
Offsets In Defense Trade

Prepared by The U.S. Department of Commerce

[The following material is extracted from an August 1998 U.S. Department of Commerce study entitled, *Offsets in Defense Trade; A Study Conducted Under Section 309 of the Defense Production Act of 1950, as amended*. The report was produced by the Strategic Analysis Division in the Office of Strategic Industries and Economic Security of the Bureau of Export Administration (BXA). This is the third in a series of congressionally required annual reports on defense related offset agreements. (Excerpts from the first such report was published in the Fall of 1996 issue of *The DISAM Journal*, pp.30-56. The second such report was published in the Winter 1997-1998 issue of *The DISAM Journal*, pp. 65-92). A copy of the complete report is available through BXA. Phone: 202-482-4060; Fax: 202-482-5650; E-mail: <bbotwin@bxa.doc.gov>.

OVERVIEW

Legislation

In 1984, Congress enacted amendments to the Defense Production Act of 1950, as amended, which included the addition of Section 309. Section 309 required the President to submit an annual report on the impact of offsets on U.S. defense preparedness, industrial competitiveness, employment, and trade to the Committee on Banking, Finance, and Urban Affairs of the House of Representatives and, the Committee on Banking, Housing, and Urban Affairs of the Senate.

When Section 309 was first enacted, the Office of Management and Budget (OMB) was appointed as the interagency coordinator in the preparation of the annual offset report for the Congress. These reports were to be prepared in consultation with the Departments of Commerce, Defense, and Labor, and the Office of the United States Trade Representative. This interagency reporting requirement continued, with minor adjustments, until 1992, when Section 309 underwent major modifications. The interagency coordination role was then transferred from OMB to the Secretary of Commerce.

The Secretary was given authority to develop and administer regulations to collect from industry the offset data required for the report. This responsibility was later delegated to the Department's Bureau of Export Administration (BXA). A change was also made in Section 309, adding a sales reporting threshold previously cited in the National Defense Authorization Act for Fiscal Year 1991. The offset agreement threshold was reduced from \$50 million to \$5 million for U.S. firms entering into foreign defense sales contracts subject to offset agreements. On a per transaction level, firms report all offset transactions for which they receive offset credits of \$250,000 or more. [A copy of Section 309 can be found in Appendix A in BXA's 1998 *Offsets in Defense Trade* report. An itemized list of information that is collected annually from industry is located in Appendix B in BXA's 1998 *Offsets in Defense Trade* report]

PERSPECTIVES ON OFFSETS

Who Really Pays for Offsets?

Do offsets increase the price of the weapon system? The answer is almost always, yes; offsets increase the price of the weapon system by imposing added costs.

The cost of offsets is difficult to measure and varies greatly in different situations, but it can be substantial. For example, if a foreign subcontractor is substituted for an established U.S. subcontractor, the cost of the first 100 units the foreign subcontractor produces will (in theory) be higher than the last 100 units produced by the U.S. firm. The actual cost difference, including the cost of qualification, is dependent on the level of prior experience and know-how existing within the foreign firm and, ultimately, the volume of work to be performed. The foreign subcontractor will probably never reach the volume levels of the U.S. counterpart, and therefore, will have higher unit costs for the lower volume of units produced.

The foreign government may subsidize the foreign subcontractor by various methods, which lowers the cost to the U.S. prime contractor and the weapon system. Nonetheless, the subsidy is still a cost incurred by the foreign government and ultimately the foreign population, and therefore is just as real an offset cost had it instead been passed through by the U.S. prime.

The unit production cost curve starts at a high level with production of the first unit and then slopes downward at a decreasing rate for each additional unit until, at some point, it will start upward again. This is known as the marginal cost curve (i.e., cost of the last unit produced). The average cost of all units also falls as progressively cheaper units are produced. However, at some point, the marginal cost and average cost curves intersect, and this is the lowest average unit cost achievable using current technology, factory layout, and labor inputs. The least cost plant configuration can vary greatly by engineering design. For example, an auto assembly plant's lowest average unit cost may be engineered into the plant at about 200,000-250,000 vehicles per year

Military weapon-system production lines, such as aircraft, do not use mass production techniques, but instead design production to minimize cost related to maximum anticipated yearly deliveries. Also, the relatively small quantities ordered by the military raise the cost per unit, making overall cost more sensitive to changes in unit volume. Thus, the larger the order quantities the more dramatically the per unit cost falls.

