in the coproduction method initial investment costs are shared by at least two nations while it is completely paid for by Turkey in the TDP and the licensing strategies. Another investment cost is the

manufacturing cost of a system (unit costs will be compared for convenience). Life of type buy offers the least cost, because procurement is made from "off-the-shelf". Coproduction offers the second least cost among the four alternatives mainly because foreign orders can be shared with coproduction and there is a limited export capacity, therefore production quantity is higher than from licensing and TDP production. With licensed production, manufacturing cost would be highest. As for the TDP, its manufacturing cost and unit cost of each item depend on the purchased quantity and export quantity (if applicable). Manufacturing cost with TDP may vary. With TDP, Turkey could have the unlimited rights to export the system. In this case, the manufacturing and investment cost burden to Turkey will be diminished.

- (3) **Operations and Maintenance Costs:** Operations and maintenance cost includes all costs associated with the operation and maintenance support of the system throughout its life cycle subsequent to equipment delivery in the field. Specific categories cover the cost of system operation, maintenance, sustaining logistics support and equipment modifications. The four alternative strategies all provide continuous operational and maintenance support. However, operational and maintenance costs depend mostly on type and quantity of item to be produced.
- b. **Delivery Schedule:** Life of type buy provides instant delivery because of buying from directly "off-the-shelf". TDP and licensed production provide better delivery schedule than coproduction principally because of program management difficulties and conflicting priorities among participant nations.
  - c. **National Economy Benefits:**
    - (1) **Job Opportunities:** Coproduction provides the highest amount of job opportunities for the national economy of the four alternatives. However, job opportunities provided by coproduction will depend on what percentage of the overall system is produced in Turkey. TDP and licensed production would provide a considerable amount of job opportunities for Turkey's economy while life of type buy offers very little.
    - (2) **Technology Transfer:** TDP has an important advantage with regard to this variable since TDP offers unlimited technology transfer to Turkey. It is followed by coproduction and licensing. Buyout provides very little opportunities in transferring technology. However, in the coproduction and the licensing technique, technology transfer takes place face-to-face with the original developer. There is a high risk involved in the TDP technique. It is extremely difficult to produce complex systems under TDP. Therefore coproduction and licensing are the most promising in technology transfer criteria.



- (3) ***Balance of Payments:*** The coproduction and TDP strategies will contribute to the balance of payments through import savings and export earnings. Licensing is expected to provide import savings. However, to date, historical records show that arms production in some countries has resulted in decreasing import-substitution. The SIPRI figures show that it is not the countries with the highest production values that have become least dependent on arms imports. The import values are still much higher than the production values in India and Israel. In India, substitution is even decreasing. The highest production-to-import ratios are found in Brazil (also reflecting substantial arms exports), North Korea and South Africa [Ref. 77].
  - (4) ***Offset Opportunities:*** Coproduction offers the highest degree of offset benefits. It is followed by licensed production. TDP and life of type buy do not normally provide offset benefits to Turkey.
  - (5) ***Other Domestic Industry Effects:*** Investments in the defense industry may cause Turkey to experience a higher inflation rate than it has now. However, defense spending may increase capacity utilization, expand output, raise the rate of return on capital and may increase the gross national product (GNP) of Turkey. On the other hand, increased domestic military investments may reduce the civilian domestic product. These effects are difficult to predict.
- d. **Contribution to National Defense:** Arms production through these acquisition strategies should bring new defense capabilities to Turkey. So, technology of the arms to be produced should add to the current military capability. In addition, they should meet a real Turkish military need and not just be prestige weapons to produce.
  - e. **Contribution to NATO:** Technology transfer and the production of the same kind of weapons in NATO will contribute to NATO's RSI policy and its military capability while providing lower unit costs to its nations.
  - f. **International Market Considerations:** TDP provides Turkey unlimited rights to export arms while coproduction has some market limitations. Licensing and life of type buy do not provide the right to Turkey to export.
  - g. **Program Management:** Program management is highly complex and difficult in coproduction programs. It is relatively easy to manage the licensing and TDP programs. Second sourcing methods could be used for competitive procurement. However, Turkish orders are too low to implement second sourcing methodology effectively. It is especially true for TDP. Qualifying a second source takes time. Split of production quantities through second sourcing will increase costs and decrease learning curve opportunities. The more complex the system the more difficult it is to second source. There is high risk involved in production of complex systems through TDP.

## B. RECOMMENDATIONS

As a summary of this research, the following recommendations are made:

1. Coproduction seems to be the most promising acquisition strategy and should be used under these following conditions:
  - a. If a system to be produced is highly complex,
  - b. If a system requires advanced technology (higher than Turkish industry capabilities),
  - c. If a system might involve complex and costly R & D activities.
2. TDP seems to be the most promising acquisition strategy and should be used under these following conditions:
  - a. If it is implemented after production of the system in Turkey under license. There are some weapons which are already in production under license in Turkey. Buying TDP of these systems is a good place to start.
  - b. The production of relatively simple systems or components. TDP can also be proper for supporting coproduction or licensed production. Some components which are required in the production of systems under coproduction or license, can be produced with TDP.
  - c. For production of spare parts.
3. Licensing does not offer very much of a future because of its low production runs and high unit costs. However, it is good for transferring technology and production experiences. It can be used as a first step strategy before buying the TDP, or realizing coproduction or domestic design production. It is also proper for creating second source and competitive procurement.
4. Life of type buy is the best way to support systems which are now being used in the Turkish Armed Forces. This strategy should be used:
  - a. To support current systems until domestic production replaces these systems,
  - b. To support domestic production in case of losing a foreign source or subcontractor which provides some parts to the domestic source,
  - c. In the future , to provide support for future systems in case of losing related domestic production sources.
5. Turkey should behave as competitive buyer and shop around to get the best price and quality combinations for a specific system solution to a military mission need.
6. In order to take advantage of economies of scale in production, Turkey should look to produce more than just their own requirement, regardless of whether coproduction or TDP strategy is used. This could also be termed using an "export-oriented" policy vice an "import substitution" policy.
7. To become an arms producer very quickly, Turkey should utilize the technologies that are adaptable to its current and developing industrial system.

8. In an attempt to summarize and quantify the above recommendations, the author offers a rating matrix as Table 2. In Table 2, the first column shows the criterion discussed above to rate the alternative acquisition strategies. Columns two through five show the alternative policies and their values resulting from this study. A maximum value (5) for a criterion indicates the optimum or most desirable situation for Turkey while a value of zero indicates the least or minimum. A further refinement of this technique is presented in Table 3. Table 3 adds a column entitled "weight" which allows for a distribution of preference among the criterion. This allows the user to interject their belief as to which criterion are the most important. The values in Table 3 reflect the opinion of the author.

### **C. AREAS FOR FURTHER RESEARCH**

It is obvious that the outcome of using the matrix in Table 3 strongly depends on the relative value of the weights assigned. Therefore, the specific values of the weights must be determined. This determination offers an area of further research to quantify the specific objectives of the Turkish government.

In choosing between alternative acquisition strategies, or selecting a mix, the DIDA would have to know the total costs of each proposed system and their effects on its policy objectives. This information would be determined according to the proposals of the bidders. To use or test the matrix specific real costs of each system and their specific advantages and disadvantages with regard to the alternative acquisition strategies would have to be used.

TABLE 2  
SIMPLE RATING MATRIX FOR EVALUATION OF ALTERNATIVE  
ACQUISITION STRATEGIES

<i>Criterion</i>	<i>Coproduction</i>	<i>T D P</i>	<i>Licensing</i>	<i>Buyout</i>
<b>SYSTEM EFFECTIVENESS</b>				
1. System Performance	*			
2. Dependability	*			
3. Availability	*			
<b>LIFE CYCLE COST</b>				
1. R & D Cost	4	2	3	5
2. Investment & Tooling Cost	5	3	3	5
3. Operation & Maintenance Cost	5	5	5	5
4. System Phase Out Cost	*			
<b>DELIVERY SCHEDULE</b>	3	5	5	5
<b>NATIONAL ECON. BENEFITS</b>				
1. Technology Transfer	5	4	3	0
2. Balance of Payments	4	3	3	0
3. Offset	5	3	0	0
4. Job	4	4	4	0
5. Other	*			
<b>CONTRIBUTION TO NATION. DEFENSE</b>	*			
<b>CONTRIBUTION TO NATO</b>	*			
<b>INTERNATIONAL MARKET CONS.</b>	4	5	0	0
<b>PROGRAM MANAGEMENT</b>	3	5	4	0
<b>TOTAL</b>	42	39	30	20

(\*): Not included

TABLE 3  
SELECTING MOST PROMISING ACQUISITION STRATEGY

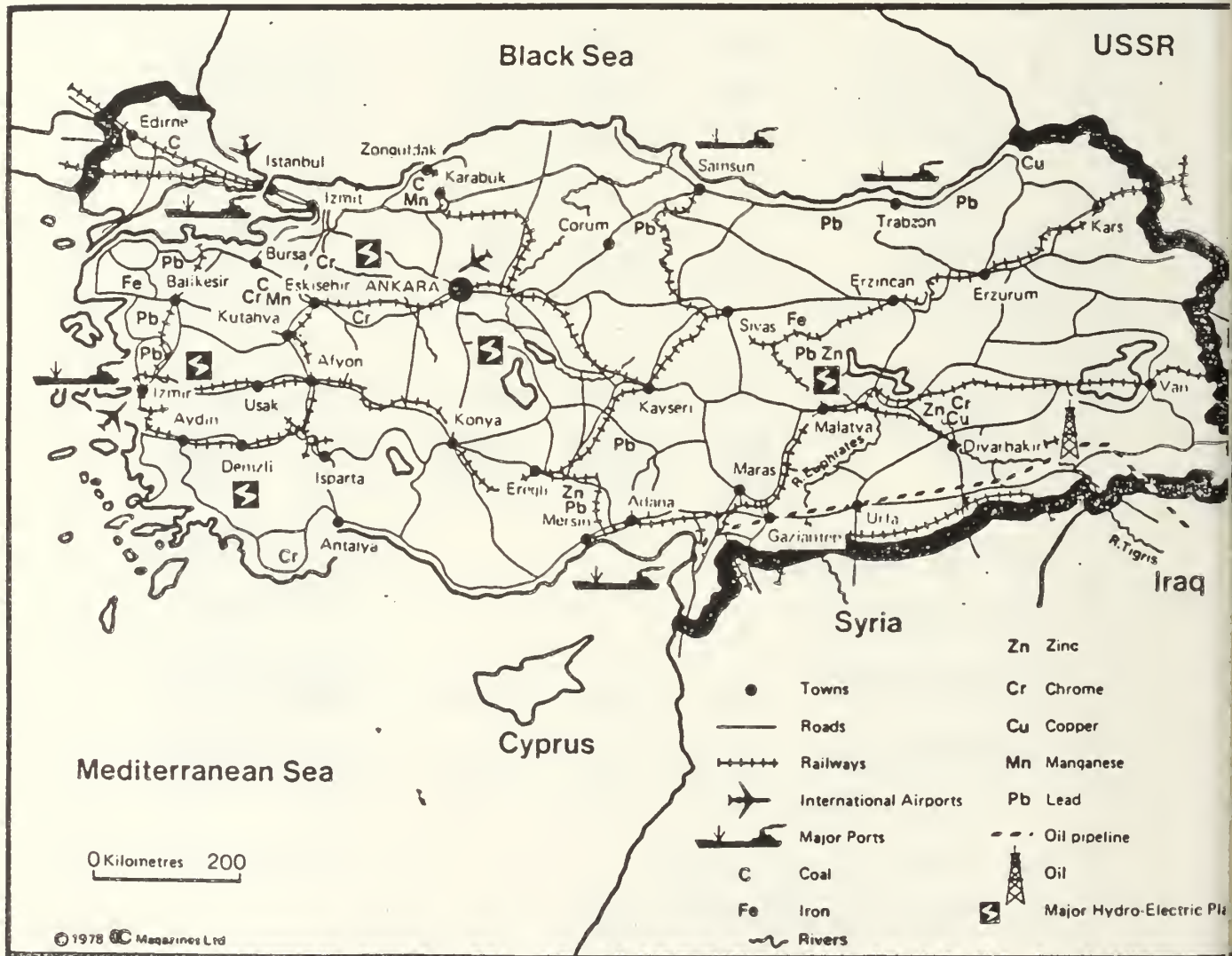
<i>Criterion</i>	<i>Weight</i>	<i>Coproduction</i> (R)-W.	<i>T D P</i> (R)-W.	<i>Licensing</i> (R)-W.	<i>Buyout</i> (R)-W.
<b>SYSTEM EFFECTIVENESS</b>					
1. System Performance	*				
2. Dependability	*				
3. Availability	*				
<b>LIFE CYCLE COST</b>					
1. R & D Cost	0.07	(4)-0.28	(2)-0.14	(3)-0.21	(5)-0.35
2. Investment & Tooling Cost	0.15	(5)-0.75	(3)-0.45	(3)-0.45	(5)-0.75
3. Operation & Maintenance Cost	0.15	(5)-0.75	(5)-0.75	(5)-0.75	(5)-0.75
4. System Phase Out Cost	*				
<b>DELIVERY SCHEDULE</b>	0.09	(3)-0.27	(5)-0.45	(5)-0.45	(5)-0.45
<b>NATIONAL ECON. BENEFITS</b>					
1. Technology Transfer	0.08	(5)-0.40	(4)-0.32	(3)-0.24	(0)-0
2. Balance of Payments	0.07	(4)-0.28	(3)-0.21	(3)-0.21	(0)-0
3. Offset	0.10	(5)-0.50	(3)-0.30	(0) -0	(0)-0
4. Job	0.15	(4)-0.60	(4)-0.60	(4)-0.60	(0)-0
5. Other	*				
<b>CONTRIBUTION TO NATION. DEFENSE</b>	*				
<b>CONTRIBUTION TO NATO</b>	*				
<b>INTERNATIONAL MARKET CONS.</b>	0.09	(4)-0.36	(5)-0.45	(0)-0	(0)-0
<b>PROGRAM MANAGEMENT</b>	0.05	(3)-0.15	(5)-0.25	(4)-0.20	(0)-0
<b>WEIGHTED TOTAL</b>	1.0	4.34	3.92	3.11	2.3

(R): Relative ranking from Table 2.

