

AD-A263 644



Logistics Management Institute

The Role of Military Exports in Maintaining the Defense Industrial Base

DC201R5

DTIC
ELECTE
MAY 06 1993
S E D

Ronald L. Straight
Donna J.S. Peterson

93 5 00 00 4

93-09712



STRIBU STATEMEN
Approved for public release
Distribution Unlimited

January 1993

The Role of Military Exports in Maintaining the Defense Industrial Base

DC201R5

Ronald L. Straight
Donna J.S. Peterson

This paper was prepared as input to the Defense Conversion Commission in the preparation of its December 1992 report, *Adjusting to the Drawdown*. This paper does not necessarily reflect the findings, conclusions, or recommendations of the Defense Conversion Commission, the Department of Defense, or any other Federal department or agency, nor does the Commission necessarily endorse the views expressed herein.

Logistics Management Institute
6400 Goldsboro Road
Bethesda, Maryland 20817-5886

Executive Summary

As the DoD reduces spending for military equipment and services, companies in the U.S. defense industrial base may attempt to replace a portion of lost domestic revenues with military export sales revenues. Recently, several large sales to foreign nations have been portrayed as helping to mitigate the impact of reduced defense spending on U.S. companies and to preserve jobs, at least over the near term. The recent sale of F-16 jet fighters to Taiwan is valued at \$5.8 billion, the sale of F-15 jet fighters to Saudi Arabia is worth \$9 billion, and the sale of tanks to Kuwait is worth \$4 billion. The permanence of these jobs will depend in part on whether U.S. manufacturers can continue to obtain new orders for military exports. The unanswered question is the size of the market for U.S. military export sales and whether that market will replace a sizable portion of business lost because of anticipated DoD spending reductions.

Currently, the United States exports \$18 billion of military items annually; about 75 percent (\$13.5 billion) comes from new production and 25 percent (\$4.5 billion) comes from inventory. Manufacturers of these items form the core of the defense industrial base: DoD depends on them for major weapon systems and they depend heavily on DoD for business. These manufacturers would have to increase exports by 2 or 3 times current levels in order to replace the expected loss of DoD business. Furthermore, to attain these higher levels of exports, U.S. manufacturers would have to dominate the world market for arms exports.

The amount of U.S. military export sales depends on a number of factors: the worldwide demand for military items, alternate competitive sources, and political considerations. The U.S. Arms Control and Disarmament Agency (ACDA) reports that worldwide military expenditures were \$1.2 trillion in 1989 (measured in constant 1993 dollars).¹ Of that \$1.2 trillion, arms transfers were \$51.8 billion (in constant 1993 dollars), a 10-year low. Expenditures by industrialized countries declined for the second year in a row. The ACDA also reports that, because of the dissolution of the Warsaw Pact, most

¹U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfer 1990*, November 1991.

industrialized countries will continue to reduce military expenditures. Expenditures have been declining among developing countries also.

In part, the growth of exports depends on the economic health of many of America's potential customers, which is not robust. The distribution of U.S. foreign military sales (FMS) deliveries in 1991 was 39 percent to the Near East and South Asia; 35 percent to Europe and Canada; 22 percent to East Asia and the Pacific; with the remaining 4 percent distributed among the South and Central American Republics, Africa, and international organizations. Several European countries are currently downsizing their military establishments in response to the end of the Cold War. An exception to these areas of slow economic growth may be the industrializing countries on the Pacific Rim such as Korea, Taiwan, Malaysia, Thailand, Indonesia, and Singapore. However, less than 5 percent of FMS have been made to these countries. Therefore, demand from the Pacific Rim would have to increase substantially to offset anticipated declines in demand from Europe, a major market for U.S. military exports.

At the same time that demand for military exports is weak, several major exporting countries are attempting to increase their foreign sales of military items, providing strong competition for U.S. defense companies in foreign markets. The United States provided 25 percent of total arms exports in 1989, the (former) Soviet Union provided 43 percent, other industrialized countries supplied 23 percent, and developing countries supplied 10 percent.² Since many other countries are downsizing their own military establishments, they also see the export market as a way to maintain their domestic business bases. Purchasers buying from the United States also considered buying military equipment from other countries (e.g., jet aircraft from France and tanks from the United Kingdom). In addition, recent news stories have reported that the Russian Government, in order to generate hard-currency export earnings, is eager to sell surplus aircraft and tanks at prices about one-third to one-half of those of the most similar U.S. items. While it is generally conceded that U.S. equipment has the technological advantage, that advantage is often diminished since the United States may choose not to sell the most advanced version of a particular system to all customers. Additionally, some customers facing regional or civil conflicts may not need, nor be able to pay for, the most advanced technology. Thus, U.S. defense suppliers may face strong competition with little expectation of increases in demand.

Another influence on the volume of military exports is the world political situation and the U.S. reaction to it. Military exports have

²Ibid.

been used to aid allies and to strengthen the U.S. defense industrial base and the general economy. Sporadically, policies to restrict arms sales in general or to restrict sales to a particular region have been considered by the President and/or Congress. Historically, changes in stated export policy have not significantly affected the overall level of military export sales. However, they may have affected the sales of a particular weapon system or sales to a particular country or region. Appendix C discusses changes in U.S. policy toward military exports since 1949.

The sizable undelivered backlog of FMS orders (\$80 billion in constant 1993 dollars) provides companies in the defense industrial base with the ability to maintain deliveries at current levels – even beyond 1997. Those large backlogs will allow some companies to accelerate deliveries to maintain their business bases.

If U.S. manufacturers hope to replace all business lost due to DoD budget declines in order to maintain 1991 levels of defense business, they cannot merely maintain current levels of military exports; they must increase exports by an *additional* \$30 billion in 1993, \$41 billion in 1994, \$47 billion in 1995, \$52 billion in 1996, and \$57 billion in 1997 (all in constant 1993 dollars).

Due to declining defense budgets, military export sales will represent a larger share of the business base of U.S. defense manufacturers even if foreign sales levels stay constant. But, is it probable that military exports will increase sufficiently to replace the lost domestic business?

Export sales (new orders) tend to be volatile since sales can be canceled. Also, sales data are collected for only a portion of military exports. Data on deliveries are collected for a larger proportion of military exports and more closely represent the potential contribution of military exports to the business bases of U.S. manufacturers. In fact, deliveries have been declining slowly over the past decade. Therefore, on the basis of past behavior, we do not expect a major acceleration in deliveries of military exports. However, to the extent that a company chooses to maintain its business base by reducing its backlog, that must be seen as a temporary measure because we do not see prospects for substantial increases in military export sales. Absent a global crisis and anticipating no substantial increase in deliveries, it is unlikely that military exports will double or triple to offset declining purchases made by DoD. At best, military exports can cushion the inevitable decline in the business base of defense firms.

CONTENTS

	Page
Executive Summary	iii
List of Tables	ix
The Role of Military Exports in Maintaining the Defense Industrial Base	1
The Market for Military Exports	1
Forecast of Military Exports Through FY97	7
Appendix A. Data on Military Exports	A-1
Appendix B. Munitions List and Department of Commerce (Dual-Use) Controlled Items List	B-1
Appendix C. Changes in Foreign Policy with Respect to Military Export Sales	C-1
Appendix D. U.S. Financing of Federal Security Assistance Programs	D-1

TABLES

	Page
1. Foreign Military Sales, Deliveries, and Backlog (1981 Through 1991)	2
2. Foreign Military Sales Deliveries by End-Item Category	3
3. Dollar Value of Munitions List Deliveries	4
4. Proscribed Country Groups	5
5. Value of Licenses for Dual-Use Items to Proscribed Countries	5
6. Licenses Approved for Export of Dual-Use Items	6
7. Erosion of Reported Foreign Military Sales	9

The Role of Military Exports in Maintaining the Defense Industrial Base

THE MARKET FOR MILITARY EXPORTS

Military export sales occur in one of three ways: through the foreign military sales (FMS) program managed by DoD, Munitions List items¹ managed by the Department of State (DOS), and dual-use items managed by the Department of Commerce (DOC). Foreign military sales are conducted on a government-to-government basis with DoD acting as the intermediary between U.S. manufacturers and a foreign government. An FMS contract often comprises a diverse bundle of goods and services, which includes the weapon system itself, spare parts, and the training necessary to operate and maintain that system. Appendix D provides a brief review of the financing of FMS exports. The Defense Security Assistance Agency (DSAA) publishes an annual report that provides information on FMS orders, deliveries, and the undelivered backlog. Table 1 shows those data for Fiscal Years (FY) 1981 through 1991. Appendix A shows historical data on FMS orders, deliveries, and the undelivered backlog by type of system sold.