The U.S. producer of the weapon system may subcontract additional work to the foreign subcontractor for the same weapon system on sales to other countries or sales or upgrades to the U.S. Defense Department. The greater volume will reduce the foreign contractor's costs. Also, the aftermarket, which can last 20-30 years into the future, can provide additional opportunities for the foreign subcontractor, certainly for those systems in his own country, but including bids for replacements in the United States. In addition, if the foreign subcontractor's performance is out-standing, the American prime may establish a longer-term relationship and use the firm on other projects as a primary source.

The United States also pays for offsets. Again, the volume of production is critical to cost structure across all part and component suppliers and production lines. The fact that the United States orders the most aircraft pushes the unit cost of aircraft down the cost curve. Additional unit cost savings can be achieved by exporting the system, which, of course, is the classic reason market-driven trade takes place at all. However, as discussed above, direct offset can quickly nullify these gains. Assuming offsets can be anticipated, especially now that many countries have formalized policies, the intelligent U.S. subcontractor would bid a higher price for a given part or component to begin with rather than risk losing money resulting from offsets. These added costs, though hidden, will be passed on to the U.S. Defense Department.

Non-defense indirect offsets are less distorting to U.S. weapon systems. However, they do present the U.S. exporter with administrative costs and the unnatural job of marketing a variety of goods for which he has no particular expertise. These costs must be recouped in the price of the weapon system to the foreign purchaser. Also, the widely distributed, mostly negative effects these indirect offsets have on U.S. competitor firms are largely untraceable and almost impossible to assess. Only anecdotal evidence exists, and while most of this evidence reflects a negative impact, a minor portion is also positive.

Another cost to the U.S. taxpayer is the publicly funded research and development that went into the weapon system, but not recaptured by the U.S. prime when exporting the weapon system to a foreign government. The Defense Department typically waives this cost. This policy affects exports that are offset as well as those that are not. However, with offsets some of the advanced technologies incorporated in the weapon system may be transferred to the foreign purchaser essentially free of charge. This issue needs further exploration.

Offsets penalize both the foreign purchaser and U.S. taxpayers. Then, why offset? If given the opportunity, foreign national governments prefer to spend national budgets domestically. By offsetting the high-priced import of a major weapon system, a government can redirect expenditures back into its domestic economy up to the value of the offset agreement. So, instead of spending the money abroad, it is actually spent at home. Moreover, the offset may also help promote or preserve an indigenous defense base, infuse new technology into the economy, or introduce domestic firms to potential export partners.

Co-production Agreements

In economic terms, co-production is perhaps the most inefficient and costly form of offset. Co-production puts a far heavier financial burden on the purchasing country than would the outright purchase of the weapon system. In spite of this, its justification is touted on national security grounds or national aspirations. Presumably, much, if not all, of the research and development work is already accomplished when a co-production agreement is negotiated. This would be a savings to the foreign co-producer. Depending upon the specific terms of the agreement, technical data may be transferred to the purchasing country with or without compensation so that a duplicate assembly facility can be established in the purchasing country. The details of part and component sourcing may also be negotiated.

While many nations may prefer self-sufficiency in armaments production, for almost all countries the cost is prohibitive. Implicit in a nation's decision to purchase foreign weapon systems is the cost of home production vs. cost of overseas purchase. This gives military trade an economic dimension. However, other national aspirations or internal politics sometimes interfere with the decision.

Co-production deprives the original producer of production volume, while creating a clone facility in a foreign country. The production volume of aircraft in the clone facility will almost certainly be (much) less than in the original producer's facility. This establishes a higher average cost structure in both the clone facility and in the original producer's facility, whose production volume decreases by an amount equivalent to that co-produced.