W.: Weighted value [(R)xWeight Factor]

APPENDIX A  
MAP OF TURKEY

# TURKEY



## APPENDIX B ABBREVIATIONS AND VOCABULARY

**ACDA:** Arms Control and Disarmament Agency  
**AECA:** Arms Export Control Act  
**AM:** Acquisition Manager  
**ASN:** Assistant Secretary of the Navy (U.S.)  
**ATMG:** Arms Transfer Management Group  
**AWACS:** Airborne Warning Control System  
**BWB:** Federal Procurement Office (FR Germany)  
**CAO:** Case Administering Office  
**CAT:** Conventional Arms Transfer  
**CLO:** Country Liason Officer (Foreign Country Representative)  
**CLSSA:** Cooperative Logistics Supply Arrangements  
**CNO:** Chief of Naval Operations  
**CPAF:** Cost Plus Avard Fee  
**CPD:** Congressional Presentation Document  
**CPFF:** Cost Plus Fixed Fee  
**CPIF:** Cost Plus Incentive Fee  
**CPL:** Country Program Listing  
**DAR:** Defense Acquisition Regulation  
**DCAS:** Defense Contract Administration Services  
**DD:** Department of Defense (used with form numbers)  
**DIDA:** Defense Industry Support and Development Administration  
**DIFS:** Defense Integrated Financial System  
**DISAM:** Defense Institute of Security Assistance Management  
**DOD:** Department of Defense  
**DSAA:** Defense Security Assistance Agency  
**EDA:** Excess Defense Articles  
**EPG:** European Producing Group  
**ESF:** Economic Support Fund  
**FAA:** Foreign Assistance Act of 1961  
**FAR:** Federal Acquisition Regulation  
**FCR:** Foreign Country Representative

**FFP:** Firm Fixed Price  
**FLO:** Foreign Liaison Officer  
**FMS:** Foreign Military Sales  
**FOB:** Free on Board  
**FPIF:** Fixed Price Incentive Fee  
**FY:** Fiscal Year  
**FYDP:** Five Year Defense Program  
**FYPSG:** Five Year Plan for Strategic Goals  
**GA:** Grant Aid  
**GAO:** General Accounting Office  
**GBL:** Government Bill of Lading  
**ILC:** International Logistics Center  
**IMET:** International Military Education and Training  
**ITAR:** International Traffic in Arms Regulations  
**JCS:** Joint Chief of Staff  
**KAF:** Kayseri Aircraft Factory  
**LCC:** Life Cycle Cost  
**LOA:** Letter of Offer and Acceptance (DD Form 1513)  
**LOI:** Letter of Intent  
**LOR:** Letter of Request  
**MAG:** Military Assistance Group  
**MAAG:** Military Assistance and Advisory Group  
**MAP:** Military Assistance Program  
**MASM:** Military Assistance and Sales Manual  
**MBT:** Main Battle Tank  
**MISIL:** Management Information System, International Logistics  
**MKEK:** Machinery and Chemistry Industry Corporation  
**MND:** Ministry of National Defense (Turkey)  
**MOA:** Memoranda of Agreement  
**MOU:** Memoranda of Understanding  
**MTTR:** Mean Time to Repair  
**MTU:** Motoren and Turbinen Union Corporation (FR Germany)  
**NATO:** North Atlantic Treaty Organization  
**NAVILCO:** Navy International Logistics Control Center  
**OA:** Obligational Authority



**OMB:** Office of Management and Budget  
**OP-63:** Office of the Chief of Naval Operations, Security Assistance Division  
**OPNAV:** Office of the Chief of Naval Operations  
**OSD:** Office of the Secretary of Defense  
**P&A:** Price and Availability  
**P&R:** Planning and Review  
**PKO:** Peacekeeping Operations  
**POM:** Program Objective Memorandum  
**PPBS:** Planning, Programming and Budgeting System  
**PTT:** Turkish Mail Telephone Telegram Inc.  
**QA:** Quality Assurance  
**R&D:** Research and Development  
**RDT&E:** Research, Development, Test and Evaluation  
**RFP:** Request for Proposal  
**SA:** Security Assistance  
**SAAC:** Security Assistance Accounting Office  
**SAO:** Security Assistance Organization  
**SDAF:** Special Defense Acquisition Fund  
**SECDEF:** Secretary of Defense  
**SECNAV:** Secretary of Navy  
**SCE:** Significant Combat Equipment  
**SIPRI:** Stockholm International Peace Research Institute  
**STANAG:** Standardization Agreement (NATO)  
**SYCOM:** System Command  
**TAI:** Turkish Aerospace Industry Inc.  
**TEI:** Tusas Engine Industries Inc.  
**TDP:** Technical Data Package  
**TGS:** Turkish General Staff  
**THK:** Turkish Air League Administration  
**UN:** United Nations  
**USAF:** United States Air Force  
**USG:** United States Government  
**USMC:** United States Marine Corps  
**USN:** United States Navy  
**USSR:** Union of Soviet Socialist Republics

## GLOSSARY OF SELECTED TERMS

**Acceptance, Letter of Offer:** (U.S. DD Form 1513 Offer and Acceptance) by which the U.S. Government offers to sell to a foreign government or international organization defense articles and defense services pursuant to the arms Export Control Act, as amended. The DD Form 1513 lists the items and/or services, estimated costs, the terms and conditions of sale, and provides for the foreign governments signature to indicate acceptance.

**Arms Transfers:** Defense articles and defense services such as arms, ammunition, and implements of war, including components thereof, and the training, manufacturing licenses, technical assistance and technical data related thereto, provided by the government under the Foreign Assistance Act of 1961.

**Blanket Order FMS Case:** An agreement between foreign customer and the U.S. Government for a specific category items or services (including training) with no definitive listing of items or quantities. The case specifies a dollar ceiling against which orders may be placed throughout the ordering period, normally 12 months.

**Case:** A contractual sales agreement between the U.S. and an eligible foreign country or international organization documented by DD Form 1513. A FMS case identifier is assigned for the purpose of identification, accounting, and data processing for each offer (DD Form 1513).

**Cash Sales (DoD):** Either cash with Acceptance payment within a reasonable period not to exceed 120 days after delivery of the service, or payments of funds required to suppliers under a "Dependable Undertaking."

**Co-Development:** A development project to which to which more than one government contributes efforts or resources.

**Commercial Sale:** Sale made by U.S. industry directly to a foreign buyer which is not administered by the DoD through FMS procedures.

**Coproduction (international):** Method by which items intended for military application are produced and/or assembled under a cooperative agreement that requires the transfer of technical information and know-how from one nation to another.

**Country Team:** Senior members of U.S. Government agencies assigned to a U.S. diplomatic mission overseas, and subject to the direction and supervision of the chief, U.S. Mission (Ambassador). Normally, such members meet regularly to coordinate U.S. Government political, economic and military activities and policies in the host country.

**Credit:** Transactions approved on a case-by-case basis by the Department of State, Treasury and Defense, which allow repayment of military export sales for periods beyond 120 days after delivery of material or performance of service. (Sections 23 and 24, AECA).

**Defined Order Case:** These cases are characterized by separately identified line items on the DD Form 1513.

**DoD Direct Credit:** Long-term credit which is directly financed from the appropriation or account available for that purpose. Authority is Section 23 of the Arms Export Control Act,

**Eligible Recipient (FMS):** Any friendly foreign country or international organization determined by the President to be eligible to purchase defense articles and defense services, (section 3, AECA)

**Excess Defense Articles:** U.S. Defense articles which are in excess of the Approved Force Acquisition Objective and Approved Force Retention Stock of all Department of Defense Components, they are dropped from the inventory by the supplying agency for delivery to countries or international organizations. (Sec. 644(g), FAA)

**Grant Aid (Military):** Military Assistance rendered under the authority of the FAA for which the U.S. receives no dollar reimbursement. Consists of MAP and IMETP.

**International Traffic in Arms Regulation (ITAR):** A document prepared by the Office of Munitions Control, Department of State, providing licensing and regulatory provisions for the export of defense articles, technical data and services. The ITAR also provides the U.S. Munitions List. (Federal Register, Vol.45, No. 246)

**Letter of Offer and Acceptance (LOA):** U.S. Department of Defense (DD) Form 1513 Offer and Acceptance by which the U.S. Government offers to sell to a foreign government or international organization defense articles and defense services pursuant to the Arms Export Control Act, as amended. The DD Form 1513 lists the items and/or services, estimated costs, the terms and conditions of sale, and provides for the foreign government's signature to indicate acceptance.

**Letter of Request (LOR):** Term to identify a request from eligible FMS participants for the purchase of defense articles and services. The request may be in message or letter format.

**Major Defense Equipment:** Any item of significant combat equipment on the U.S. Munitions List having a non-recurring research and development cost of more than \$50 million or a total production cost of more than \$200 million.

**Military Assistance Program (MAP):** That portion of the United States security assistance authorized by the Foreign Assistance Act of 1961, as amended, which provides defense articles and services to recipients on a nonreimbursable (grant) basis.

**Military Export Sales:** All sales of defense articles and defense services made from U.S. sources to foreign governments, foreign private firms and international organizations. Such sales fall into two major categories: Foreign Military Sales and Commercial Sales.

**Munitions List:** The U.S. Munitions List lists defense articles and defense services in the International Traffic in Arms Regulation (ITAR).

**Operation & Maintenance Costs (O&M Costs):** Costs associated with the equipment, supplies, and services required to train, operate, and maintain forces, including cost of spare parts other than concurrent spares and initial stockages, ammunition and missiles used training or replacements for such items expended in training or operations, rebuild and overhaul costs (excluding modernization) of equipment subsequent to initial issue, training and other services that do not constitute investment costs, and administrative costs associated with overall program management and administration.

**Planning, Programming, Budget System (PPBS):** An integrated system for the establishment, maintenance, and revision of the Five Year Defense Plan (FYDP) and DOD budget.

**Reimbursements:** Funds realized from the sale of MAP owned property, such funds begin deposited to MAP accounts and available for Programming.

**Trust Fund (FMS):** A fund credited with receipts which are earmarked by law and held in trust, or a fiduciary capacity by the government for use in carrying out specific purposes and programs in accordance with an agreement.

## APPENDIX C

### FOREIGN MILITARY SALES PROCESS

Any assistance provided to a foreign country should support U.S. security assistance objectives, which is stated in Chapter III. Law requires a presidential determination first to cite the eligibility of any country to receive U.S. defense articles and services. There must be continuous consultation between the U.S. Security Assistance Organization (SAO) and the recipient country during planning of FMS sales. [Ref. 34: p. 8-1]

Even before a specific request is made by a purchasing country, the U.S. may be involved in forward planning, to determine the needs of the buying country and the budget and procurement issues relating to the U.S.. There are several separate planning activities. The actual planning of FMS sales, however is carried out by two types of groups: the "Country Team"<sup>8</sup> and the "Washington Team", which may be a consultative or survey team dispatched for a particular purpose, or associated with a Joint Military Commission. A key planning instrument prepared by the country team, is the Annual Integrated Assessment for Security Assistance (AIASA). Other planning documents include Consolidated Data Reports (CDRs), which abbreviate the AIASA information for use in the Congressional Presentation Document (CPD). This is produced as part of the budget process each year and outlines in general detail what will be required for a given country in the form of security assistance. For some countries, a Security Assistance Defense Analysis Paper may be prepared annually.

Any country desiring to buy or lease defense articles or defense services, whether FMS or commercial sales, must first meet the eligibility requirements under the U.S. Arms Export Control Act (AECA). The recipient must also agree to provide the security protection to the item purchased.

Although, an FMS sale may be for cash, it differs from a commercial sale in that the Department of Defense buys the equipment and manages the entire sale. The sale may be financed using FMS Credits under the U.S. international security assistance program. FMS credits are made as part of the foreign assistance budget request.

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<sup>8</sup>The Country Team involves the Country Security Assistance Office (SAO) in the affected country, regional departments of the State and Defense Departments, the Operations branch of DSAA, and the Commanders of the Unified Commands of the Armed Forces responsible for the area involved.

Sometimes that request includes a statement that a given country is expected to use its credits for a specific purchase or for a generic category of equipment or it could remain unspecified with the country then requesting equipment.

FMS credit funds may be used for procurement outside of the U.S. only if the President determines that such procurement will not result in adverse effects upon the U.S. economy or industrial mobilization base. Some FMS credits may be used to finance commercial sales. These are handled like regular commercial sales except for an additional referral of the sale to the Defense Security Assistance Agency (DSAA), which manages FMS for the Pentagon. Another way of financing an FMS sale is through the use of U.S. Military Assistance Program (MAP) funds. MAP, a part of the international security assistance package, provides outright grants of equipment, training, or funds. MAP funds are transferred to the country's FMS account, so for all practical purposes a MAP delivery operates exactly like an FMS sale.

Customer's requests can be originated either in the purchasing country or in the U.S.. If they originated in the purchasing country they should be sent via the U.S. Embassy. These requests can originate with the purchasing country's representative in Washington. First, the type of request is determined. There are two types of request: request for significant military equipment (SME) and requests for all other foreign military sales. The FMS process for these two kinds of requests are different. (See Figures C.1 and C.2). There are several ways to request Foreign Military Sales. The precise channels through which it proceeds may be depend on the country of origin, the type of request, the service involved and other considerations. If the foreign country seeks Significant Military Equipment (SME refers the U.S. Munitions List which is published as part of the International Traffic in Arms Regulations), the request must be sent to the U.S. Department of State's Bureau of Politico-Military Affairs ("State PM") and also to the DSAA, the Pentagon's main implementation body for all foreign security assistance. For SME, the request must address need, force structure effects, the reaction of neighboring countries, the ability to operate and support the equipment, the source of financing, "human rights considerations", and whether the U.S. Government should approve transfer.

For Foreign Military Sales on the Munitions List, but not identified as Significant Military Equipment, the channels differ. If the request originates abroad, it may be transmitted to the Embassy, or "the DoD element of the U.S. country team" with copies sent to the "cognizant DoD component", which means the relevant branch

Figure C.1 Submission of Request For SME [Ref. 34: p. 8-3].