Sales tend to be volatile, ranging from a low of \$8 billion in 1987 to a high of \$25.5 billion in 1982, averaging \$15.9 billion for the entire 11-year period. The annual level of deliveries tends to be more stable, varying between \$8.5 billion and \$18.6 billion, averaging \$12.4 billion over that same 11-year period. Over this period, the value of deliveries in constant dollars displays a statistically significant downward trend of 6.7 percent per year.

In addition to orders and deliveries, a third measure of the FMS program is the backlog of undelivered goods and services under prior year agreements. This backlog fell from \$70 billion in 1981 to \$59 billion by 1987 (in constant 1993 dollars). By 1991, the backlog had risen to a new high of \$80 billion, reflecting the effects of Operation

¹The Munitions List contains those items designated as arms, ammunitions, and implements of war by the DOS.

TABLE 1

Foreign Military Sales, Deliveries, and Backlog (1981 Through 1991)
(Billions of 1993 dollars.)

Year	Sales	Deliveries	Undelivered backlog ^a	Years of deliveries in backlog
1981	12.5	15.8	70.3	4.4
1982	25.5	16.4	71.6	4.4
1983	20.6	18.6	68.4	3.7
1984	17.8	13.1	69.1	5.3
1985	14.9	11.0	70.7	6.4
1986	8.2	10.0	67.0	6.7
1987	3.0	14.1	59.2	4.2
1988	14.2	11.0	60.6	5.5
1989	12.3	8.5	61.9	7.3
1990	15.9	8.5	66.8	7.9
1991	25.4	9.8	80.1	8.2

Source: Defense Security Assistance Agency, *Foreign Military Sales, Foreign Military Construction Sales and Military Assistance Facts*, as of 30 September 1991.

^a When expressed in constant dollars, the backlog is not simply the difference between sales and deliveries added to the previous year's backlog. This is because the effect of inflation is to reduce the value of the backlog in real dollars even if it is the same in nominal dollars.

Desert Shield/Desert Storm. The average backlog has been 5.8 years of deliveries, ranging from a low of 3.7 years in 1983 to a high of 8.2 years in 1991.

Table 2 shows FMS deliveries by major end-item category over time. Aircraft has become a larger proportion of military exports. Construction and missile sales account for a smaller share of exports now. Otherwise, the percentage distribution has not changed appreciably.

The second type of exports are purchases of munitions-controlled items by foreign governments directly from U.S. manufacturers. The DOS administers the U.S. Government's program to control commercial exports of defense items and services through an export licensing program. Appendix B provides data on Munitions List items. Data on those exports are collected when shippers' export documents and completed licenses are returned to the Office of Defense Trade Controls (DTC) of DOS. Thus, the best available data are data on deliveries (not orders or backlog) regarding direct commercial sales of

TABLE 2*Foreign Military Sales Deliveries by End-Item Category*

Equipment and service category	Percent of deliveries	
	1950 – 1980	1981 – 1991
Aircraft	29.0	37.0
Other services	11.5	11.6
Construction	16.8	9.8
Missiles	11.2	9.4
Vehicles and weapons	8.7	9.3
Supply operations	3.4	4.4
Communication equipment	2.3	3.6
Training	2.9	3.5
Ships	3.5	3.4
Ammunition	4.1	2.5
Other equipment	2.7	2.0
Undefined and adjusted	2.6	1.7
Repaired and rehabbed equipment	1.1	1.4
Books, maps, and publications	0.1	0.3
Total	100.0	100.0

Source: Defense Security Assistance Agency, *Foreign Military Sales, Foreign Military Construction Sales and Military Assistance Facts, Annual Reports, 1981 – 1991*.

Note: Totals do not add due to rounding.

military items. Also, licenses are issued for 3-year periods and actual deliveries are not known until the licenses are used for a delivery or expire – so there is a lag in reporting data on deliveries. The DTC estimates that, on average, future exports are between 40 and 60 percent of the actual dollar value of licenses approved in the 2 previous fiscal years.²

Table 3 shows the annual value of worldwide Munitions List exports licensed by DOS (in constant 1993 dollars). The value of these exports has ranged from \$1.3 billion in 1983 to \$9.6 billion in 1988 and 1989. From 1981 through 1991, these deliveries have averaged \$5.5 billion annually. However, since all commercial deliveries of items on the U.S. Munitions List must be reported, the total may include some items intended for civilian rather than military use.

Data are least comprehensive for the third form of export sales: dual-use items managed by the DOC as “controlled items.” Dual-use

²Jointly prepared by the Department of State and the Defense Security Assistance Agency, *Congressional Presentation for Security Assistance Programs, Fiscal Year 1993*.

TABLE 3
Dollar Value of Munitions List Deliveries
(Billions of constant 1993 dollars)

Year	Value of deliveries
1981	3.8
1982	2.8
1983	1.3
1984	4.4
1985	6.7
1986	5.4
1987	6.5
1988	9.6
1989	9.6
1990	6.2
1991	4.1

Source: Defense Security Assistance Agency, Foreign Military Sales, Foreign Military Construction Sales and Military Assistance Facts, Annual Report, 1991.

items are those that have both commercial and military applications, such as computers, commercial helicopters, and some components like antifriction bearings. Dual-use sales are between foreign governments and U.S. manufacturers. When a dual-use item is exported, it is not known whether it will be used for commercial or military purposes. Under the legislative authority of the Export Administration Act of 1979, as amended, controls on dual-use commodities and technologies are maintained for reasons of national security, foreign policy, or short supply. Controls are also maintained for purposes of nuclear nonproliferation under the Nuclear Non-Proliferation Act of 1978. Dual-use sales are monitored through a licensing program similar to the DOS' Munitions List program. Appendix B lists the items exported in FY91 that are controlled by the DOC under the Export Administration Regulations.

The DOC reports the dollar value of export activity only for proscribed countries [country groups Q, W, Y, Z, and People's Republic of China (PRC)]. Table 4 lists the proscribed countries and Table 5 shows the total dollar value of exports to all proscribed countries combined, for the period 1985 through 1991. For all other countries, the only data reported are the number of license applications and approvals.

TABLE 4
Proscribed Country Groups

Group designation	Countries
Q	Rumania
W	Czechoslovakia, Hungary, and Poland
Y	Albania, Bulgaria, Estonia, Laos, Latvia, Lithuania, Mongolian People's Republic, and the former Union of Soviet Socialist Republics
Z	Cambodia, Cuba, North Korea, and Vietnam
PRC	People's Republic of China

Source: DOC, Bureau of Export Administration, Annual Reports, Fiscal Years 1981 – 1991.

TABLE 5
Value of Licenses for Dual-Use Items to Proscribed Countries
(Billions of constant 1993 dollars)

Year	License value
1985	4.7
1986	3.7
1987	1.9
1988	2.9
1989	4.7
1990	6.0
1991	4.5

Source: DOC, Bureau of Export Administration, Export Administration, Annual Reports, Fiscal Years 1981 – 1991.