In the 1980s, the Japanese co-produced about 200 F-15s at an estimated 250 percent the cost of purchase from the U.S. producer. Is Japan more secure? That can be debated. Did they achieve their national aspirations? Perhaps, but the cloned facility had very limited market potential. Once production was finished, its useful life was over and it would require a new infusion of capital to restore viability in some other area.

Other examples abound. Japan's co-production of 130 F-2 (formerly the FSX) fighter aircraft (a hybrid of the F-16) may ultimately cost the country about \$100 million per plane vs. \$20 million per aircraft if purchased from the United States. Japan's economy is large enough to absorb this added cost, and presumably the experience will help their ambitions to develop a commercial aircraft industry. This remains to be seen. Additional co-production agreements for the F-16 with the European Participants Group (Belgium, Netherlands, Denmark, and Norway) and Turkey also resulted in cost penalties to the co-producer countries, while reducing business for the U.S. prime. Another co-production program in Egypt was completed in early 1998. Egypt had a co-production program for 555 kits of the M1A1 Abrams tank for final assembly, and is now trying, to convert the facility to commercial operations. In general, the more expensive the weapon system, the lower its overall volume is likely to be and the less economic sense it makes to co-produce.

Turkey recently eased its offsets policy (*Defense News*, June 29-July 5, 1998, page 4), in part to encourage more international arms traders to form joint ventures with domestic defense firms. While Turkey's objective remains the establishment of a stronger domestic defense infrastructure, the Turkish Government recognized that offsets as currently structured added costs and inefficiencies to weapon systems. It is hoped that this policy will generate foreign investment and an infusion of technology transfer. This may reduce future direct co-production type arrangements with their inflated prices.

Military Export Contracts

The U.S. State Department is responsible for issuing licenses for the export of defense items covered under the International Traffic in Arms Regulations (ITAR). In each of the last several years, State has issued about 45,000-50,000 licenses (for 4-year validation periods) with a total value ranging from \$20-30 billion. These licenses were issued to private U.S. firms to export

items covered by the “munitions list,” for what can be called commercial military exports. The foreign buyer could be a public or private entity.

The majority of State-licensed military export orders are written for less than \$1 million, *and most are between private firms*. The great majority of these fall below the offset reporting threshold. However, most of these likely do not include formalized offsets because of their generally low value and the involvement of private entities. Still, much of this business may include replacement parts or service items related to major weapon systems exported previously, which could have included offsets.

The average commercial military export license was for roughly \$600,000. However, the median (middle value) is much lower, at under \$100,000. A few licenses may be for over a billion dollars, although most of the higher values go the Foreign Military Sales (FMS) (i.e., government-to-government) route. Larger contracts are almost always negotiated with a foreign government, and are more likely to include offsets. It is not known how much of the \$20-30 billion is actually exported, but much of it is ultimately cancelled. Licenses are frequently acquired simply to have them ready should an emergency shipment become necessary. Also, it is often difficult to accurately plan four years out, but it is better to err on the high side and acquire a license for the greater estimate.

A review of FMS agreements, published by the U.S. Defense Security Assistance [Cooperation] Agency, indicates 8,672 FMS agreements totaling over \$65.6 billion were entered into between FY1993 and FY1996. Over the same period actual FMS deliveries equaled \$44.7 billion, indicating that many cancellations, perhaps as much as one-third of the business, probably have occurred or will occur. The average export agreement was for less than \$7.6 million. However, this average is several times as large as the median FMS value, which would actually place the great majority of the FMS agreements below our reporting threshold.

By comparison, BXA received reports on 173 offset agreements supporting export contracts valued at \$29.1 billion. These included both commercial and FMS agreements. The four-year average export contract was \$168.4 million, although this varied a great deal from one year to the next. This implies that a small percentage of the total FMS export contracts and a smaller fraction of the commercially licensed exports are offset. However, even the contracts that are offset are very large and represent at least an estimated 30-40 percent of the total dollar value of military exports.