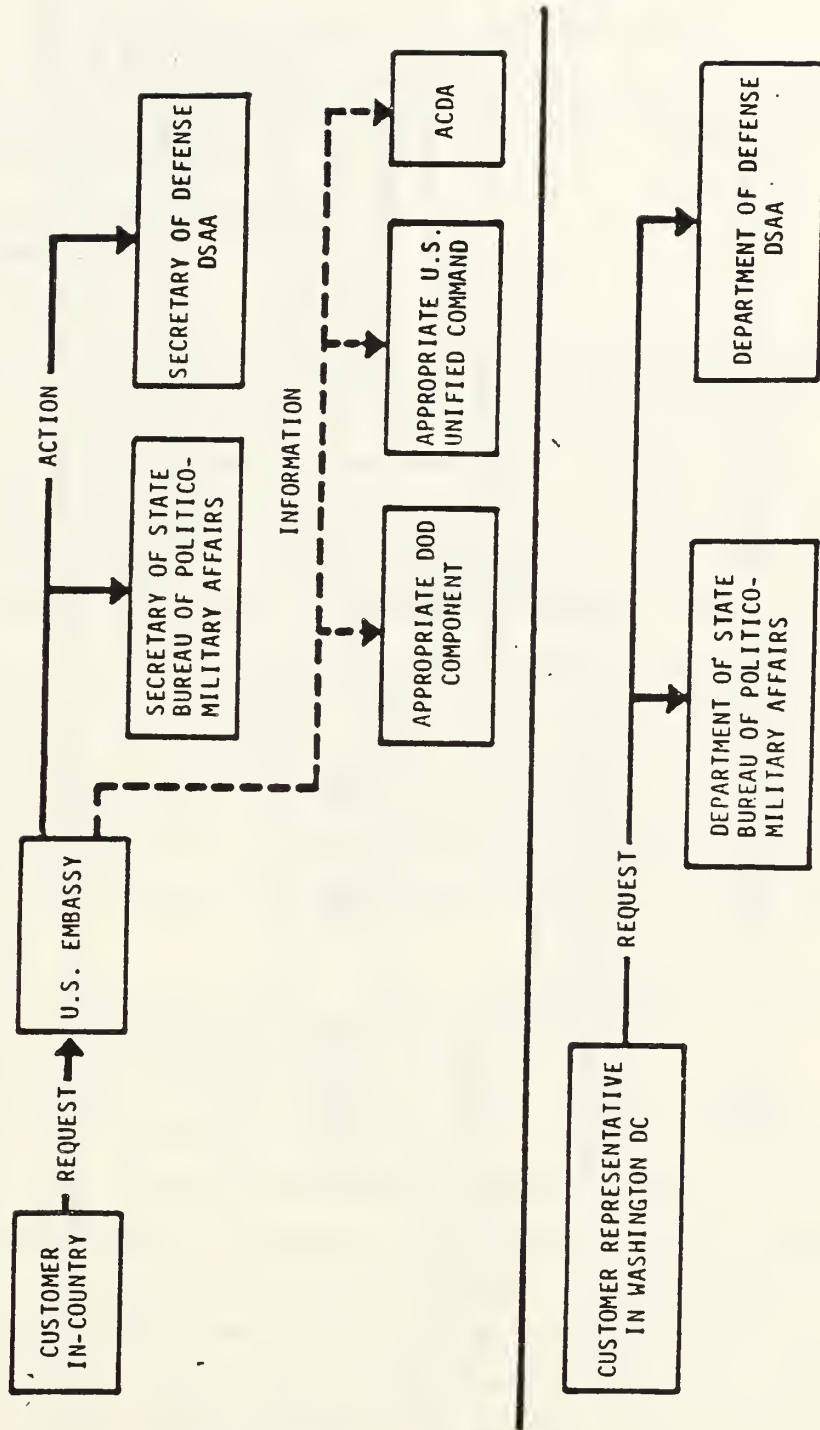
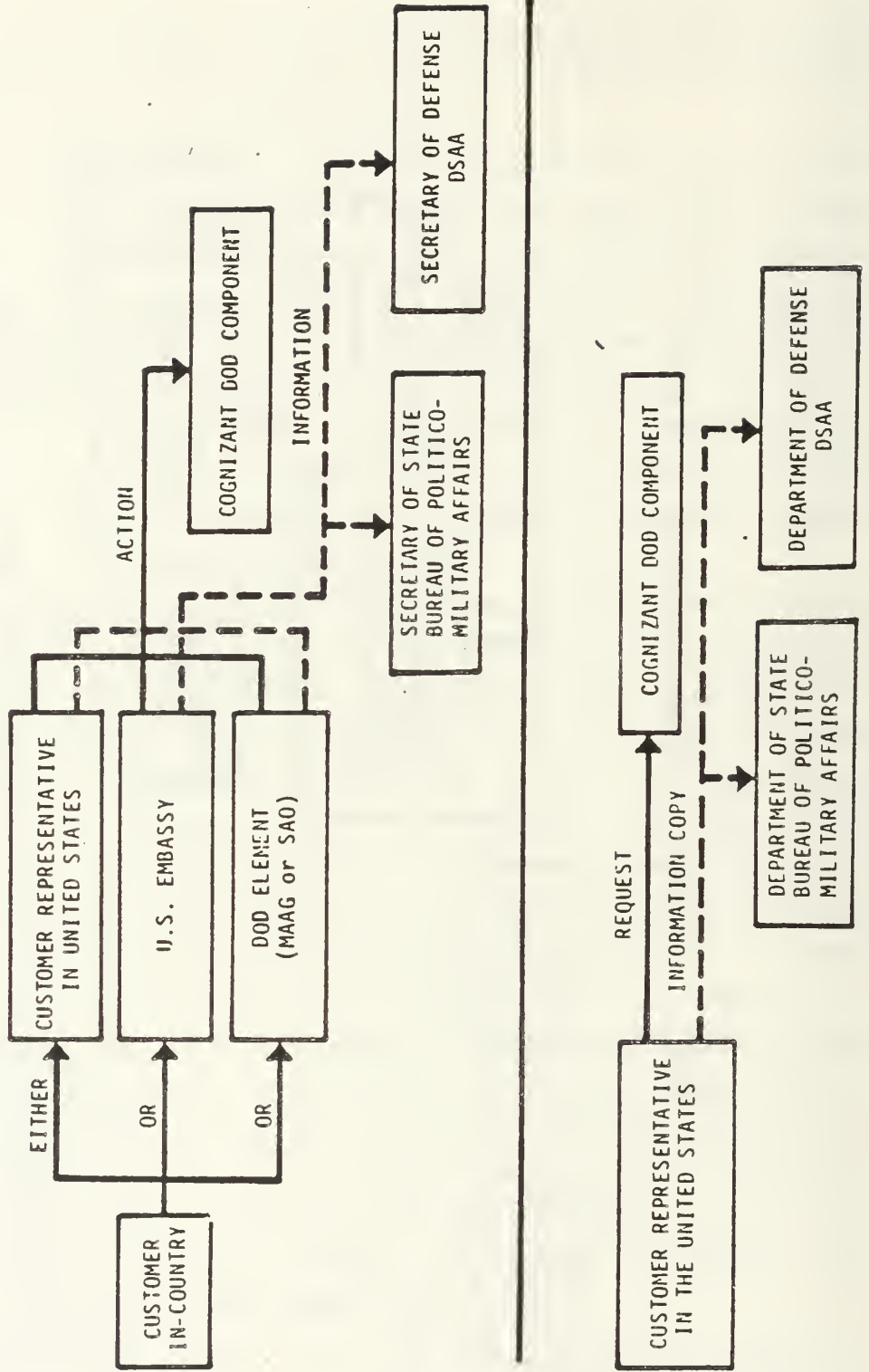


Figure C.2 Submission of Requests for All Other Foreign Military Sales.





or service. For the U.S. military services, the "Cognizant Military Departments" (MILDEPs) are:

1. ARMY: U.S. Army Security Assistance Center, Washington, D.C.,
2. NAVY: Office of the Chief of Naval Operations (OP-63),
3. AIR FORCE: USAF Air Staff (PAI) and Air Force Logistics Command International Logistics Center,
4. Defense Contract Audit Agency,
5. Defense Mapping Agency,
6. Defense Logistics Agency,

The State PM is the responsible authority. It would normally send the request out for comment to the regional bureaus. If the request is small, the PM and DSAA will process it and perhaps include the regional bureaus and the relevant country desks within the State Department. If all is routine, the PM will notify DSAA for approval. For an expensive system, which requires Congressional approval, the PM must prepare Congressional notification. After the Under Secretary approves the request, DSAA is notified.

DSAA coordinates the Pentagon's side, including the relevant country desks and other interested agencies. For a simple request, or from a country with a long-established military relationship with the U.S., the process is routine. In complicated cases, an iterative effort between the various divisions of State and DoD ensures; it is a "non-linear" process which involves much coordination and does not lend itself to graphic representation.

The general procedures of a Letter of Request (LOR) are explained below. In Figures C.3 through C.7, LOR processing is shown in detail.

After an initial request is received, there are several possible approaches. The buyer may request either preliminary informational data known as Planning and Review (P&R) data, or more specific and detailed Price and Availability (P&A) data which offers precise estimates of the costs involved and speed of delivery available, or may directly request the preparation of a Letter of Offer and Acceptance (LOA).

The usual document used for the actual sale transaction is DoD Form 1513 (DD Form 1513), which lists the items or services, estimated costs, terms and conditions of the sale. There may also be a Letter of Intent (LOI), for cases where procurement of long lead time items may need to be financed; and either DD Form 212, which provides for financing procurement of long lead time items prior to the LOA's

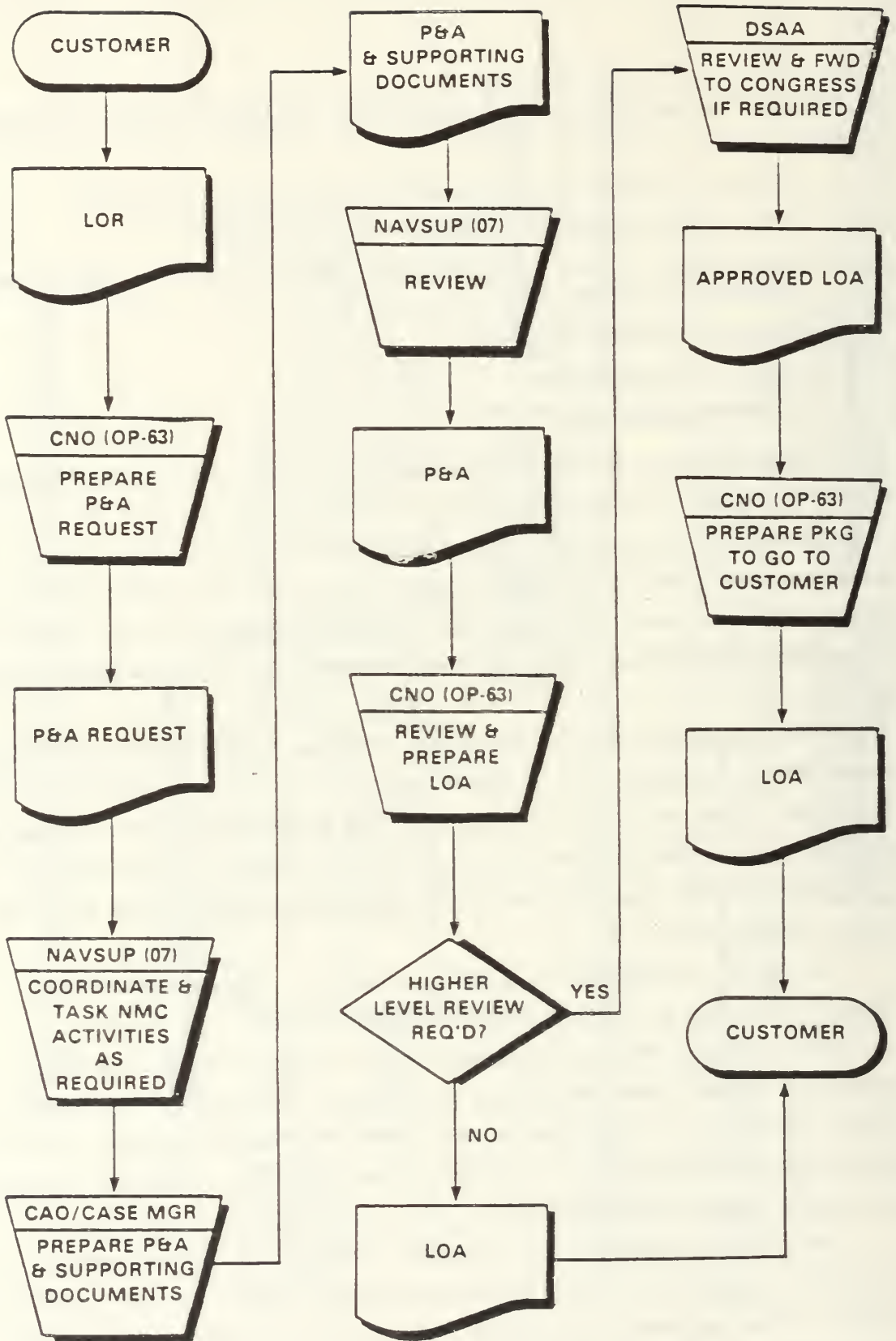


Figure C.3 Processing the LOR [Ref. 38: p. 1-12].