The value of such items for which 2-year export licenses have been granted for deliveries to countries on the proscribed list has ranged from a low of \$1.9 billion in 1987 to a high of \$6 billion in 1990. In 1991, exports to proscribed countries fell to \$4.5 billion. Over the last 7 years the value of export licenses has averaged \$4.1 billion (in 1993 dollars). Since the dollar values are reported only for proscribed countries, they

represent only a fraction of the total number of export licenses approved.

Table 6 shows the number of license applications for dual-use exports approved from 1985 through 1991, broken out into the free world (including the PRC), the PRC, and the proscribed countries. The United States imposes controls on the export and re-export of strategic commodities and technical data worldwide in order to prevent the diversion of strategic commodities to the proscribed countries. This is done in cooperation with other nations through the Coordinating Committee for Multilateral Export Controls, known as COCOM. The COCOM member nations have been Australia, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Greece, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Turkey, the United Kingdom, and the United States. In November 1992, COCOM added former Soviet bloc nations to form a 42-nation COCOM Cooperation Forum, which will concentrate on teaching the basics of export controls to those former Soviet bloc nations.

TABLE 6
Licenses Approved for Export of Dual-Use Items

Fiscal year	Total approvals	Free world (including the PRC)	PRC ^a only	Countries in groups Q, W, Y, and Z	COCOM
1985	100,750	97,962	9,000	2,788	N.R.
1986	99,492	96,947	6,800	2,545	N.R.
1987	97,668	93,852	5,400	3,816	N.R.
1988	92,041	88,258	5,600	3,783	N.R.
1989	74,717	71,064	4,800	3,653	N.R.
1990	61,601	58,242	4,025	3,359	N.R.
1991	33,551	24,317	2,399	2,083	7,151

Note: N.R.=not reported; COCOM=Coordinating Committed for Multilateral Export Controls.

^a For 1985 through 1989, annual PRC approvals are not reported. For those years, PRC approvals are calculated at 80.6 percent (the 1990 approval rate) of total PRC applications.

A complication in the data about dual-use items is that the items regarded as dual-use change as technologies and the political landscape change. In May 1991, COCOM agreed to a new "Core List," which reduced the scope of COCOM controls by about 50 percent. As a result, the number of license applications required from U.S. exporters

continued to decline, as shown in Table 6. No licenses are required for dual-use exports to Canada, our largest trading partner; therefore no separate information is reported on dual-use military exports to Canada.

The value of the exports cannot be calculated from the number of licenses approved. No dollar values are associated with most license approvals and not all licenses will be carried out or performed up to the maximum export quantity authorized. In addition, the exporter need not specify whether the item will be used for commercial or military purposes. As a result, it is not possible to estimate a dollar value of dual-use exports.

FORECAST OF MILITARY EXPORTS THROUGH FY97

The forecast for average annual deliveries of military exports (in 1993 dollars) is \$12.4 billion from the FMS program (with about 25 percent of the value coming from items in stock) plus \$5.5 billion of Munitions List items. This forecast is based on maintaining FMS deliveries at the average level attained over the past decade. Maintaining the average volume of deliveries would require almost 5 percent per year real growth to offset the decline occurring during the past decade. Although that level of growth may seem optimistic, the decline in domestic demand should allow for some acceleration of export deliveries. The projection of \$5.5 billion for Munitions List items is also the average for the past decade.

The DSAA provides information on FMS orders, deliveries, and the undelivered backlog. Sales for FY92 are expected to be about \$15.1 billion³ (in constant 1993 dollars) and could rise to \$25 billion based on recently announced sales levels that probably will be agreed to in FY93. In general, sales data are too volatile to be easily forecast.

Military export deliveries have been declining steadily for the past decade. If that trend continues, deliveries would fall to about \$2 billion by FY97. This seems unrealistic given the sizable backlog of FMS orders and the expectation that substantial domestic production capacity will become available due to declining defense budgets. However, the diminishing worldwide market for military expenditures and the high level of competition for export markets would mitigate

³Based on discussions between Logistics Management Institute and DSAA personnel, October 1992.

against U.S. manufacturers being able to sustain a continuing, substantial increase in deliveries. If domestic defense manufacturers increase deliveries by 4.8 percent per year through FY97, they would reach the past decade's average level of deliveries of \$12.4 billion. Since this requires arresting the downward trend and actually increasing deliveries, it seems unreasonable to project that deliveries will exceed this average level through FY97.

The backlog of undelivered orders must be adjusted for two factors: exports of items delivered from stock on hand and an erosion of orders in the years following the initial sale. Since 1983, data show that for closed cases, over 55 percent of items were delivered from stock; for open cases, 25 percent of deliveries are from in stock items.⁴ Thus, projections for deliveries and backlog should reflect the split between deliveries from stock or from new production. Since it is probable that deliveries from stock are completed sooner than those from new production, future deliveries from the backlog are expected to be about 75 percent from new production.

Erosion is defined as the decline in reported sales over time due to canceled orders and other adjustments. Table 7 shows the percentage decline in the value of the sales (orders) as time passes. With the three notable exceptions of FY81 – FY83, we calculate that the total erosion reaches 8 to 9 percent in about the fourth year and then remains near that level. Appendix A contains data on the year-by-year adjustments to FMS orders. To project the value of undelivered orders, the backlog should be further reduced to reflect this effect. The current backlog is \$80 billion (in constant 1993 dollars). At this level, with deliveries averaging \$12.4 billion per year, the undelivered backlog represents 6.5 years of deliveries. The equipment items currently contained in the backlog are shown in Appendix A.

Exports of Munitions List items have averaged \$5.5 billion in constant 1993 dollars. While the world situation may be the key factor in the export of Munitions List items, the average value of those exports is expected to remain unchanged through 1997.

Although the total value of items classified as dual use on the DOC controlled list is very large, the inability to verify the items' total value and the list's relevance to the companies in the defense industrial base makes dual-use items the most difficult area in which the impact of

⁴Since services are not provided from stock and they constitute about 20 percent of FMS deliveries since 1980, the value of *equipment* provided from stock on still open cases would equal 29.4 percent of equipment in the undelivered backlog.

TABLE 7
Erosion of Reported Foreign Military Sales
(Percentage)

Year of sale	Percentage decline by 1991
1980	8.39
1981	16.11
1982	23.01
1983	21.42
1984	9.38
1985	8.21
1986	9.07
1987	8.09
1988	5.43
1989	2.49
1990	+1.24

exports on the defense industrial base can be evaluated. Many of the dual-use item exports will be for commercial use. Most of the manufacturers of those items have a large nondefense commercial business base and will not experience a large impact due to declining DoD business. Therefore, we do not include this portion of the base in our projections.

APPENDIX A

Data on Military Exports

TABLE A-1

Annual Foreign Military Sales (Orders)
(Billions of nominal dollars)

Category	1981	1982	1983	1984
Aircraft (+ SP)	2.4	9.5	7.9	5.9
Ships (+ SP)	0.7	0.3	0.0	0.1
Vehicles and weapons (+ SP)	0.7	1.6	0.8	0.9
Ammunition	0.3	0.4	0.3	0.2
Missiles (+ SP)	0.8	1.5	2.9	1.4
Communications equipment (+ SP)	0.4	0.7	0.4	1.3
Other equipment (+ SP)	0.1	0.2	0.2	0.1
Repaired and rehabilitated equipment	0.2	0.2	0.2	0.1
Supply operations	0.3	0.7	20.6	5.4
Training	0.1	0.6	0.5	0.4
Other services	0.9	1.8	1.9	1.4
Books, maps, and publications	0.1	0.0	0.1	0.0
Undefined and adjustments	-0.7	0.3	-0.1	-0.2
Foreign military sales	6.3	18.0	15.6	12.2
Foreign military construction	-1.4	1.8	0.9	0.1
Worldwide total	4.9	19.8	16.6	12.3

Source: Defense Security Assistance Agency, *Foreign Military Sales, Foreign Military Construction Sales and Military Assistance Facts*.