This conclusion is reinforced by various known country thresholds at which formal offsets are implemented. Appendix D in BXA's 1997 *Offsets in Defense Trade* report included information on the export dollar value at which selected countries require offsets. The 15 cited thresholds ranged from Israel's low of \$500,000 to \$50 million for Taiwan. The average value was \$7.9 million and the median, \$1.7 million. Three thresholds were less than \$1 million.

The United Kingdom, which alone accounted for more than 30 percent of total new offset agreements between 1993 and 1996, has a high threshold of \$16 million. Britain is also one of the major destinations of defense products licensed by the State Department. Israel, with a lower

threshold, has a low percentage of new agreements (2.4 percent), but a high percentage of offset transactions (8.9 percent). Some of these transactions emanate from agreements entered into prior to 1993. Others could be from agreements beneath BXA's \$5 million reporting requirement.

Aerospace Dominates Offsets

Offset agreements are overwhelmingly tied to aerospace exports. With literally tens of thousands of parts and components per aircraft and an abundance of advanced technology, from the purchaser's view aerospace products offer ample opportunities for offsets. BXA's database (1993-1996) indicates that 91.1 percent of the dollar value of all new offset agreements (\$13.8 of \$15.1 billion) were written against aerospace exports. The aerospace export contracts these offset agreements referenced were 91.8 percent (\$26.7 of \$29.1 billion) of all the export contracts. The percentage of offsets aerospace export contracts averaged 51.6 percent.

Offset transactions told a similar story. Offset transactions referenced aerospace weapon system exports 92.7 percent (\$8.56 of \$9.23 billion) of the time. However, only 53.7 percent of offset transactions themselves were identified as aerospace products. This means that aerospace exports are frequently offset by non-aerospace products. The transaction breakout was \$4.96 billion aerospace, \$4.16 non-aerospace, and \$0.11 unknown products. If just aerospace exports are matched to aerospace transactions, the relationship is about 58 percent (\$4.96/\$8.56 billion).

It is also evident that a very high percentage of all exported military aircraft, engines, and missiles are offset. Estimates of aerospace exports published in the Aerospace Industries Association's 1998 *Facts and Figures*, indicate roughly \$14.8 billion of these systems were exported from 1993 to 1996. Judging from BXA's total of \$26.7 billion in export contracts that were offset over the same period with an average term of about seven years, it is apparent offsets played a major role in moving these items.

In addition to the \$14.8 billion in major system exports, AIA reported that \$18.9 billion in (military) parts and components were exported. Exports of major U.S. weapons systems generate a future flow of parts exported to the after market. A large (but unknown) portion of the parts trade is accounted for in this way. In addition, foreign production of new systems, and the after market for those systems also generates parts exports from the United States. However, the parts trade is understated because of the wide cross-section of industries that feed parts into aerospace systems (e.g., software, forgings, ammunition, tires, etc.), but that are not captured as such in the official trade statistics.

Effects of Defense Industry Consolidation on Offsets

Mega-mergers and consolidations within the U.S. defense establishment have reduced the number but increased the average size of companies reporting offset activity. Some companies continue reporting under their old names, and others report as divisions of the new parent corporation. Of the 32 companies reporting new offset agreements at any time during 1993-1996, 11 have now merged with others. These same 11 are also included among the 34 reporting offset

transactions. In 1993, 18 companies or divisions reported new offset agreements. In 1996, the number was 15, four of whom were now parts of larger firms.

Aside from reducing the number of firms reporting offsets, the consolidation trend could have more profound effects on offsets. Under one scenario, the stronger competitive position of merged U.S. defense prime contractors poses an increased threat to European defense firms. The stronger presence of U.S. firms and the shrinking global defense market could foster a more rapid consolidation among European defense producers and lead to a degree of isolation. One indication that this is already happening is the Eurofighter 2000, an effort by four European nations to reduce dependence on the United States. Consolidation in Europe could reduce the international market potential available to U.S. firms and in so doing reduce offsets.

However, rationalization and consolidation of defense assets have not proceeded at the European level. Rather, individual countries have done so primarily on their own, resulting in a surplus of defense assets, with numerous redundancies across Europe. A more likely scenario is that defense budgets will drop further, and consequently reduce the market for U.S. weapon systems. Such a drop would have little connection to consolidation.