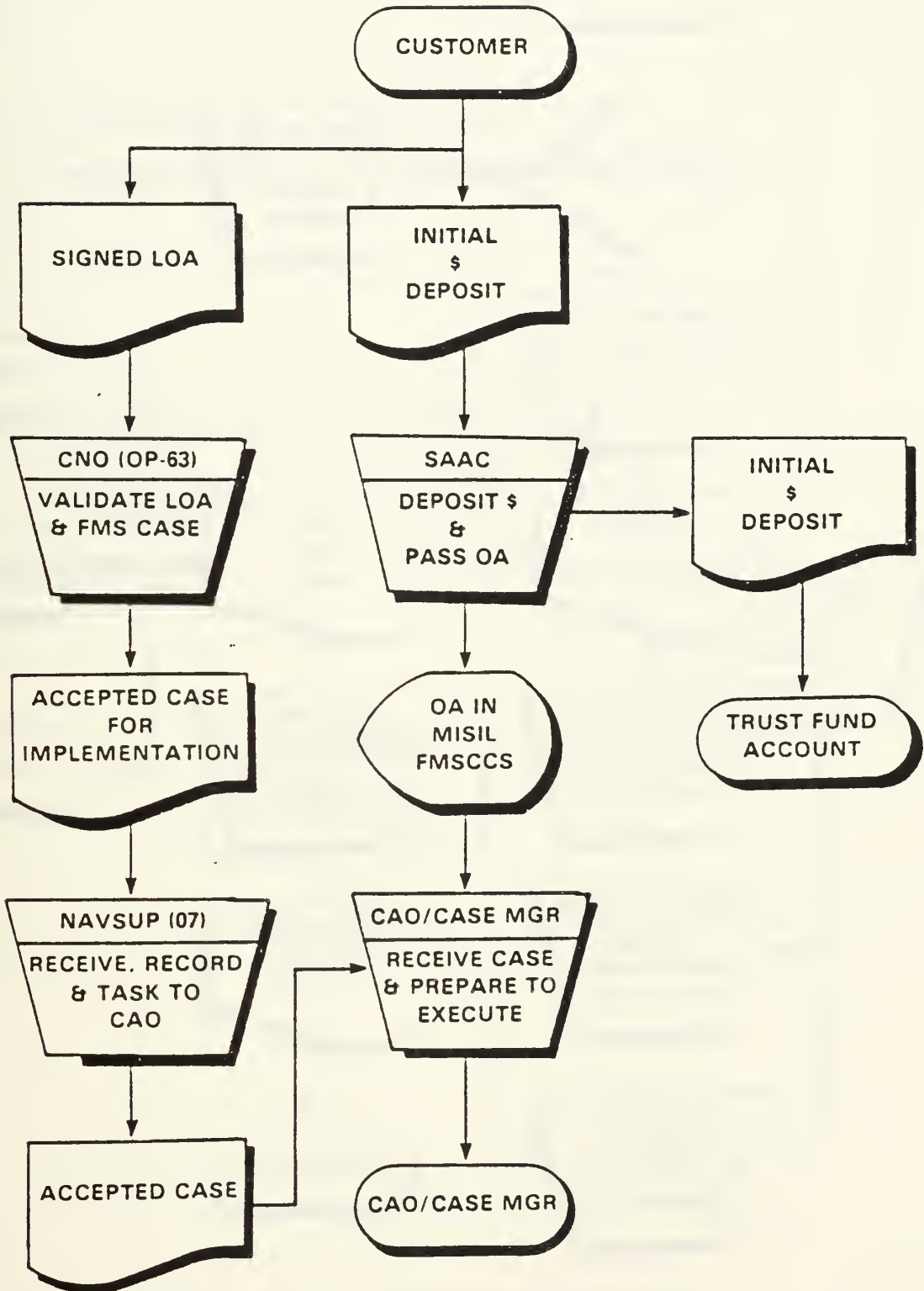


Figure C.4 Case Acceptance and Implementation [Ref. 38: p. 1-13].

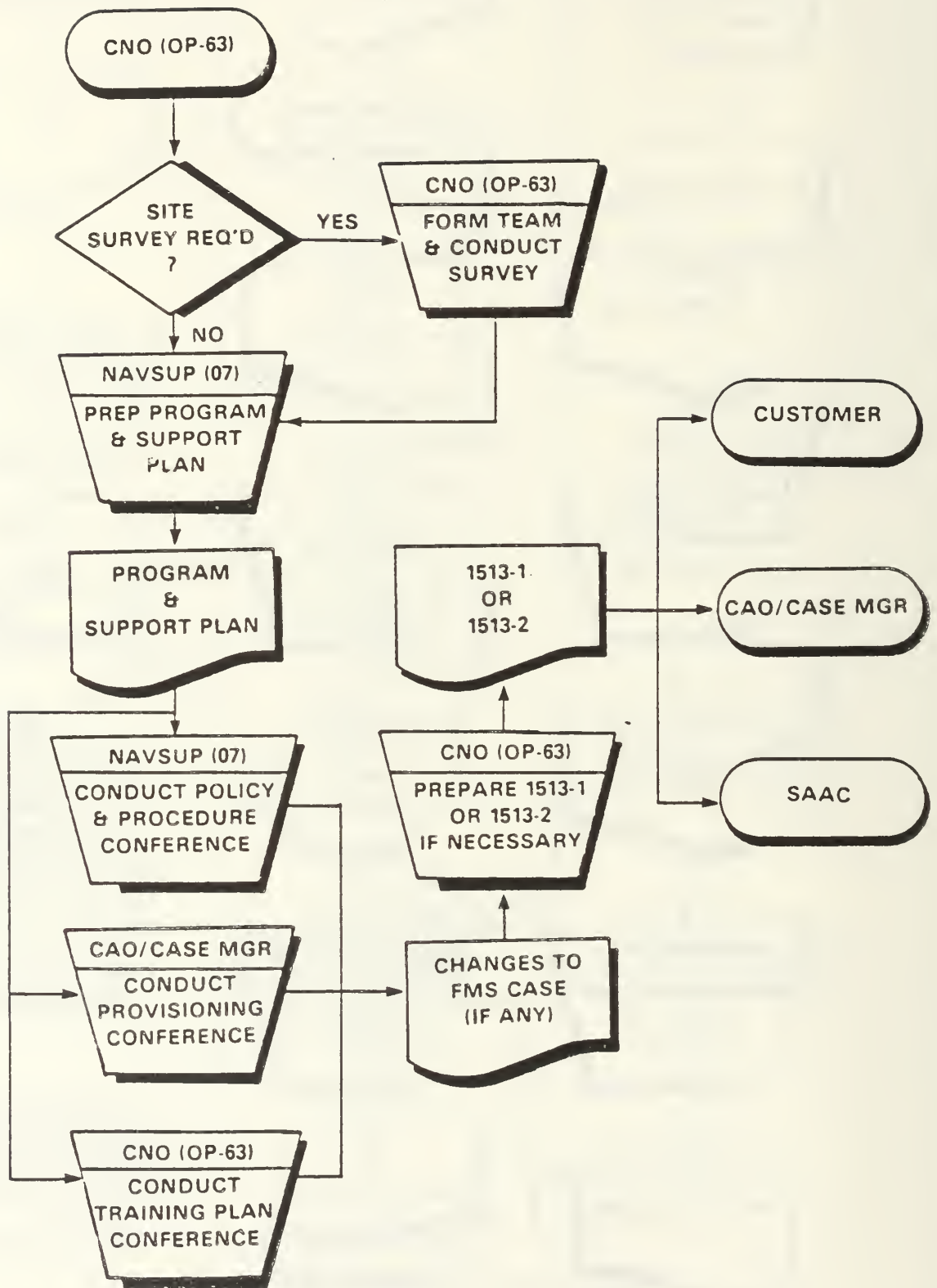


Figure C.5 Case Execution [Ref. 38: p. 1-14].

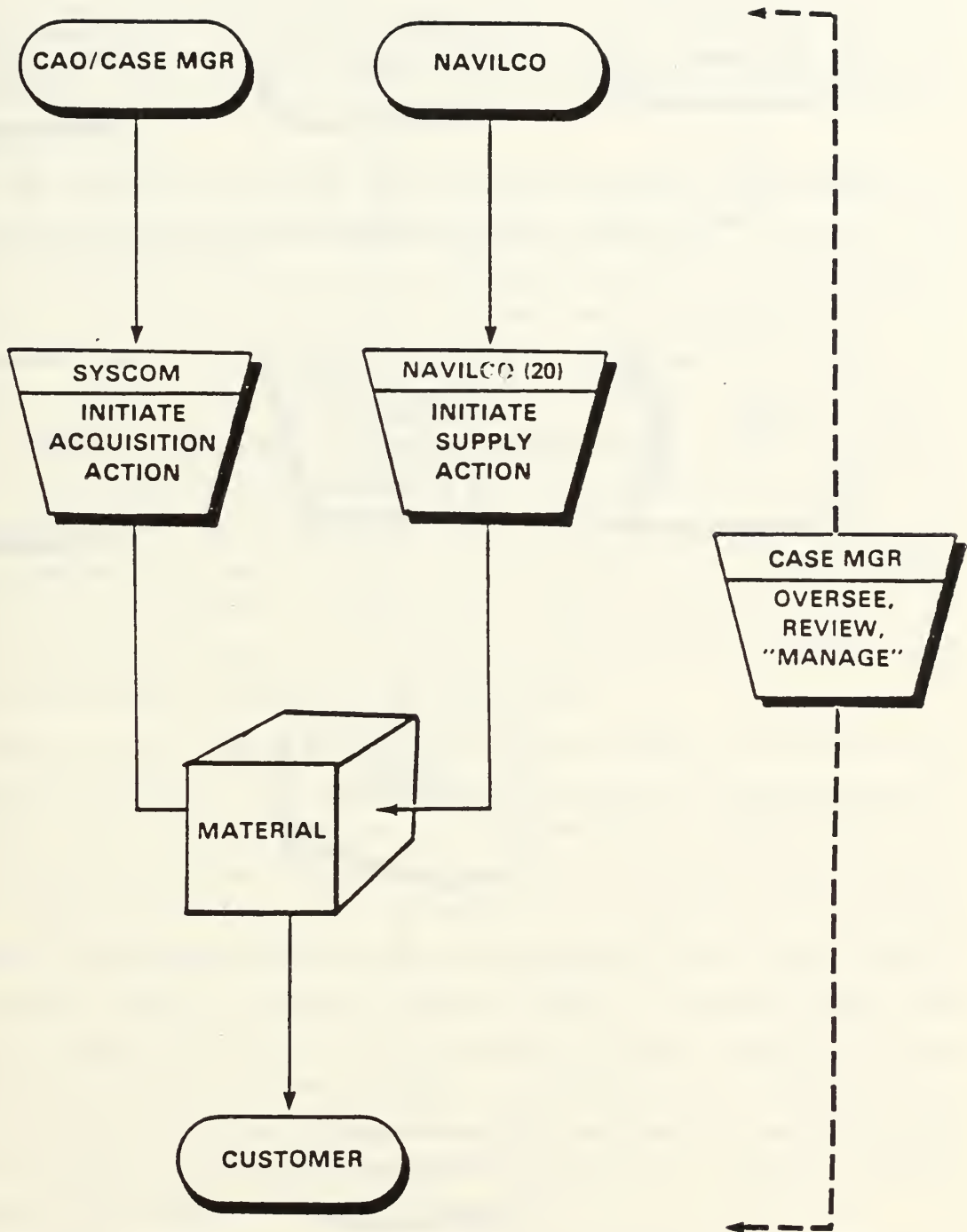


Figure C.6 Case Execution (Cont'd).

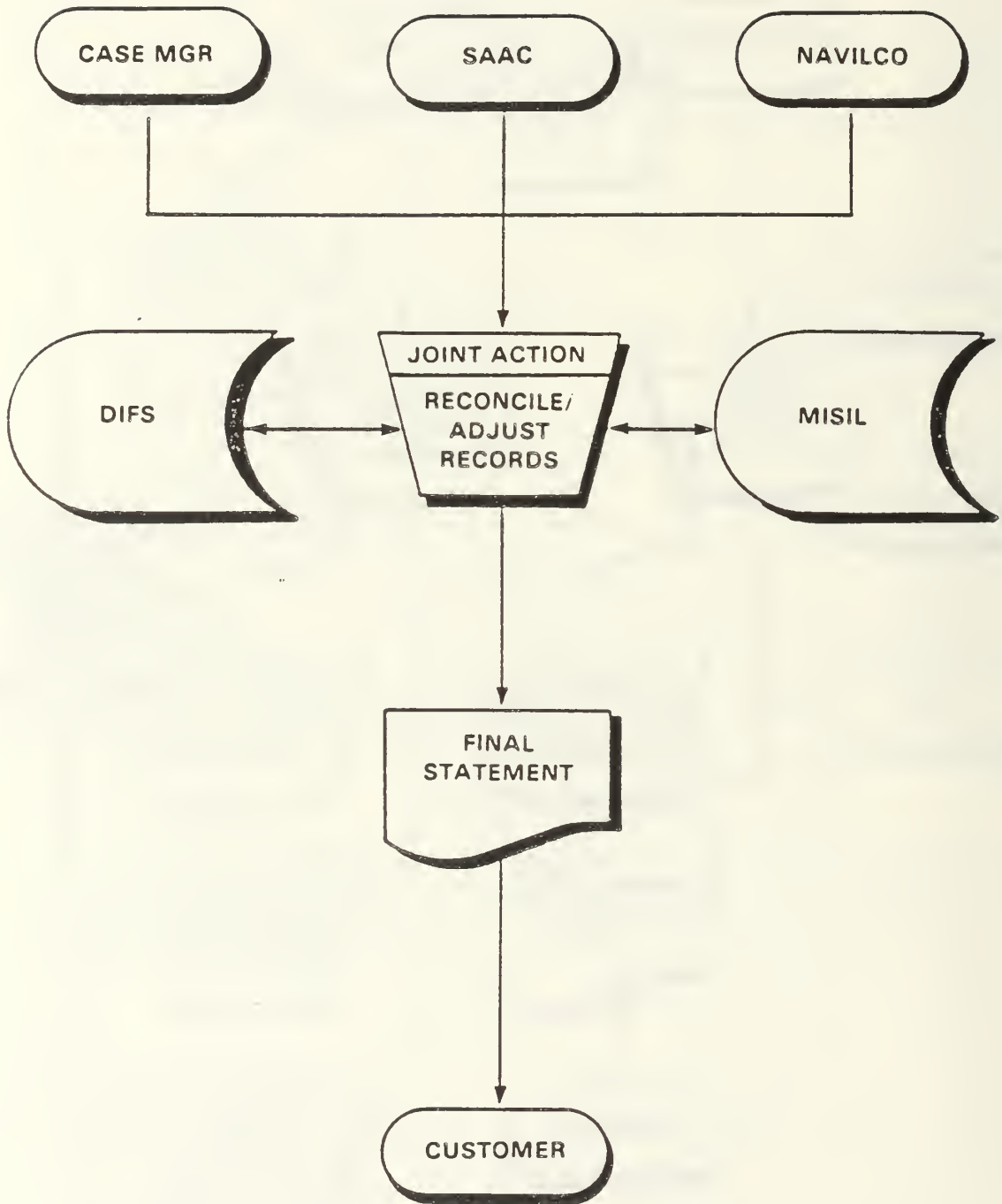


Figure C.7 Case Closure [Ref. 38: p. 1-16].

issuance, or Form 2012-1, which covers the period between LOA issuance and acceptance. The LOA itself, which details what is being ordered, can range from a couple of pages for a simple order to 30 or more pages for a complex package. It is written by the implementing service. In the Army, for example, this is the Material Readiness Command; in the Navy, the Security Assistance Division (OP-63) of the Office of the CNO, and in the Air Force, the Air Staff Directorate of International Programs (AF/PAI).