Notes: These numbers were developed from cumulative totals that represented initial annual data, unadjusted for cancellations and

Totals may not add up due to rounding.

SP = spare parts; 0.0 = less than \$50 million.

(1)

(2)

	1984	1985	1986	1987	1988	1989	1990	1991
	5.9	1.7	1.2	1.0	5.7	2.1	2.8	3.8
	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.3
	0.9	0.7	0.8	0.5	0.8	2.6	3.0	5.5
	0.2	0.3	0.1	0.3	0.2	0.3	0.4	0.7
	1.4	2.2	0.5	0.8	1.0	0.6	0.9	1.5
	1.3	1.5	0.3	0.3	0.2	0.3	0.3	2.0
	0.1	0.2	0.2	0.2	0.2	0.2	0.4	0.4
	0.1	0.2	0.2	0.1	0.2	0.3	0.4	0.4
	5.4	0.5	0.3	0.3	0.6	0.4	0.5	0.9
	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.9
	1.4	0.8	1.0	1.5	1.2	1.4	2.3	3.5
	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
	-0.2	0.1	-0.2	0.4	-0.1	0.0	0.8	1.4
	12.2	8.7	4.6	5.9	10.6	8.8	12.2	21.5
	0.1	0.8	-0.1	-3.9	-0.4	0.0	0.3	1.2
	12.3	9.5	4.6	2.0	10.2	8.8	12.4	22.6

and Military Assistance Facts, Annual Report 1981 - 1991.

Adjusted for cancellations and adjustments. These totals may not match other compilations.

(5)

(1)

	1986	1987	1988	1989	1990	1991
5						
7	1.2	1.0	5.7	2.1	2.8	3.8
0	0.1	0.1	0.1	0.1	0.1	0.3
7	0.8	0.5	0.8	2.6	3.0	5.5
3	0.1	0.3	0.2	0.3	0.4	0.7
2	0.5	0.8	1.0	0.6	0.9	1.5
5	0.3	0.3	0.2	0.3	0.3	2.0
2	0.2	0.2	0.2	0.2	0.4	0.4
2	0.2	0.1	0.2	0.3	0.4	0.4
5	0.3	0.3	0.6	0.4	0.5	0.9
4	0.3	0.3	0.4	0.4	0.4	0.9
8	1.0	1.5	1.2	1.4	2.3	3.5
0	0.1	0.1	0.1	0.1	0.1	0.1
1	-0.2	0.4	-0.1	0.0	0.8	1.4
7	4.6	5.9	10.6	8.8	12.2	21.5
8	-0.1	-3.9	-0.4	0.0	0.3	1.2
5	4.6	2.0	10.2	8.8	12.4	22.6

Report 1981 - 1991.

ments. These totals may not match other compilations



TABLE A-2

*Annual Foreign Military Sales Deliveries
(Billions of nominal dollars)*

Category	1981	1982	1983	1984
Aircraft (+ SP)	3.4	4.0	3.5	2.5
Ships (+ SP)	0.5	0.4	0.8	0.5
Vehicles and weapons (+ SP)	0.8	1.7	1.1	0.8
Ammunition	0.4	0.3	0.3	0.4
Missiles (+ SP)	1.0	1.1	1.4	1.0
Communications equipment (+ SP)	0.1	0.2	0.3	0.4
Other equipment (+ SP)	0.1	0.2	0.2	0.2
Repaired and rehabilitated equipment	0.1	0.1	0.1	0.1
Supply operations	0.3	0.4	0.4	1.3
Training	0.3	0.3	0.3	0.3
Other services	0.9	0.4	2.0	0.6
Books, maps, and publications	0.0	0.0	0.0	0.0
Undefined and adjustments	0.1	0.1	0.2	0.2
Foreign military sales	8.3	9.3	10.7	8.4
Foreign military construction	1.6	1.9	1.8	1.5
Worldwide total	9.9	11.2	12.5	9.8

Source: Defense Security Assistance Agency, *Foreign Military Sales, Foreign Military Construction Sales and Military Assistance Facts*

Notes: These numbers were developed from cumulative totals that represented initial annual data, unadjusted for cancellations and

Totals may not add up due to rounding.

SP = spare parts; 0.0 = less than \$50 million.

(17)

(17)

1984	1985	1986	1987	1988	1989	1990	1991
2.5	3.0	1.8	6.8	3.8	3.3	2.5	3.9
0.5	0.4	0.1	0.1	0.1	0.4	0.1	0.2
0.8	0.9	0.8	0.7	0.9	0.4	0.6	0.8
0.4	0.3	0.1	0.1	0.1	0.1	0.2	0.2
1.0	0.8	0.4	0.9	0.7	1.1	0.4	0.9
0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1
1.3	-0.5	0.4	0.5	0.4	0.4	0.4	0.4
0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4
0.6	2.1	0.7	1.3	0.9	0.8	1.0	1.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.2
8.4	8.4	5.6	11.6	8.2	7.6	6.5	9.1
1.5	0.9	0.6	0.3	0.4	0.4	0.3	0.4
9.8	9.3	6.2	11.8	8.6	8.0	6.8	9.5

Assistance Facts, Annual Report 1981 - 1991.

cancellations and adjustments. These totals may not match other compilations

(Q)

3

TABLE A-3

*Backlog of Undelivered Orders
(Billions of nominal dollars)*

Category	1980	1981	1982	1983	1984
Aircraft (+ SP)	12.8	11.8	17.3	21.7	25.1
Ships (+ SP)	2.8	3.0	2.9	2.2	1.7
Vehicles and weapons (+ SP)	3.7	3.6	3.4	3.0	3.1
Ammunition	1.3	1.3	1.3	1.3	1.1
Missiles (+ SP)	6.4	6.3	6.6	8.2	8.5
Communications equipment (+ SP)	1.1	1.4	1.9	2.0	2.9
Other equipment (+ SP)	0.8	0.8	0.8	0.7	0.6
Repaired and rehabilitated equipment	0.5	0.6	0.6	0.7	0.7
Supply operations	1.9	1.8	2.1	2.4	1.7
Training	1.2	1.1	1.4	1.6	1.7
Other services	6.7	6.7	8.1	8.1	8.9
Books, maps, and publications	0.1	0.1	0.1	0.2	0.1
Undefined and adjustments	2.8	2.0	2.3	1.9	1.4
Foreign military sales	42.2	40.3	49.0	54.0	57.8
Foreign military construction	12.8	9.8	9.6	8.7	7.3
Worldwide total	55.0	50.0	58.6	62.6	65.1

Source: Defense Security Assistance Agency, *Foreign Military Sales, Foreign Military Construction Sales and Military Assistance Facts*, Annual Report 1981

Notes: These numbers were developed from cumulative totals that represented initial annual data, unadjusted for cancellations and adjustments. These totals may not add up due to rounding.

SP = spare parts; 0.0 = less than \$50 million.