Once completed, the LOA still requires a review process by various agencies. If the foreign buyer finds the offer acceptable (and this is usually the case because of the degree of coordination put into the case beforehand, but there have been instances where an LOA was issued but financial or other terms were subsequently rejected) then the purchaser must complete and sign the DD 1513's acceptance portion, date it, and forward the copies to the military department (MILDEP), as well as an additional copy to the Security Assistance Accounting Administration (SAAC) in Denver. SAAC is a branch of DSAA, but runs independently as the accounting manager for FMS. Any required initial deposit (specified in the DD 1513) must be provided in U.S. dollars by check or wire transfer before the expiration date. If the purchaser wishes to extend the expiration dates, a full review is required by the preparing agency to insure that all price and other data remains valid. If change of expiration date is authorized, then SAAC and the DSAA are provided a copy of the message.

Once the LOA is signed and sealed, only delivery remains. SAAC issues the obligational authority (OA) to the cognizant DoD component, as evidence that proper acceptance of the LOA has been received. Procurement and logistical aspects of delivery will not be described in excessive detail here. Procurement procedures depend on the item, but are handled in the same way as regular U.S. Government procurement, with program directors and system managers as needed, dealing with the U.S. Military Assistance and Advisory Group (MAAG) in the buying country and overseeing progress of the deal. The basic procurement varies according to the case. Items may be procured from new production or taken from U.S. Government stocks, and the complete system then put together or FMS needs may be consolidated with U.S. Government procurement requirements or placed on a separate contract, whichever is more efficient.

In 1981, legislation authorized the creation of the Special Defense Acquisition Fund (SDAF) as a revolving fund separate from other accounts, under DoD control,

to finance the acquisition of defense articles in anticipation of their sale through FMS. This was done to make it possible to fill urgent requirements more quickly, smooth out production rates, and reduce procurement time. The SDAF is under the direction of the Director of the Security Assistance Agency (DSAA). Usually SDAF items are actually sold prior to the actual delivery from production. When all items are finally delivered, billed, and paid, SAAC issues a "Final Statement", and the FMS case is closed. <sup>9</sup>

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<sup>9</sup>This section is obtained from [Refs. 78,34: pp. 7-14,8.1-8.13].



APPENDIX D  
LAW CONCERNING ESTABLISHMENT OF DIDA

LAW CONCERNING ESTABLISHMENT OF DEFENSE INDUSTRY DEVELOPMENT AND SUPPORT ADMINISTRATION AND AMENDMENTS IN TWO ARTICLES OF THE LAW REGARDING ESTABLISHMENT OF THE NATIONAL LOTTERY NO. 3670 OF 11 JULY 1939, AND ONE ARTICLE OF THE LAW REGARDING VALUE ADDED TAX, NO. 3065 OF 25 OCTOBER 1984 (LAW NO. 3238, LEGISLATION DATE: 7 NOVEMBER 1985)

**PURPOSE**

**Article 1.** The purpose of this law is to develop a modern defense industry and provide modernization for the Turkish Armed Forces.

**DEFINITIONS**

**Article 2.** Abbreviations:

**Board:** Defense Industry High Coordination Board.

**Committee:** Defense Industry Executive Committee.

**Fund:** Defense Industry Support Fund.

**Administration:** Defense Industry Development and Support Administration (DIDA).

**DEFENSE INDUSTRY HIGH COORDINATION BOARD**

**Article 3.** The Defense Industry High Coordination Board, under the Chairmanship of the Prime Minister, is composed of the Chief of General Staff, Minister of State for Economic Affairs, Minister of National Defense, Minister of Foreign Affairs, Minister of Finance and Customs, Minister of Industry and Commerce, Service Commanders, General Commander of the Gendarmerie, Undersecretary to the Prime Minister, Undersecretary of the State Planning and Organization and Undersecretary of the Treasury and Foreign Trade.

The board shall meet at least twice a year upon call by the Prime Minister.

**FUNCTIONS OF THE BOARD**

**Article 4.** The functions of the Board are specified below:

- Follow up the planning and coordination, in line with the general strategy approved by the Council of Ministers (cabinet), and issue guiding directives.
- Establish the manner of procurement of weapon systems, material and equipment envisioned for procurement through the Fund in conformity with the Strategic Target Plan developed by the Turkish General Staff.

## DEFENSE INDUSTRY EXECUTIVE COMMITTEE

**Article 5.** Defense Industry Executive Committee, under the chairmanship of the Prime Minister, is composed of the Chief of General Staff and Minister of National Defense.

The committee shall meet upon call by the Prime Minister. The President of Defense Industry Development and Support Administration (DIDA) shall act as the Secretary of the Committee.

## FUNCTIONS OF THE COMMITTEE

*Article 6.* The functions of the Committee are specified below:

- Make decisions in line with the general strategy and principles established for developing the defense industry by the High Coordination Board.
- Make decisions relevant to local production or, when necessary, internal or external procurement of modern weapons, material and equipment which are required to be procured in accordance with the Strategic Target Plan for the Turkish Armed Forces.
- Seek opportunities for the public and private sector to establish defense production facilities, with foreign capital and technology; when necessary, make decisions in principle for the State participation in such facilities.
- Issue instructions to DIDA concerning research, development, prototype production, advance payments, long term orders and other financial and economic incentives for modern weapons, material and equipment.
- Make decisions on exportation, offset and mutual trade of defense industry products.
- Provide co-ordination between organizations concerned in defense industry.
- Establish guidelines for utilization of the Defense Industry Fund.

## DEFENSE INDUSTRY DEVELOPMENT AND SUPPORT ADMINISTRATION (DIDA)

**Article 7.** DIDA is established as an organization attached to the Ministry of National Defense and has legal personality.

The President of DIDA shall be appointed by a joint decree, the vice presidents and department heads shall be appointed on proposals by the president and approval

of the Ministry of National Defense; and other personnel shall be appointed by the President of DIDA. The president may delegate this authority to his immediate subordinate.

## **PERSONNEL REGIME**

**Article 8.** (Not included)

## **BUDGET**

**Article 9.** The budget of the Administration shall be made up of an amount which does not exceed two percent of Defense Industry Support Fund. This amount may be increased by a maximum of 50 percent by the Council of Ministers.

## **THE FUNCTIONS OF THE ADMINISTRATION**

**Article 10.** The functions of the Administration are specified below:

- Implement the decisions made by the Executive Committee,
- Make contracts on orders for procurement programs,
- Re-organize and integrate the existing national industry according to defense industry requirements, encourage new enterprises and guide them according to the integration and requirements, seek possibilities for foreign capital and technology contribution, guide the enterprises, and make plans for State participation in this respect,
- Determine the procurement programs and funding models by considering the funding sources,
- Plan for production of modern weapons, material and equipment,
- Support export oriented, private, public or mixed investments, provided,
- Research and develop modern weapons, material and equipment; produce their prototypes; make advance payments; establish long term orders and other financial and economic incentives,
- Make contracts including technical and financial matters by considering the terms of purchases to be made according to peculiarity of the matter, and the specifications and standards to be determined by the Ministry of National Defense (MND).
- Coordinate the exploration of Defense industry products and offset trade matters,
- Provide credit from the Fund or obtain credit from local and foreign sources and, set up companies with local and foreign capital,
- Follow up as to whether or not the goods produced are in conformity with the contract terms, and whether or not the quality controls and contract terms are fulfilled,

- Insure that implementation problems are resolved between the establishments and organizations concerned.

#### NON APPLICABLE PROVISIONS AND PRIORITY

*Article 11.* The provisions of General Accounting Law No. 1050, State Tender Law No. 2886, and Supreme Accounting Court Law No. 832 shall not be applied to the activities and transactions envisioned in this law.

Preparation of the technical specifications and quality control services requested by the Administration shall be accomplished on a priority basis by the MND and Service Commands.

#### DEFENSE INDUSTRY SUPPORT FUND

*Article 12.* To realize the objective of this law, Defense Industry Support Fund is established at the disposal of the Administration at the Central Bank of Turkey. The sources of the Fund are shown below:

- Yearly State Budget appropriations,
- Amounts to be determined-as much as 20 times, maximum- by the council of Ministers in multiples of 50 lira per package, bottle or similar container in sales of all types of alcoholic beverages (sparkling wine, vermont and cinchona wine included; other types of wines and beer excluded) and alcohol; as well as multiples of 10 Lira per package, bottle or similar container in sales of cigarettes, cigars, pipe tobacco, rolling tobacco, snuff, leaf tobacco and similar tobacco products, beer and other types of wine. However, the amount to be paid to the Fund shall be taken into consideration as expense in computation of the base for income and corporate tax. The Council of Ministers is authorized to differentiate the amounts to be paid according to the size of containers of products to be subjected to Fund payment, and the amounts to be received on the basis of importation of merchandise groups; and establish the size of containers which will not be subjected to Fund payment, and the procedures and guidelines for payments to be made to the Fund.
- Transfers to be made from the Foundations established for the purpose of strengthening the Turkish Armed Forces,
- Revenues cited in Article 11 of the Law Regarding Establishment of the National Lottery No. 3670,
- Entire share allotted in accordance with Law No. 1473 of 25 August 1971, and the entire net proceeds obtained from all kinds of parimutuals-current or to be established- or the amounts to be computed from these proceeds on a rate to be determined by the Council of Ministers,
- Transfers to be made on amounts determined by the Council of Ministers from funds established by law (tax laws excluded),

- Funds to be collected from oil consumption at a rate to be determined at maximum five percent by the Council of Ministers, on the basis established for fuel consumption tax,
- Funds to be allocated for modern weapons, material and equipment in the budget of the MND.
- Amount to be allocated between Housing Development Fund and Defense Industry Support Fund by the Council of Ministers from the collections at a maximum rate of 50 percent of gross proceeds of fortune games operated under permission in accordance with Article 19 of Law of Tourism Incentives No. 2634, dated 12.3.1982, (however, the amounts paid to the Fund through this article shall be considered as an expense with regard to the taxable income).
- Revenue to be obtained from the assets owned by the Fund,
- Revenue to be obtained from the payable military service pursuant to Article 10 of the Military Service Law No. 1111,
- Donations and aids.

No share shall be allotted, pursuant to Law No. 2380, to the municipalities and local governments from the revenues collected and paid to Defense Industry Support Fund by public organizations which are included in the General Budget. The Council of Ministers is authorized to set rules and regulations for utilization of excess amounts of the Fund in total or partially in short-term investments out of the Central Bank.

## **LIABILITY, DECLARATION, PLACE AND TIME OF PAYMENT**

### **Article 13.**

- The liable parties for the payments to the Fund on delivery of the products listed at subpara. b of article 12 of this law are the local manufacturers or importers who produce or import those products. Payments to be made in this manner shall be declared in a Supplementary Tax Return Form arranged in accordance with the provisions of the Value Added Tax Law No. 3065. Exemptions indicated in the Value Added Tax No. 3065 shall be valid also for implementation of this subpara.
- The share allocated through Law No. 1473 dated 8.25.1971, and the whole or certain parts determined by the Council of Ministers of the share to be allocated from existing or to be established parimutuals shall be charged by the organizers of such games. The shares shall be declared along with Value Added Tax returns of the month concerned to the tax office and paid within the same period. The Ministry of Finance and Customs is authorized to set the rules and regulations for the declaration of this amount.
- The share of the Petroleum Consumption Tax to be transferred to the Fund which is determined by Council of Ministers and collected by the liable parties of this tax, shall be declared to the tax office of their headquarters on a form to be determined by the Ministry of Finance and Customs, by the twentieth evening of the following month and shall be paid within the same period.

- The amount to be collected in accordance with the decision of the Council of Ministers at a rate maximum fifty percent of the gross proceeds of the fortune games permitted under article 19 of the Law of Tourism Incentives No. 2634 dated 3.12.1982, shall be declared by real or legal entities who operate those establishments, along with their Value Added Tax returns to their tax offices, and shall be paid within the same periods. The Ministry of Finance and Customs is authorized to determine the principles and regulations for the declaration of this payment.
- Two and a half percent of the sum computed as Income and Corporate Tax shall be separately calculated by taxpayers as an amount payable to Defense Industry Support Fund. Liable persons who withhold taxes shall add to their short return forms the amount they computed for the Fund and pay it to the appropriate tax office along with their withholding taxes.

Income and corporate taxpayers who submit annual, short or specific returns shall add the amount payable to the Fund into their return forms and pay it along with their income and corporate taxes. In the events when any amount had been calculated and paid previously for the Fund in the income declared in that return, this amount shall be deducted from the sum calculated according to the return. Amount held internally shall not be subject to this Fund. In computation of amounts to be paid to the Fund by taxpayers whose incomes are computed in the lump sum method, the income tax computed over the total amount indicated in their tax books shall be taken as the basis.

In connection with the rules and guidelines on levying, assessment and payment of the amount to be paid to the Fund by income and corporate taxpayers and liable parties for withholding taxes, provisions of income and corporate tax laws shall apply.