D

	1984	1985	1986	1987	1988	1989	1990	1991
	25.1	23.8	23.2	17.5	19.4	18.3	18.5	18.4
	1.7	1.3	1.3	1.3	1.4	1.1	1.1	1.2
	3.1	2.9	3.0	2.8	2.7	4.9	7.3	12.0
	1.1	1.2	1.2	1.3	1.4	1.5	1.8	2.3
	8.5	9.9	10.0	9.9	10.2	9.7	10.2	10.7
	2.9	4.0	3.9	3.8	3.7	3.6	3.5	5.1
	0.6	0.7	0.7	0.7	0.7	0.7	0.9	1.1
	0.7	0.8	0.9	0.8	0.9	0.9	1.2	1.4
	1.7	2.7	2.6	2.4	2.5	2.6	2.6	3.1
	1.7	1.9	1.7	1.7	1.7	1.8	1.8	2.3
	8.9	7.6	7.9	8.1	8.3	8.9	10.2	12.3
	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
	1.4	1.3	0.8	1.0	0.8	0.8	1.5	2.8
	57.8	58.2	57.2	51.5	54.0	55.1	60.8	73.2
	7.3	7.2	6.6	2.4	1.6	1.2	1.2	1.9
	65.1	65.4	63.7	53.9	55.6	56.3	62.0	75.1

Source: Facts, Annual Report 1981 - 1991.

Includes corrections and adjustments. These totals may not match other compilations.

2)

TABLE A-4

*Undelivered Backlog of Foreign Military Sales
and Military Assistance Programs
(Units as of 30 September 1991)*

Items	FMS	MAP
Aircraft		
Attack A-4	24	0
Cargo C-130	6	2
Electronic E-2C	12	0
Fighter F-4E	6	0
Fighter F-4M	3	0
Fighter F-5A	4	0
Fighter F-5E	4	0
Fighter F-8J	11	0
Fighter F-15C	7	0
Fighter F-15D	8	0
Fighter F-16A	80	0
Fighter F-16B	20	0
Fighter F-16C	166	0
Fighter F-16D	62	0
Fighter F-18A	55	0
Observation O-1	15	0
Patrol P-3	8	1
Helicopter AH-1	34	0
Helicopter UH-1	92	30
Helicopter TH-13	21	0
Helicopter OH-58	8	0
Helicopter UH-60	10	0
Helicopter AH-64	54	0
VTOL AV-8	2	0
VTOL OV-10	24	12
Miscellaneous aircraft	47	0
Ships		
Drydock, floating	1	0
Landing craft	2	0
Minesweeper	1	0
Ocean tugs, auxiliary	3	0
Patrol craft	43	0
Patrol gunboats	1	0
Miscellaneous boats and craft	164	45

Source: Defense Security Assistance Agency, *Foreign Military Sales, Foreign Military Construction Sales, and Military Assistance Facts*, Annual Report, 30 September 1991.

Note: VTOL = vertical take-off and landing.

TABLE A-4

*Undelivered Backlog of Foreign Military Sales
and Military Assistance Programs (Continued)
(Units as of 30 September 1991)*

Items	FMS	MAP
Vehicles and weapons		
Armored cars	1,586	0
Armored cargo carrier	52	0
Armored personnel carrier	316	0
Tanks	1,159	0
Tank recovery vehicles	199	0
Miscellaneous combat vehicles	77	0
Artillery SP 155MM howitzer	107	0
Howitzers 155MM	11	0
Aegis weapon system	3	0
Close-in weapon system/Phalanx	61	0
Missiles		
AMRAAM	136	0
Chaparral	299	0
Dagon	201	0
Harm	812	0
Harpoon	731	0
Hawk	372	0
Hellfire	1,020	0
Maverick	2,624	0
Patriot	667	0
Seasparrow	49	0
Sidewinder	6,136	0
Sparrow	2,153	0
Standard	1,469	0
Standard arm	100	0
Stinger	485	0
Tow	17,049	0
Miscellaneous	99	0

Source: Defense Security Assistance Agency, Foreign Military Sales, Foreign Military Construction Sales and Military Assistance Facts, Annual Report, 30 September 1991.

Note: VTOL = vertical take-off and landing.

TABLE A-5**Foreign Military Sales
Analysis of Fiscal Year Erosion
(Millions of dollars)**

Year	1980	1981	1982	1983	1984	1985	1986
1980	15,277	15,068	15,214	15,002	14,931	14,705	14,304
1981		8,525	8,212	9,088	7,766	7,643	7,384
1982			21,457	20,911	20,626	20,291	19,942
1983				18,276	18,014	16,626	16,042
1984					14,554	14,343	14,196
1985						12,462	12,261
1986							7,128
1987							
1988							
1989							
1990							
1991							

Source: Defense Security Assistance Agency, 27 October 1992.

1)

	1986	1987	1988	1989	1990	1991	Beginning value erosion through 1991
05	14,304	14,241	14,106	14,027	14,026	13,996	(1,281)
33	7,384	7,487	7,403	7,291	7,325	7,152	(1,373)
91	19,942	17,755	17,435	16,909	16,643	16,520	(4,938)
26	16,042	15,746	14,873	14,581	14,466	14,361	(3,915)
33	14,196	14,054	13,886	13,692	13,276	13,189	(1,366)
62	12,261	12,105	11,836	11,626	11,517	11,439	(1,023)
	7,128	7,100	6,927	6,803	6,609	6,482	(647)
		7,078	7,134	6,978	6,582	6,505	(573)
			12,476	12,352	11,946	11,798	(678)
				10,921	10,821	10,648	(272)
					14,182	14,358	176
						23,788	0

2)

APPENDIX B

**Munitions List and Department
of Commerce (Dual-Use)
Controlled Items List**

TABLE B-1

*Department of Commerce Military Items
U.S. Exports - Harmonized Schedule B*

Harmonized number	Commodity description	Units	CY89 deliveries		CY90 Quantities
			Quantity	Value (\$000)	
3603000000	Safety fuses, detonating	THS	1,535,115	37,236	1,290,500
8407100090	Piston aircraft engines	EA	2,230	38,255	1,800
8411114050	Turbojet aircraft engines <25KN	EA	136	14,539	200
8411124050	Turbojet aircraft engines >25KN	EA	182	100,361	500
8411214050	Turbopropeller aircraft engines <1100KW	EA	31	5,636	100
8411224050	Turbopropeller aircraft engines >1100KW	EA	29	6,590	100
8411814050	Aircraft turbines <5000KW	EA	362	44,624	200
8411824050	Aircraft turbines >5000KW	EA	146	25,852	500
8412100010	Missile and rocket engines	EA	5,072	11,010	1,200
8412909050	Parts of reaction engines	X		2,166	
	Subtotal engines			249,033	
8710000030	Tracked vehicles	EA	553	333,721	1100
8710000060	Armored fighting vehicles	EA	288	17,999	1300
8710000090	Parts, armored vehicles	X		461,371	
	Subtotal vehicles			813,091	
8802110015	Helicopters, new military <2000KG	EA	7	2,168	100
8802110060	Helicopters, used military <2000KG	EA	53	2,247	100
8802120020	Helicopters, new military >2000KG	EA	29	178,181	300
8802120060	Helicopters, used military >2000KG	EA	0	0	100
8802200020	Aircraft, new military >450KG <2000KG	EA	200	19,637	200
8802200030	Military aircraft, new >450 <2000KG	EA	216	22,609	2100
8802200070	Military aircraft, used <2000KG,	EA	9	1,768	100
8802300010	Fighters, new >2000 <15000KG	EA	32	368,167	300
8802300020	Military aircraft, nesoi >2000 <15000KG	EA	89	10,985	200
8802300070	Military aircraft, used >2000 <15000KG	EA	6	4,631	100
8802400015	Fighters, new >15000KG	EA	0	0	100

Notes: Department of State Munitions List data collected by the Department of Commerce; > = greater than; < = less than; EA = each; KG = kilogram; KN = kilonewton; THS = thousands; X = units not applicable.

17

	CY89 deliveries		CY90 deliveries		CY91 deliveries	
	Quantity	Value (\$000)	Quantity	Value (\$000)	Quantity	Value (\$000)
	1,535,115	37,236	1,290,500	44,120	1,447,955	60,386
	2,230	38,255	1,864	35,325	2,684	30,439
	136	14,539	212	19,652	510	23,268
	182	100,361	91	74,765	113	86,575
	31	5,636	16	2,154	33	4,594
	29	6,590	26	23,636	39	16,723
	362	44,624	289	21,487	230	27,485
	146	25,852	97	25,775	157	12,645
	5,072	11,010	1,215	30,654	531	6,736
		2,166		2,237		1,671
		249,033		235,685		210,136
	553	333,721	119	113,319	417	181,201
	288	17,999	138	15,695	421	27,757
		461,371		536,886		591,235
		813,091		665,900		800,193
	7	2,168	15	21,835	6	1,220
	53	2,247	7	428	36	302
	29	178,181	32	358,985	66	586,155
	0	0	0	0	6	3,409
	200	19,637	21	4,039	22	3,642
	216	22,609	210	23,220	161	16,407
	9	1,768	4	541	2	9
	32	368,167	39	532,943	14	284,779
	89	10,985	27	32,956	44	77,275
	6	4,631	1	393	25	66,842
	0	0	0	0	2	73,778

greater than; < = less than; EA = each; KG = kilogram; KN = kilonewtons; KW = kilowatt; nesoi = not elsewhere specified

2

B-3

TABLE B-1

*Department of Commerce Military Items
U.S. Exports – Harmonized Schedule B (Continued)*

Harmonized number	Commodity description	Units	CY89 deliveries		Qu.
			Quantity	Value (\$000)	
8802400020	Cargo, new military aircraft > 15000KG	EA	14	232,817	
8802400030	Military aircraft, nesoi > 15000KG	EA	60	1,159	
8802400080	Used military aircraft > 15000KG	EA	129	47,137	
8802509020	Military spacecraft (including satellites)	X		11,850	
	Subtotal aircraft			903,356	
8906009010	Warships	X		14,098	
9005100020	Prism binoculars infrared	EA	1,809	2,215	
9005804020	Optical telescopes infrared	EA	2,441	7,916	
9013102000	Telescopic sights rifle	EA	25,999	4,859	
9013104000	Periscopes/telescopes as parts	EA	21,402	29,287	
9013800000	Optical devices, nesoi	X		124,489	
9014208080	Instruments for navigation	EA	277,160	42,959	33
	Subtotal optical			211,725	
9301003000	Rifles 9307, military	EA	22,437	7,808	
9301006000	Shotguns 9307, military	EA	3,772	554	
9301009010	Self-propelled guns, howitzers, mortars	X		8,523	
9301009020	Guns, howitzers, mortars > 30MM	X		82,697	
9301009030	Machine guns < 30MM	EA	6,195	7,632	
9301009040	Guns, howitzers, mortars < 30MM	EA	1,073	1,267	
9301009050	Missile/rocket launchers	EA	18,083	37,291	3
9301009090	Military weapons, other than revolvers/pistols	EA	47,012	21,934	2
9305902000	Parts, shotguns 9301	X		4,411	
9305903010	Parts, guns/howitzers/mortars < 30MM	X		0	
9305903030	Parts 9301, nesoi	X		103,477	
9306304010	Cartridges, .22 caliber	THS	257,900	8,004	11
9306304020	Cartridges, rifle/pistol nesoi	THS	284,299	30,733	14

Notes: Department of State Munitions List data collected by the Department of Commerce; > = greater than; < = less than; EA = each; KG = kilograms or identified; THS = thousands; X = units not applicable

1)

CY89 deliveries		CY90 deliveries		CY91 deliveries	
Quantity	Value (\$000)	Quantity	Value (\$000)	Quantity	Value (\$000)
14	232,817	7	180,020	10	304,801
60	1,159	36	252,138	32	388,389
129	47,137	16	63,213	108	190,624
	11,850		8,970		10,000
	903,356		1,479,681		2,007,632
	14,098		14,468		6,747
1,809	2,215	7,157	6,662	5,129	18,795
2,441	7,916	2,361	6,785	1,502	7,803
5,999	4,859	28,071	5,091	58,820	7,916
1,402	29,287	9,758	12,860	22,432	19,377
	124,489		72,117		74,137
7,160	42,959	330,954	54,229	253,401	44,169
	211,725		157,744		172,165
2,437	7,808	21,956	10,494	34,110	110
3,772	554	3,089	510	7,926	17,257
	8,523		40,201		1,193
	82,697		37,362		28,294
6,195	7,632	3,074	6,193	4,156	8,345
1,073	1,267	1,524	2,700	20,539	20,614
3,083	37,291	36,750	50,650	69,846	44,103
7,012	21,934	22,925	13,716	41,151	18,159
	4,411		1,124		776
	0		0		12,965
	103,477		99,570		193,048
7,900	8,004	115,397	6,646	179,728	12,471
3,299	30,733	147,283	47,893	506,541	48,078

< = less than; EA = each; KG = kilogram; KN = kilonewtons; KW = kilowatt; nesoi = not elsewhere specified

2
B-5

TABLE B-1

*Department of Commerce Military Items
U.S. Exports – Harmonized Schedule B (Continued)*

Harmonized number	Commodity description	Units	CY89 deliveries	
			Quantity	Value (\$000)
9306304030	Cartridges, nesoi	THS	41,040	13,896
9306304040	Empty cartridges, rifle/pistol	THS	9,803	1,457
9306304050	Empty cartridges, nesoi	THS	1,995	23,716
9306308000	Parts of cartridges, nesoi	X		18,775
	Subtotal guns			372,175
9306900020	Guided missiles	EA	6,706	375,209
9306900040	Bombs, grenades, torpedoes, mines	X		113,789
9306900060	Parts, guided missiles	X		655,774
9306900080	Parts, bombs, grenades, torpedoes	X		126,552
9307000000	Swords, cutlasses, bayonets	X		852
9803100000	Military wearing apparel	X		22,704
9803200000	Military equipment not identified	X		326,203
	Grand total			4,203,797

Notes: Department of State Munitions List data collected by the Department of Commerce; > = greater than; < = less than; EA = each; KG = kilograms; THS = thousands; X = units not applicable.

1)

CY89 deliveries		CY90 deliveries		CY91 deliveries	
Quantity	Value (\$000)	Quantity	Value (\$000)	Quantity	Value (\$000)
1,040	13,896	252,949	23,609	99,679	15,310
1,803	1,457	9,224	1,260	10,607	1,147
1,995	23,716	66,093	30,229	78,536	22,673
	18,775		18,275		18,075
	372,175		390,432		462,618
1,706	375,209	14,593	551,334	32,733	341,449
	113,789		133,765		102,303
	655,774		723,765		898,705
	126,552		297,220		233,557
	852		1,030		1,021
	22,704		33,473		49,676
	326,203		496,107		665,316
	4,203,797		5,224,724		5,951,518

< = less than; EA = each; KG = kilogram; KN = kilonewtons; KW = kilowatt; nesoi = not elsewhere specified

2)

TABLE B-2***Department of Commerce Control List (Dual-Use Items) FY91***

ECCN	Commerce control list
1B50	Vacuum/controlled environment furnaces
1B51	Specially designed pressure measuring instruments
1B70	Equipment for production of chemical weapon precursors
1C18	Items on the international munitions list
1C60	Precursor/Intermediate chemicals for chemical warfare
1C96	Other materials
1091	Numerical control equipment (specified)
1099	Dimensional inspection systems or devices
1205	Devices for chemical/solar/nuclear to electric engine conversion
1312	Presses and specialized controls/accessories
1353	Machinery for making communication cable
1355	Electronic device manufacturing equipment (specified)
1357	Machinery: filament winding/tape laying (specified)
1358	Equipment to manufacture/test high tech memory/switching devices
1362	Vibration testing equipment (specified)
1370	Machines for turning optical quality surfaces
1371	Anti friction bearings (specified)
1391	Robots/controllers/end effectors
1460	Aircraft/helicopters/engines (nonmilitary, specified)
1485	Compasses/gyroscopes/accelerometers (specified)
1501	Equipment: navigation/direction-finding/radar/airborne communications
1502	Communications/detection/tracking equipment: ultraviolet/infrared/ultrasonic
1510	Underwater detection/locating equipment
1516	Radio receivers (specified)
1519	Transmission equipment: single/multi channel (specified)
1520	Radio relay equipment (specified)
1522	Lasers/laser systems
1526	Cable/communications/other coaxial
1527	Cryptographic and ancillary equipment
1529	Measuring/calibrating/testing equipment: electronic
1531	Frequency synthesizers and equipment containing (specified)
1533	Radio spectrum analyzers (specified)
1537	Microwave equipment (specified)
1544	Semiconductor diodes (specified)
1548	Photosensitive components (specified)

Note: ECCN = Export control classification number.