The Council of Ministers is authorized to increase to 7.5 percent or decrease to zero the 2.5 percent indicated in this article. This authorization may be used for determining separate rates for each of the types of incomes subject to withholding. Amount collected for the Fund by tax offices and accounting offices according to this article shall be transferred to the Fund Account at the Central Bank of the Republic of Turkey by the end of their collection.

## THE EXEMPTIONS

Article 14. Defense Industry Development and Support Administration and the Fund under the authority of the Administration are exempt from:

- The Corporate Tax,
- Inheritance and Transfer Tax for grants and donations to be made,
- Stamp Tax for all transactions,

- The Banking and Insurance Transactions Tax for interest of the loans lent.

The provisions of previously existing laws and regulations regarding exemptions on taxes, dues and fees applicable for:

- The shares of the Foundations at various enterprises,
- General Directorate of Defense Ordnance Enterprises and its affiliations shall continue to apply after they are transferred to Defense Industry Development and Support Administration and the Fund established at the order of this Administration (excluding those to be established anew).

### IMPLEMENTATION OF THE LAWS NO. 213 AND 6183

**Article 15.** For the amounts to be charged on the taxpayers for the Fund, the Tax Regulations Law and the Collection Procedures Law for Public Claims shall apply.

**Article 16.** The second paragraph of Article 60 of the Value Added Tax Law No. 3065 is amended as follow:

The base of the Additional Tax shall consist of the factors that make the base of the Value Added Tax. The amount to be paid to Defense Industry Support Fund is not to be included in the base.

### AUDITING

**Article 17.** All kinds of transactions of the Administration and the Fund shall be audited by a board composed of one member from each of the Prime Ministry, the Ministry of National Defense and the Ministry of Finance and Customs elected for two years.

**Article 18.** Articles 1 and 11 of the Law Concerning Establishment of National Lottery No. 3670 are amended as follows:

*Article 1.* With the aim of assisting defense industry, a National Lottery Administration is established as an organization which is attached to the Ministry of Finance and Customs, has legal personality, is subject to civil regulations and is qualified for every kind of transactions. The right to draw lottery in cash within Turkey belongs only to the National Lottery Administration.

*Article 11.* The net revenue of the past year to be transferred to the Treasury is to be determined by the end of the second month of each fiscal year on the balance sheet by subtracting current and investment expenditures from gross revenues, shall be recorded by Ministry of Finance and Customs on the one hand as revenue for the State Budget and on the other hand as appropriation for the relevant section of the Budget

of the MND in fifteen days at the latest and shall be paid to the account of Defense Industry Support Fund at the Central Bank in cash at once within a week.

### STATE PROPERTY CONSIDERATION

**Article 19.** Offenses committed against to the properties and all kinds of assets of the Administration and Fund attached to the Administration shall be considered as offenses committed against State property. The punishments in the Turkish Penal Code shall apply. No movable property and real estate of the Administration and of the Fund may be seized.

### EXPROPRIATION

**Article 20.** The Administration, the Fund, and weapons and munitions producing enterprises of partnerships whose shares are more than half owned by the Administration and/or the Fund shall enjoy the provisions of the Laws and Regulations on exploration.

**Provisional Article 1.** Movables and real estate of the General Directorate of Defense Ordnance Enterprises are transferred without any requirement for action to DIDA, with all its equipment, budget and personnel.

**Provisional Article 2.** Shares of the Foundations established for strengthening of Turkish Armed Forces, at various companies, may be transferred to the Fund.

**Provisional Article 3.** The transfer actions foreseen in Provisional Article 1 and 2 shall be accomplished within six months. The present implementation shall continue until the transfer actions are accomplished. The transfer actions and all revenues resulting from this transfer shall be exempt from all taxes, dues and fees.

**Provisional Article 4.** The provisions of this law shall apply to all income that must be declared in annual, short and specific returns for 1985 income of taxpayers for income and corporate tax as from 1 January 1986. No amount shall be computed of 1985 income and revenue, certain portions of which is withheld. Provisions of this law shall apply for income and revenue to be withheld as from 1 January 1986.

**Provisional Article 5.** (Not included)

**Provisional Article 6.** Net Lottery revenue of 1985 of the National Lottery Administration shall be paid to the Fund in accordance with the principles set forth at amended Article 11 of this Law No. 3670 Regarding the Establishment of National Lottery Administration.



## DATE OF IMPLEMENTATION

Article 21 This Law shall come into force on the date of its publication.

Article 22 Provisions of this law shall be implemented by the Council of Ministers.

APPENDIX E  
WEAPONS PROCURED BY SECURITY ASSISTANCE

*MAJOR TURKISH WEAPONS SYSTEMS*

**ARMY**

**Equipment**

**Tanks:** some 3,700: 900 M-47 (700 in reserve, 200 in store), 1,085 M-48A1 (to be -A5), 1,615 M-48A5, some 77 Leopard 1A3. **Light** (100 M-41 in store).

**Armored Fighting Vehicle**

(M-8 in store)

**Armored Personnel Carrier (APC):** 3,750: 700 M-59, 2,250 M-113, some 800 M-2/-3 (perhaps 300 in store).

**Artillery:** some 2,000.

**Guns:** 186 155mm, 150 M-59 towed 175mm, 36 M-107 self-propelled.

**Howitzers:** 75mm: 100 M-116A1;

105mm: 600 M101A1, 72 M-108 self-propelled (sp)(108 M-7 sp. and 216 M-52 in store),

155mm: 144 M-44 sp. (some in store), 378 M-114A1;

203mm: 104 M-115, (81 M-55 (U.S.) sp. in store), 16 M-110A2 sp.

**Mortars:**

1,800 81mm: M-1; M-4A1 (M-2/-3 APC) sp., Soltam M-125A1 sp.; 107mm (including 4.2 inch): M-2, M-30, M84 (M-59 APC)sp., M-106A1 sp; 120mm: 100: Soltam, TOSAM MKE HY12-DI.

**Anti-tank Recoilless launcher(s):** 57mm: 1,400 M-18; 75mm:1,000 M-20; 106mm: 1,200+ M-40.

**Anti-tank guided weapons (ATGW):** 85 Cobra, SS-11, TOW including M-113 sp., Milan.

**Air Defense: guns:** 20mm: 300: HS-820, Mk 20 RH-202 twin; 35mm; 40mm: 900 M-1A1, L/60, M-42;75mm: M-51; 90mm: M-117/-118.

**Surface-to-air missiles (SAM):** Redeye, some S Rapier launchers with 54 missiles.

**Aviation:**

**Aircraft:** 2 DHC-2 Beaver, 100 U-17 (Cessna 185), 70 O-1E, 8 Cessna 206, 20 Cessna 421, 5 Dornier Do-27, 5 Do-28, 15 Beech Baron, 5 T-42 (Beech Cochise), 40 Champion Citabria 150S training.

**Helicopter:** 65 Agusta-bell AB-204/-205, 15 AB-206A, 20 Bell 47G, 30 Bell UH-1D, 40 UH-1H, 30 Hughes Th-55.

(On order: TOW. 1,040 Milan ATGM; 26 AH-1S Cobra (Improved TOW) attack, 25 UH-1H hel; Rapier SAM (some 8 launchers, 108 missiles)).

## **NAVY:**

### **Equipment:**

**Submarines:** 17: 6 Type 1200; 9 U.S. Guppy (2 in reserve); 2 Tang (on loan).

**Destroyers:** 13: 9 Gearing (5 with 1 octuple ASROC); 2 Carpenter; 1 Sumner; 1 Smith.

**Frigates:** 4: 2 Berk each with 1 Helicopter; 2 Köln.

**Fast Attack Craft (Missile) (FAC (G):** 11: 6 Dogan (Lursen FPB-57) with 2 quad Harpoon; 9 Kartal (Jaguar-Type) with 4 Penguin 2 Surface-to-surface Missile (SSM);

**Fast Attack Craft (Torpedo) FAC(T):** 11:

5 S-141 Jaguar, 6 Zobel-type.

**Patrol Craft:** 28: 24 Large (1 Girne, 1 U.S. Asheville, 12 AB-25, 6 PC-1638, 4 PGM-71); 4 coastal 83-ft < .

**Minelayers:** 7: 1 Nusret, 6 coastal.

**Minesweepers:** 26 12 U.S. Adjutant, 4 Canadian, 6 FRG Vegesack coastal; 4 U.S. Cape inshore; 8 minehunting craft.

**Amphibious: Landing Ship, Tank (LST):** 7 (4 are dual-purpose minelayers); **Landing Craft, Tank (LCT):** 40. **Landing Craft Utility (LCU):** 13. **Landing Craft Medium (LCM):** 20.

**Auxiliary Ships:** 1 Headquarter ship; 1 Destroyer tender, 1 subtender, 2 repair ships; 4 depot ships; 1 fleet, 6 support, 3 harbour tankers; 38 transportations.

**Naval Aviation:** 15 combat aircraft; 6 combat helicopters.

**Antisubmarine Warfare (ASW):** 1 squadron with 15 S-2A/E Tracker aircraft; 3 Agusta-Bell AB-204B, 3 AB-212 helicopters.

(On order: 1 Type 1200 SS Diesel submarine, 4 MEKO-200 frigates, 12 LCT)

## **AIR FORCE:**

**Fighters- Ground Attack (FGA):** 19 squadrons:

2 with Northrop F-5A/B;

2 with F-100D Super Sabre;

5 with McDonnell-Douglas F-4E;

10 with Lockheed F-104G/TF-104.

Fighters: 2 squadrons with F-104S/TF-104G.

Reconnaissance: 2 squadrons: 1 with F-5A, RF-5A; 1 with RF-4E.

Transportation: 5 squadrons:

1 with C-130 Hercules;

1 with Transall C-160;

3 with c-47 (Douglas DC-3), Beech C-45, BAe Viscount 794 (VIP) ac;  
Bell UH-1H hel.

1 flight with C-47, Cessna Citation.

Liaison: 3 flts: C-47, Beech AT-11, Lockheed T-33 aircraft; UH-1H Helicopters; 10 base flts with C-47, T-33, AT-11 aircraft; UH-1H, UH-19B (Sikorsky S-55) helicopters.

Operational Conversion Units: 5 squadrons: 2 with F-5A/B, F-104G; 2 with T-33, Northop T-38; 1 with Cessna T-37C.

Training: 3 squadrons with T-33, T-34 Beech Mentor, T-41 Cessna Mescalero, training schools with C-47 aircraft; UH-1H Helicopters.

SAM: 8 squadrons with Nike Hercules; 2 Rapier squadrons (to have 24 launchers, 324 missiles)

**Equipment:** 448 combat aircraft

F-5: 91: -A: 30 (Fighter ground attack (FGA)); -B: 16 FGA; -A/B: 24 Operational Conversion Units (OCU); RF-5A: 18 reconnaissance; RF-5B: 3 reconnaissance (recce).

F-100D/F: 40 FGA.

F-4E: 97: 90 FGA; RF-4E: 7 recce.

F-104: 220: -D/G: 160 FGA; -S: 32 fr.; TF-104: 28: 20 FGA, 4 fr., 4 OCU.

C-130: 7 transportation (tpt). Transall C-160D: 20 tpt. Viscount: 3 VIP. C-47: 44+ (40 tpt, 2 VIP, 2 Base flt + communications flt, training school aircraft) Citation: 2 VIP transportation. AT-11: 18. Beech 18: 2 tpt. T-33: 82, T-37: 37. T-34: 15 T-41: 30.

Helicopters:

UH-1H: 15+.

UH-19B: 5.

Missiles: SAM: 72 Nike Hercules, 24 Rapier.

(On order: 160 F-16 fighter, 18 S-2E Tracker ASW, 2 Citation II Training aircraft, 15 AH-1S Cobra Hel., Super Sidewinder, Sparrow AAM; AGM-65 Maverick; 24 Rapier SAM Missiles.).

*Sources:* [Ref. 79], [Ref. 80], [Ref. 81], [Ref. 82], [Ref. 83], [Ref. 84],  
[Ref. 85], [Ref. 86], [Ref. 87], [Ref. 88], [Ref. 89], [Ref. 91], [Ref. 92],  
[Ref. 93], [Ref. 94], [Ref. 95], [Ref. 96], [Ref. 97], [Ref. 98].

TABLE 4  
ARMS SUPPLIED TO TURKEY

Delivery Date	#	Item	Supplier	Comment
<b>AIRCRAFT</b>				
(1951)	36	Lockeed T-33 A-N	USA	
1952	24	Beech T-34 Mentor	Canada	MAP
1952-53	(130)	Republic F-84F	USA	
(1953)	(8)	beech C-45	USA	
1954-56	82	Canadair CL 13 Sabre MK 2 and MK 4	canada	
1956	3	Douglas C-54	USA	
(1956)	(30)	Republic RF-84F	USA	
1956-57	25	Canadair CL-13 Sabre MK 4	UK	
(1957-59)	200	Piper L18 Super Cub	USA	
1958	260	NA F-100C Super Sabre	USA	MAP
(1958)	(30)	Lockeed RT-33A	USA	
(1959)	50	NA F-86D Sabre	USA	MAP
(1960)	(25)	NA F-100F Super Saber	USA	
(1961)	23	Cessna T-37	USA	Might be from Canada
1962-63	(65)	NA F-86K Sabre	Nether- lands	Overhauled by Fiat in Italy
1963	38	canadair F-104G Starfighter	Canada	MAP offshore procurement
1964	5	Lockheed C-130E Hercules	USA	
1964	42	Republic F-84F	FR Germany	NATO Aid surplus
1965	40	Northrop F-5 Freedom Fighter	USA	
1965	5	C-130E Hercules	USA	
1966	18	Cessna U-1	USA	
1966	15	Dornier Do-27	FR Germany	NATO aid
1966	5	Dornier Do-28 B-1	FR Germany	NATO aid
1966	(20)	Agusta-Bell 47	Italy	
1966	13	Agusta-Bell 204B	Italy	
1966-68	75	Northrop F-5 Freedom Fighter	USA	
1967	42	Republic F-84F	FR Germany	NATO aid surplus
(1967)	7	Agusta-Bell 204B	Italy	
(1967)	8	Grumman S-2 Tracker	Nederlands	
1967-68	(5)	Bell 47G	USA	
1968	3	Dornier Do-27	FR Germany	NATO aid surplus
1968	18	Lockeed T-33	FR Germany	NATO aid surplus
1968-69	36	Convair F-102A Delta Dagger	USA	MAP
1968-69	3	Convair TF-102	USA	
1968-69	(35)	Agusta-Bell 206A Jet Ranger	Italy	For army

TABLE 4  
ARMS SUPPLIED TO TURKEY (CONT'D.)