TABLE B-2

*Department of Commerce Control List (Dual-Use Items) FY91
(Continued)*

ECCN	Commerce control list
1549	Tubes: photomultiplier (specified)
1555	Electron video tubes/specialized components (specified)
1558	Electron tubes (valves) (specified)
1564	Electronic assemblies and integrated circuits
1565	Computing equipment: electronic
1566	Computer software
1567	Communications switch: stored program
1568	Electric/electronic equipment (high tech, specified)
1571	Magnetometers (specified)
1572	Recording/reproducing equipment (specified)
1574	Electronic devices: superconducting
1584	Oscilloscopes and components for (specified)
1585	Photographic equipment (specified)
1586	Acoustic wave devices
1595	Gravity meters and components
1675	Superconductive materials
1710	Fluids and lubricating materials
1715	Boron metal/compounds/mixtures
1746	Polymeric substances/manufactures (specified)
1754	Fluorocarbon compounds/manufactures (specified)
1757	Compounds/materials (specified)
1759	Syntactic foam for underwater use
1763	Fibrous/filamentary materials (specified)
1781	Oils/greases: synthetic (specified)
2A50	Nuclear reactor and nuclear power plant related equipment
2B06	Dimensional inspection/measuring systems or equipment
2B08	Assemblies/units/inserts for machine tools in 2B06
2120	Cryogenic equipment/materials (specified)
2319	Chambers: environmental (specified)
2708	Explosives/propellants/fuels (listed)
3A01	Analog to digital converters
3A01	Electronic devices/components
3A02	Frequency standards and equipment containing frequency standards
3A02	General purpose electronic equipment
3B02	Test equipment: computerized electric/electronic

Note: ECCN = Export control classification number.

TABLE B-2***Department of Commerce Control List (Dual-Use Items) FY91
(Continued)***

ECCN	Commerce control list
3A52	Cathode ray oscilloscopes and components
3A96	Other equipment/assemblies/components in category
3D03	CAD software for semiconductor devices: integrated
3D96	Software for development/production/use of category 3 items
3E01	Technology for items controlled by 3A/3B/3C
3261	Neutron generator systems (specified)
3604	Zirconium metal/alloys (specified)
3608	Hafnium metal/compounds/alloys (specified)
4A01	Electronic computers/related equipment
4A03	Digital computers/assemblies/related equipment
4A04	Systolic array/neural/optical computers
4A94	Digital computers with a calculated throughput 6 million floating point operations per second (mflops) or higher
4A96	Other computer equipment/assemblies/components
4B96	Other computer test/production/inspection equipment
4D01	Software for equipment in categories 4A, 4D, or nonspecified
4D96	Software to support computer equipment or material
4E01	Technology for equipment in categories 4A, 4C, or nonspecified
4E96	Technology for items controlled by category 4
4203	Furnaces: electric (high tech, specified)
4363	Nuclear reactor/nuclear power plant related equipment
4518	Telemetry/telecontrol equipment (specified)
4564	Analog to digital converters: integrated circuits
4587	Quartz crystals and assemblies
4592	Equipment for measuring pressures (specified)
4597	Voice print analysis/identification equipment
4654	Magnesium: high purity
4720	Radioisotopes (specified)
4721	Helium: enriched in isotope 3
4798	Dimethyl methylphosphonate
4997	Viruses/viroids
4998	Bacteria/fungi/protozoa
5A02	Telecommunication transmission equipment/systems
5A03	Switching equipment/signaling systems
5A05	Optical fiber communication cable and optical fiber
5A11	Systems/equipment/integrated circuits for information security

Note: ECCN = Export control classification number.

TABLE B-2

*Department of Commerce Control List (Dual-Use Items) FY91
(Continued)*

ECCN	Commerce control list
5A96	Other telecommunications equipment
5B02	Bit error rate test equipment/data communication analyzers
5D01	Software for development/production/use of items in categories 5A/5B/5C
5D11	Software for development/production/use of information security
5132	Pumps or valves: vapor proof
5133	Thermometers or other sensors
5460	Aircraft: larger nonmilitary
5584	Oscilloscopes: transient recorders and plug in models
5998	Guns/devices for crowd control
5999	Protection/restraint equipment for personnel not elsewhere specified
6A01	Acoustics
6A08	Naval direction finding/radar/airborne/mobile communications/ marine
6099	Metal working machines and parts for (others not elsewhere specified)
6299	Equipment: electrical/power generating (not elsewhere specified)
6399	Equipment: general industrial (in interpretation 29)
6498	Aircraft parts/boats/diesel engines/underwater cameras
6499	Transport equipment (others not elsewhere specified)
6565	Limited capability personal computers
6599	Equipment: electronic/photographic/precision (not elsewhere specified)
6699	Metals/minerals and manufactures of (others not elsewhere specified)
6799	Chemicals/materials/products (in interpretation 24)
6999	Commodities and parts: miscellaneous (not elsewhere specified)
7A21	Accelerometers for guidance systems with specifications of
7A23	Inertial or other equipment using accelerometers
7999	Printed materials/reproductions thereof
9999	Models: technical

Note: ECCN = Export control classification number.

APPENDIX C

Changes in Foreign Policy with Respect to Military Export Sales¹

Modern arms export policy dates from the inception of NATO and the passage of the Mutual Defense Assistance Act of 1949. At that time, the U.S. policy was to assist allies who were unable to pay for their own defense needs. In 1961, during the term of Secretary of Defense Robert McNamara, the policy was changed to one of selling arms to allies, since by then the NATO countries had rebuilt their economies. In the late 1960s, the Nixon Doctrine emphasized that each country was primarily responsible for its own security. During the same time, Congress was becoming more active in dealing with military exports. In 1967 and 1968, laws were passed that restricted the use of economic assistance and barred the use of loans from the U.S. Export-Import Bank for foreign military sales. In the 1970s, Congress also passed several acts giving itself more power to limit U.S. arms sales, requiring an annual report, the Arms Sales Proposal known as the Javits Report, which provides advance notification of specific sales.

In the late 1970s, the Carter Administration mandated an \$8.6 billion ceiling per annum on the value of U.S. military export sales. That administration also implemented policy limitations. For example, a country's human rights record and its economic development was considered before a license was granted, but these limitations did not apply to NATO members, Israel, Japan, and a few other countries. Several countries received approvals for large sales. As a result, under President Carter the value of new arms export agreements increased from \$14.5 billion in 1975 to \$15 billion in 1978, despite the limitations imposed.