Delivery Date	#	Item	Supplier	Comment
1969	40	NA F-100C Super Sabre	USA	
1969	15	Siat 223 Flamingo	FR Germany	Built in Spain
(1969)	25	Northrop F-5	USA	
		Freedom Fighter		
1971	5	Beech T-42 Baron	USA	MAP
1971	12	Lockeed T-33	FR Germany	Ex-luftwaffe
1971	2	Dornier Do-28	FR Germany	
1971-72	12	Grumman S-2 Tracker	USA	
1971-72	2	Grumman TS-2	USA	
1971-72	20	Transtall C-160	FR Germany	
1972	19	Cessna T-41	USA	MAP
1972	3	Agusta-Bell 205 Iroquoris	USA	
1972	9	Lockheed T-33	USA, Nether-lands, Canada	NATO aid
1972	(5)	Republic RF-84F	France	
1972	7	Lockheed F-104 Starfighter	Spain	
(1972)	4	Cessna 206	USA	For Army
(1972)	2	Britten-Norman BN-2 Islander	UK	
1974-76	40	F-104S Starfighter	Italy, USA	
(1973-77)	40	F-4E Phantom	USA	
(1977-78)	15	F-100	USA	
1977-78	56	AB 205 A-1 Helicopter	Italy, USA	
1977-78	6	AB 212 AS ASW Helicopter	Italy, USA	
1978	20	F-104G Starfighter	FR Germany	MAP
1978	2	Bell 205 UH-1H Helicopter	USA	
1977-78	32	F-4E Phanthom	USA	Direct purch. to circumvent embargo on MAP
1979	40	citabria 150 H9C	USA	
(1978-80)	9	RF-4E Phantom	USA	
1979-80	3	S-2 Anti-submarine	USA	
1980	27	T-38 Talon	USA	
1980	12	G-91 training aircraft	FR. Germany	Grant aid
-	40	F-104 fighter aircraft	Netherlands	
1981	30	T-38A Talon trg. aircraft	USA	Aid
(1980-81)	15	F-4 Fighter ac.	USA	
n/a	16	F/TF-104G fighter/trg. aircraft	Belgium	
n/a	23	F-100D/F fighter ac.	Denmark	
n/a	16	C-160 trans. aircraft	FR. Germany	aid
n/a	31	F/TF-104G figh./trg. aircraft	Netherlands	

TABLE 4  
ARMS SUPPLIED TO TURKEY (CONT'D.)

Delivery Date	#	Item	Supplier	Comment
n/a	12	UH-1H Helicopter	USA	
n/a	15	UH-1H Helicopter	USA	
n/a	10	UH-1H SAR Helicopter	USA	
n/a	4	UH-1H ECM Helicopter	USA	
n/a	50	F-104 Starfighter ac	FR. Germany	
1987-92	160	F-16 fighter aircraft	USA	coproduction
(1983)	23	F-104G FGA ac	Nederlands	
(1983)	18	F-104G FGA ac	Belgium	
n/a	52	G-222 transportation aircraft	Italy	
n/a	35	F-4E Interceptors	Egypt	
1985	12	F-5 Interceptors	Norway	
n/a	50	CF-104 interceptor ac.	Canada	
n/a	15	UH-1H Helicopter	USA	local assembly
MISSILES				
(1955)	75	Western Electric Nike Ajax	USA	
(1958)	(600)	NCW Sidewinder	USA	
(1959)	(75)	Western Electric Nike Hercules	USA	
(1960)	(24)	Unamicon MGR-1 Honest John	USA	
1964	(300)	MBB BO 810 Cobra	FR Germany	
(1966)	300	Martin Bullpup	USA Built	Built under license in European consortium
(1967-73)	500	MBB BO 810 Cobra 2000	Turkey, FR Germany	
(1968)	(100)	Nord SS.11	France	
(1975)	n/a	Penguin naval SSM	Norway	
1976	200	AIM 7-E Sparrow AAM	Italy, USA	
1977	6,520	Milan ATM	FR Germany, France	
1977	n/a	AGM 65-A Maverick	USA	
(1978)	n/a	TOW ATM	USA	
1978	33	Harpoon SSM	USA	
1977-78	(720)	AIM 7 Sparrow AAM	USA	
n/a	258	AIM 7 Sparrow AAM	USA	
n/a	400	Sidewinder AAM	USA	
(1980-81)	2500	Milan ATGW	FR. Germany	assistance
(1980-81)	12	RGM_84A Harpoon SSM	USA	



TABLE 4  
ARMS SUPPLIED TO TURKEY (CONT'D.)

Delivery Date	#	Item	Supplier	Comment
n/a	750	AIM-9P3 Sidewinder AAM	USA	
n/a	36	Rapier SAM, Blindfire radars	UK	
n/a	6	AH-1S Cobra/TOW	USA	
n/a	-	ATK hel. Rapier SAM	UK	
NAVAL VESSELS				
1950	2	Submarine "Gur" Class	USA	Launched 1943-45
1950	1	Submarine rescue ship	USA	Launched 1946 adapted 1947
1952	5	Coastal minelayer	USA	Launched 1945 as LSM; converted 1952 NATO aid
1952	1	Repair ship	USA	Launched 1944
1953	4	Motor launch	USA	ex US
1954	2	Submarine "Gur" class	USA	Launched 1943-45 on loan
1957	4	Destroyer, "Milne" Class	UK	Completed 1941-42; re-fitted 1959
1957	9	Coastal escort, "Bartia" class	Canada	Completed 1941-42; ex-Bangor class
1958	1	Submarine Gur Class	USA	Launched 1943-45
1958	1	Coastal Minelayer	USA	Completed 1958; MAP
1958	4	Coastal Minesweeper	Canada	
1958-59	4	Coastal Minesweeper	USA	
1959	60	Torpedoboat, "Nasty" class	FR Germany	Completed 1959-60; war reparations
1960	2	Submarine "Gur" class	USA	Launched 1943-45
1961	1	Motor launch	FR Germany	Built 1960-61
1961	1	Boom defense vessel	USA	Launched 1960; procured by US from W Germany
1964	3	Patrol boat "Akhisar" class	USA	
1964	1	Boom defense vessel	France	Built 1938
1965	2	Patrol boat "Akhisar" class	USA	
1965	4	Coastal minesweeper	USA	

TABLE 4  
ARMS SUPPLIED TO TURKEY (CONT'D.)

Delivery Date	#	Item	Supplier	Comment
1966-67	6	Motor Torpedo boat Jaguar class	FR Germany	Built 1966-67; NATO aid
1967	2	Destroyer "Fletcher" class	USA	Launched 1943
1967	1	Coastal minesweeper	USA	
1967	2	Inshore minesweeper	USA	
(1968)	1	Motor torpedo boat "Jaguar" class	FR Germany	NATO aid
1969	3	Destroyer "Fletcher" class	USA	Completed 1943-44
1969	1	Submarine depot ship	USA	Completed 1944
(1969)	2	Torpedo boat Nasty class	FR Germany	NATO aid
1970	1	Boom defense vessel	USA	Completed 1952; ex-Dutch
1970	3	Coastal minesweeper "MSC" type	(USA)	ex-French ex-British
1970-71	4	Submarine "Guppy II A" type	USA	Completed 1944
1971	2	Destroyer "Gearing" class	USA	Completed 1945-46; modernized
1971-72	7	Gunboat	USA	New
1972	1	Submarine "Guppy II A" type	USA	Completed 1944
1972	1	Submarine "Guppy I A"	USA	Completed 1944 modernized 1951
1972	1	Destroyer "gearing" class	USA	Commissioned 1947
1972	2	Destroyer "Allen M. Summer" class	USA	Completed 1944-45; 1 modernized early 1960s; 1 in 1972
1972	1	Fleet ocean tug	USA	Launched 1942; FY 1973 ship lease
1972	1	Supply ship	FR Germany	
1972	1	Minelayer	FR Germany	Former US landing ship
1973	2	Fast patrol boat "Ashville 1968" class	USA	Commissioned 1969
1975-76	7	"Jaguar" Fats attack torpedo boat	FR Germany	Completed (1962)
1975-76	5	"Vegasack" coastal minesweeper	FR Germany	Completed 1960

TABLE 4  
ARMS SUPPLIED TO TURKEY (CONT'D.)

Delivery Date	#	Item	Supplier	Comment
1976	1	"Lursen" fast missile boat	FR Germany	3 more being license-produced in Turkey 2 more being license-produced in Turkey
1977-78	2	Type 209 submarine	FR Germany	
n/a	4	MEKO-360 frigate	FR. Germany	

ARMORED FIGHTING VEHICLES

(1950)	(25)	M-36 tank destroyer	USA	
(1952)	(100)	M-26 Pershing MBT	USA	
(1950-52)	(50)	M-24 Chaffee lt. tank	USA	
(1955-58)	(540)	M-47 Patton MBT	USA	
(1957-58)	(100)	M-41 Walker Bulldog	USA	
(1957-58)	(400)	M-59 APC	USA	
(1961-64)	(140)	M-48 Patton med tank	USA	
(1963)	(100)	M-113 APC	USA	
1964	481	M-113 APC	Italy	
1968-70	(24)	M-44 and M-52 SPH	FR Germany	NATO aid
1969-70	69	M-74 ARV	FR Germany	NATO aid; surplus
(1969-70)	79	M-48 Patton med. tank	FR Germany	NATO aid surplus
1972-73	250	M-48 Patton med. tank	USA	MAP
1977	n/a	M-113 APC	USA	
(1980-81)	70	Leopard 1 medium tank	FR. Germany	Military
(1980-81)	200	Renovation of M-48 medium tank	FR. Germany	grant
n/a	600	M-48A5 tank conversion	USA	
n/a	760	M-48A5 tank conv. kits	USA	

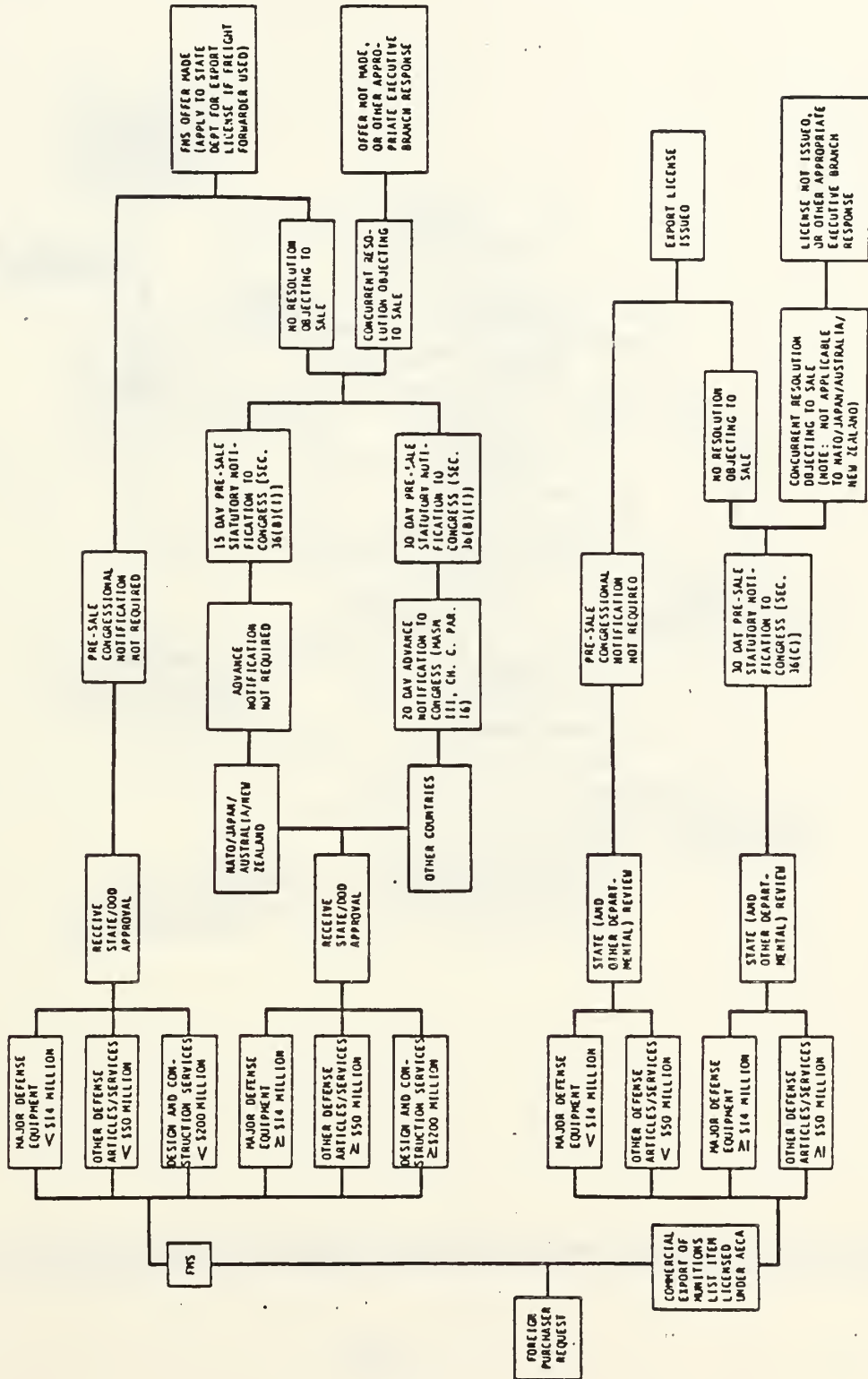
APPENDIX F  
THE U.S. MILITARY AID TO TURKEY

TABLE 5  
THE U.S. SECURITY ASSISTANCE TO TURKEY

	FY 1950-FY 1986
FMS AGREEMENT	\$7,551,797,000
FMS DELIVERED	\$2,122,672,000
FMS FINANCING DIRECT	\$1,014,424,000
FMS FINANCING GUARANTY	\$2,335,900,000
COMMERCIAL EXPORT LICENSED	\$111,643,000
MAP MERGER FUNDS	\$717,755,000
MAP AGREEMENTS	\$3,138,699,000
MAP DELIVERY	\$3,137,916,000
MAP EXCESS DEFENSE ARTICLES	\$857,039,000
IMET DELIVERY	\$129,625,000

# APPENDIX G TECHNOLOGY TRANSFER PROCESS

Figure G.1 Technology Transfer Process [Ref. 43: pp. 6,7].