Under President Reagan, the military export policy differed in the 1980s by offering new evaluation criteria; but, the overall volume of export sales did not change significantly. President Bush continued the Reagan policies in effect until Iraq's invasion of Kuwait. At that time

¹This discussion is based on Ian Anthony, ed., *Arms Export Regulations*, Stockholm International Peace Research Institute, 1991, pp. 183–202.

the Bush Administration issued a reappraisal of U.S. policy. The new policy particularly focused on sales of conventional weapons to the Middle East and suggested that the five permanent members of the U.N. Security Council work together on military export issues. President Bush also emphasized counter-terrorism, nuclear and chemical nonproliferation, and control of illegal drug trafficking.

APPENDIX D

U.S. Financing of Federal Security Assistance Programs

The U.S. Government provides several types of financial assistance to foreign governments seeking to purchase U.S. military goods and services. Security assistance can be divided into three types. Under the first type of assistance, the DoD performs administrative functions for the foreign military sales (FMS) program. The functions include negotiating contracts with U.S. manufacturers, collecting payments from the purchasing foreign government, and disbursing those payments to manufacturers. The DoD charges a fee for these services. Typically, sales under the FMS program represent the highest dollar value of military exports. The second type of security assistance is a group of programs that provide grants or loans to foreign governments seeking to purchase U.S. military goods and services. The third type of assistance covers the U.S. Government's contributions to counter-narcotics and peacekeeping efforts.

Each year the Department of State and the Defense Security Assistance Agency jointly prepare the *Congressional Presentation for Security Assistance Programs* report. The most recent is for FY93; it was used as the basis for the program descriptions in this appendix. The estimates made in that report are shown in Table D-1.

The FMS program conducts sales of military services and equipment on a government-to-government basis. The United States offers to sell defense items and services (including training services) under FMS procedures only in response to specific requests from foreign governments' authorized representatives or eligible international organizations. Currently, nearly 100 countries participate in annual FMS and construction sales agreements.

The Federal Government acts as an intermediary in government-to-government FMS. The program is handled through the FMS Trust Fund, which pays the DoD for the purchases and is then reimbursed by the foreign countries. The DoD procurement accounts actually are used to pay the U.S. firms. Thus, except for timing adjustments, the net

TABLE D-1
Security Assistance Programs
(Billions of nominal dollars)

Financing category	Actual FY91	Estimate FY92	Proposed FY93
FMF (11-1082) TOA	4.3	4.6	4.1
FMF (11-1085) TOA	0.1	0.1	
Loan liquidating (11-4121) net outlays	1.0	0.2	0.2
Direct loan financing (11-4122) net outlays		>0.1	0.1
Economic support TOA	4.0	3.2	.
Military assistance program net outlays	0.1	0.1	0.1
International military education and training TOA	>0.1	0.1	>0.1
Peacekeeping	>0.1	0.4	>0.1
Special defense acquisition fund obligations	0.3	0.4	0.3
Total financing support	9.9	9.2	8.0

Source: Congressional Presentation for Security Assistance Programs, Fiscal Year 1993.

Notes: FMF = foreign military financing; TOA = total obligational authority.

outlays of the FMS Trust Fund are zero and are not a part of the Federal budget. Thus, changes in the FMS financing program will not change any component of the Federal budget, but changes will appear as changes in exports.

Foreign military financing (FMF) is largely a grant program that enables U.S. friends and allies to acquire American military equipment and related services and training. In general, FMF provides financing for FMS. However, 10 countries (i.e., Greece, Turkey, Portugal, Morocco, Pakistan, Tunisia, Egypt, Israel, Jordan, and Yemen) are eligible by law to use FMF for procurement outside FMS channels through direct commercial contracts. The FMF program is administered through a series of accounts that provide different types of assistance.

Beginning in FY92, the FMF 11-1082 account contains only the FMF grant portion of the program and administrative costs. This account is divided into three similarly sized parts: Israel, Egypt, and all others. [In earlier years, account 11-1082 contained budget authority for both the grant and loan programs. Currently, the Foreign Military Loan Liquidating Account (formerly the Guaranty Reserve

Fund) is used as the liquidating account for all FMF loans issued prior to FY92.]

Budget authority in the FMF 11-1085 account consists of the subsidy element of the proposed FMF concessional loan program and a small amount for administrative expenses. Those funds subsidize the difference between the principal and interest payments made by recipient countries and the payments made by the U.S. Government (at present value) over the life of the loan. A credit rating determined for each country, combined with the terms of the loans and the cost of the money to the U.S. Government, determine the amount of subsidy for each credit program.

The FMF Direct Loan Financing Account contains the financial transactions related to the FMF direct loans. The subsidy element of loans is transferred from the FMF 11-1085 account to this account. These loan funds are augmented by permanent borrowing authority from the U.S. Treasury to make expenditures for FMS and commercial procurements. Receipts of debt service payments from FMF borrowers are used for repayment of the funds borrowed from the Treasury.

The International Military Education and Training (IMET) program provides military education and training on a grant basis to students from allied and friendly nations.

The Economic Support Fund provides economic and counter-narcotics assistance to allies and friendly developing countries. The Agency for International Development (AID) implements this program under the direction of the Administrator of AID with overall foreign policy guidance from the Secretary of State.

The Foreign Assistance Act of 1961 authorizes assistance to friendly countries and international organizations for peacekeeping operations that further U.S. national security interests. The United Nations' Force in Cyprus and the multinational force and observers in the Sinai are two examples of such assistance.

The Special Defense Acquisition Fund (SDAF), authorized in 1982, is a revolving fund capitalized at \$1.07 billion. Congressional authority to obligate SDAF funds is required in annual security assistance appropriations legislation and has been provided for 3-year periods each year since FY89. The SDAF procures high-demand, long lead time defense equipment in anticipation of sales through FMS. The SDAF has bridged gaps in production for several weapon systems and

contributed to higher production volumes of selected defense items, which resulted in lower unit prices for all purchasers.

REPORT DOCUMENTATION PAGE

Form Approved
OPM No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources gathering, and maintaining the data needed, and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE Jan 93	3. REPORT TYPE AND DATES COVERED Final
----------------------------------	--------------------------	---

4. TITLE AND SUBTITLE The Role of Military Exports in Maintaining the Defense Industrial Base	5. FUNDING NUMBERS C MDA903-90-C-0006 PE 0902198D
--	---

6. AUTHOR(S) Ronald L. Straight, Donna J. S. Peterson	
--	--

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Logistics Management Institute 6400 Goldsboro Road Bethesda, MD 20817-5886	8. PERFORMING ORGANIZATION REPORT NUMBER LMI-DC201R5
--	---

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Mr. David Berteau Chairman, Defense Conversion Commission and Principal Deputy Assistant Secretary of Defense (Production and Logistics) 1825 K Street, N.W., Room 316 Washington, DC 20006	10. SPONSORING/MONITORING AGENCY REPORT NUMBER
--	--

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT A: Approved for public release; distribution unlimited	12b. DISTRIBUTION CODE
--	------------------------

13. ABSTRACT (Maximum 200 words) <p>As the DoD reduces spending for military equipment and services, companies in the U.S. defense industrial base may attempt to replace a portion of lost domestic revenues with military export sales. This report examines the potential size of the export market for military exports and discusses whether that market is large enough to replace a substantial portion of the business base lost due to declining U.S. defense spending.</p> <p>Currently the U.S. exports \$18 billion of military items annually; about 75 percent comes from new production and 25 percent comes from inventory. If U.S. manufacturers hope to replace all business lost due to defense budget declines in order to maintain 1991 levels of defense business, they cannot merely maintain current export levels but must increase exports substantially each year for the next several years. The authors argue that increasing military exports substantially is unlikely for a number of reasons and conclude that, at best, military exports will be sustained at current levels.</p> <p>The report contains historical data on military exports, a brief history of export policy, and a discussion of the financing of military exports.</p>

14. SUBJECT TERMS Foreign military sales; FMS; Military exports; Defense industrial base; Downsizing	15. NUMBER OF PAGES 48
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL
---	--	---	----------------------------------