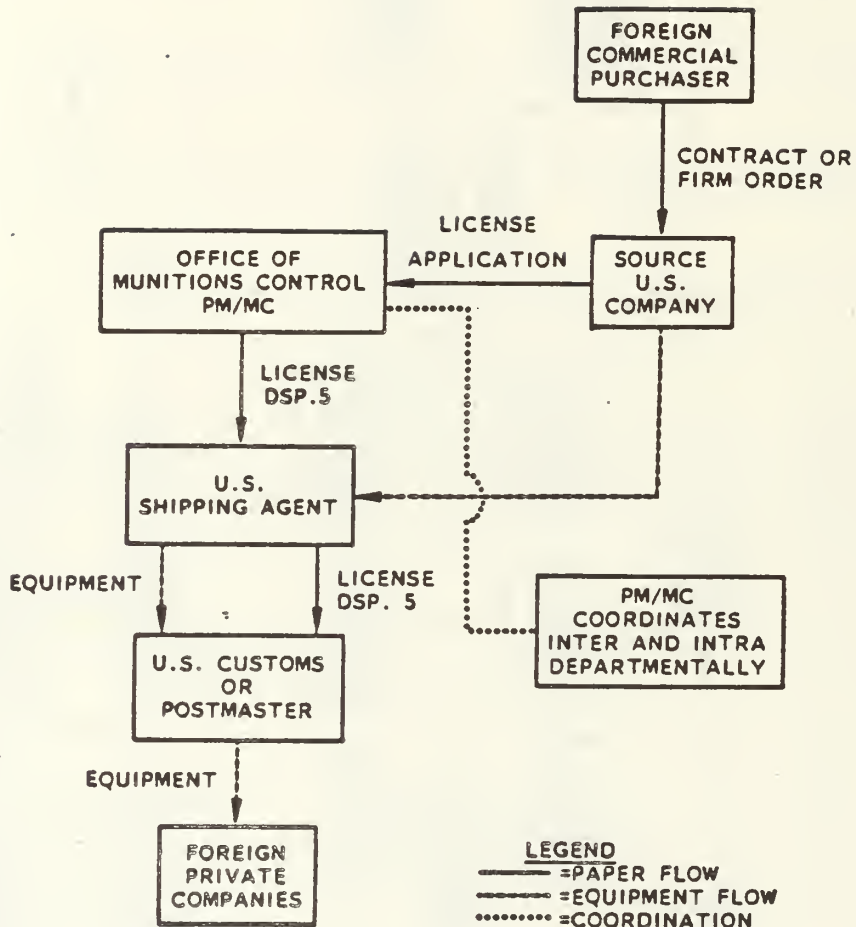


Figure G.2 Technology Transfer (Foreign Commercial Purchaser) [Ref. 34 : p. 13-22].

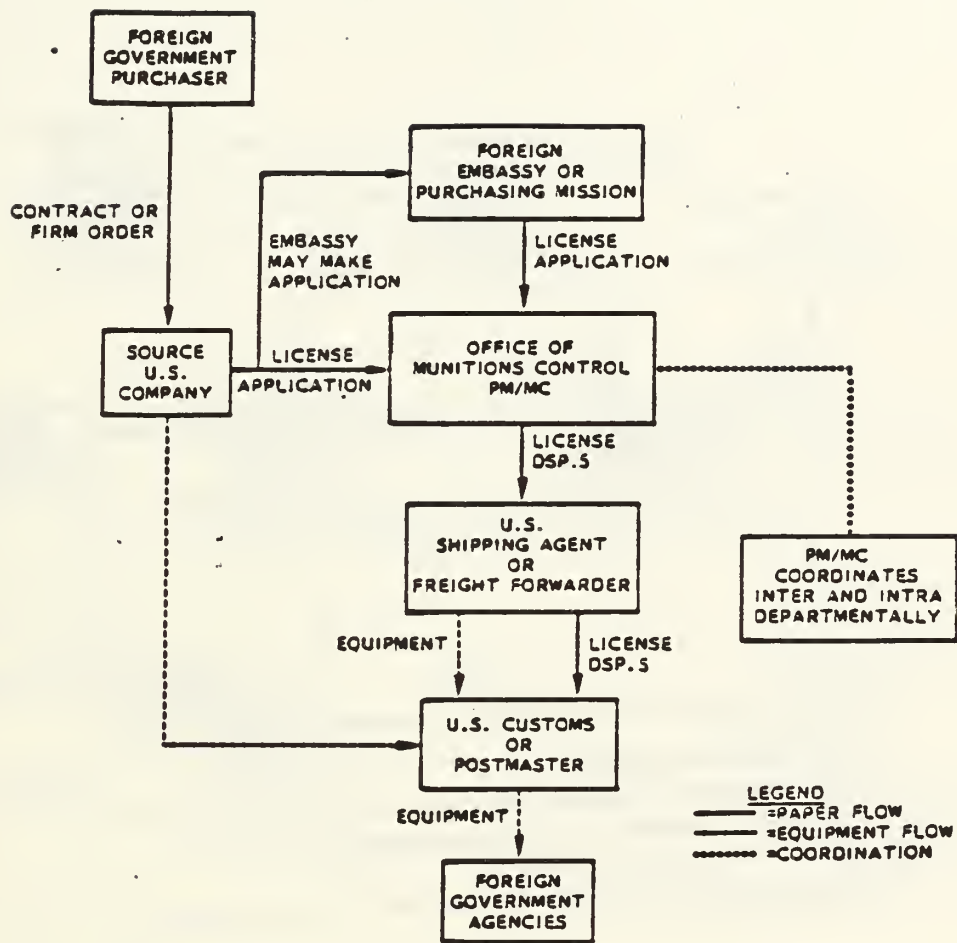


Figure G.3 Technology Transfer (Foreign Government Purchaser) [Ref.34 : p. 13-23].

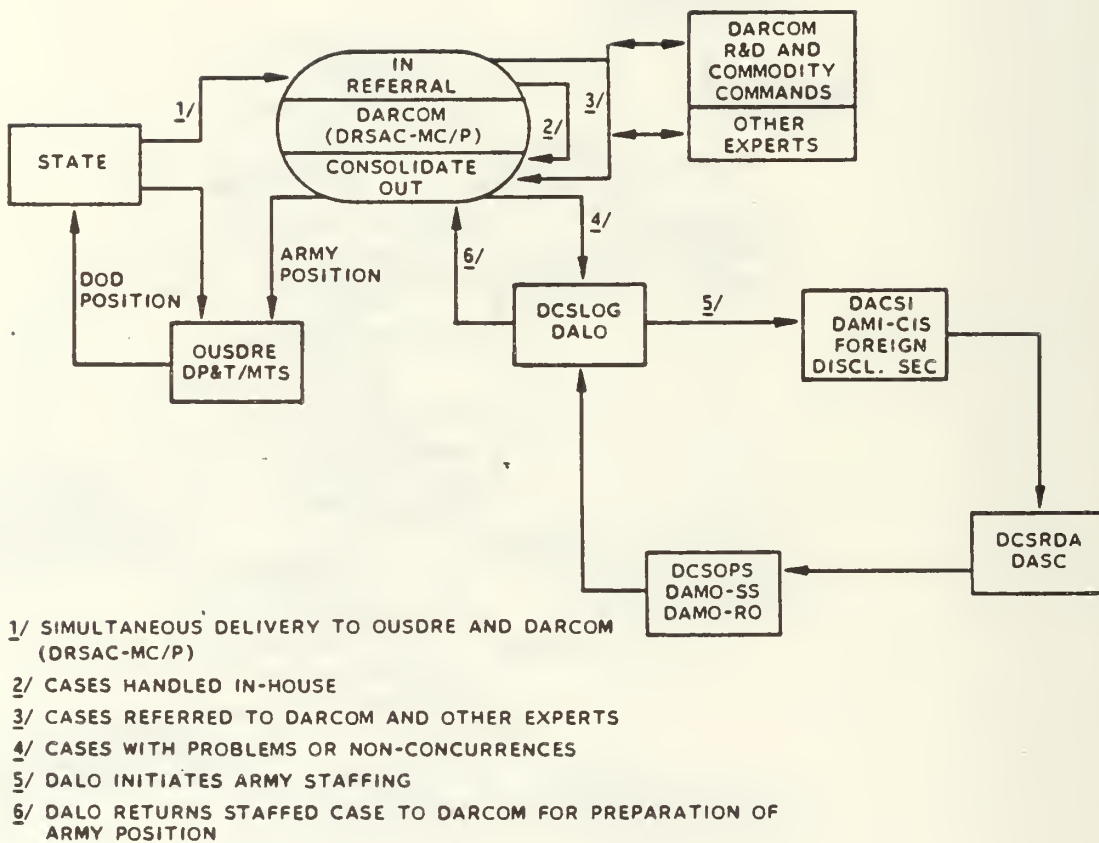


Figure G.4 Technology Transfer (U.S. Army) [Ref. 34 : p. 13-24 ].



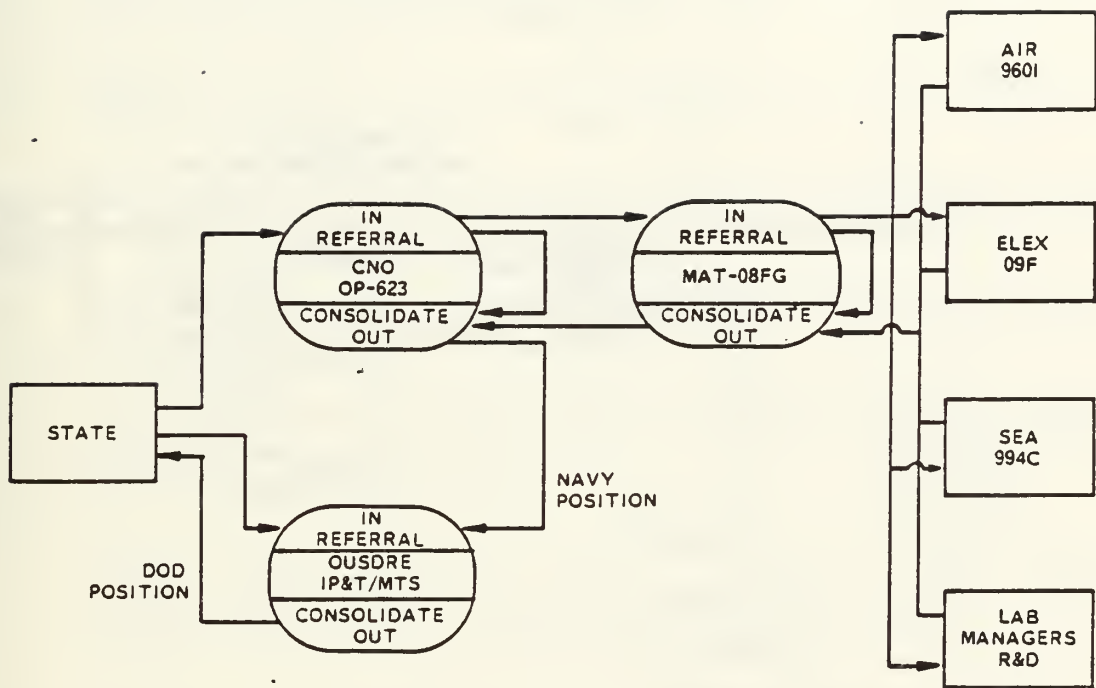


Figure G.5 Technology Transfer (U.S. Navy) [Ref. 34 : p. 13-25].

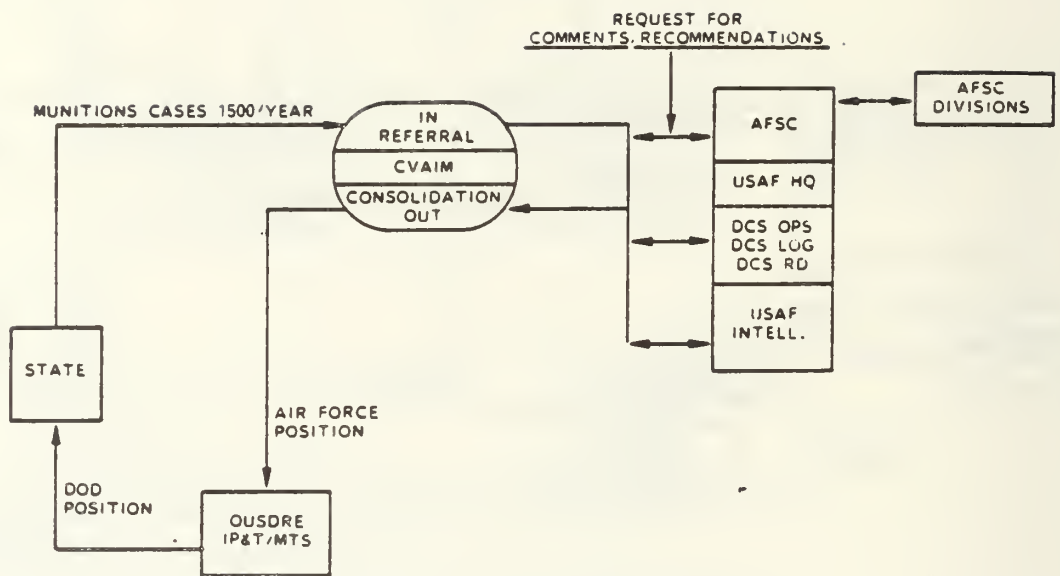


Figure G.6 Technology Transfer (U.S. Air Force) [Ref. 34 : p. 13-26].

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