Under a rosier scenario, company consolidations could extend across national borders and increase the participation of foreign entities in the development and production of new U.S. weapon systems. This could also occur by partnering or joint venturing, as well as by acquisition, with foreign entities. For example, the Joint Strike Fighter program seems to be evolving multi-nation program without offsets. Currently, the program has U.S., U.K., Dutch, and Canadian participation. In other areas, the U.K.'s General Electric Company recently acquired Tracor. In the last decade, the U.K.'s Lucas Aerospace (now part of Rolls-Royce) purchased Western Gear, and Rolls-Royce bought Allison Gas Turbine.

It's also conceivable the U.S. and allied foreign governments will encourage such developments, and combine defense budgets to develop future weapon systems. This would spread costs and benefits across borders, and help eliminate redundancies. Assuming all participants share in costs and profits, it would also provide incentives to market the system as widely as possible. Offsets would then be less of a factor, except in sales to third parties.

In another scenario the U.S. government could elect to develop and produce weapons domestically on national security grounds. This option may be a more expensive choice in light of the increased complexity and cost of the latest aircraft. It may also serve to increase offsets above current levels, particularly in aerospace defense trade, assuming a higher proportion of ultimate production of aircraft may be exported than in the past.

Historical Review, 1980-1996

The Office of Management and Budget (OMB) was responsible for reporting on offsets under the Defense Production Act (of 1950), Section 309, beginning in 1984. Acting under that authority in 1988, OMB tasked the U.S. International Trade Commission (ITC) to collect offsets data from defense prime contractors for the years 1980 through 1984. The collection required a

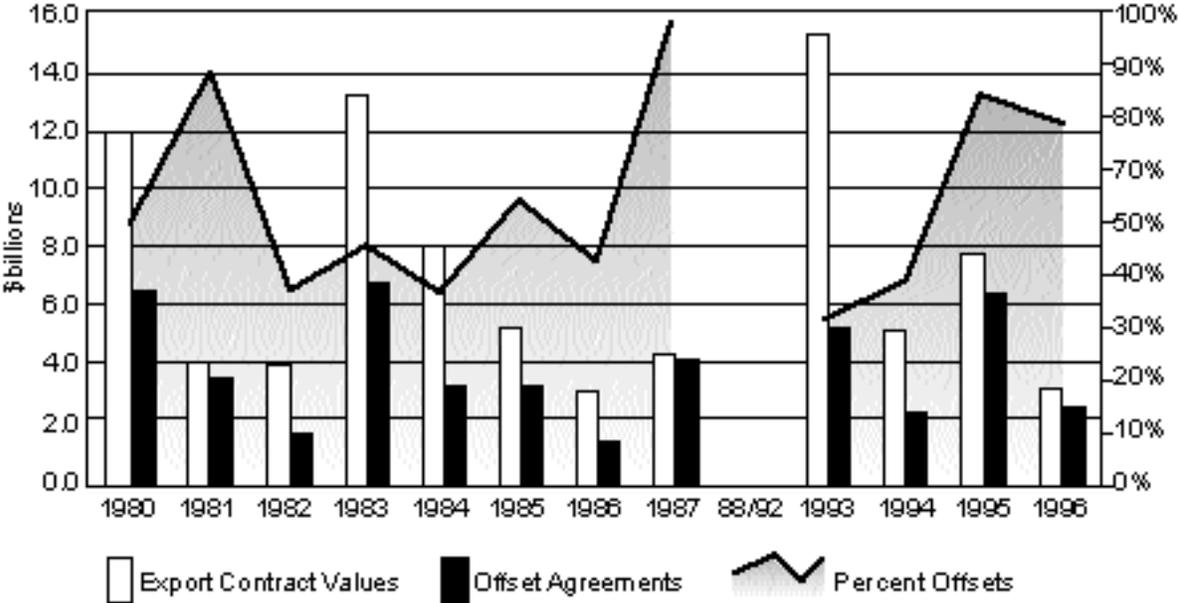
response from the prime if any military export sales contract valued at \$500,000 or more was countered by an offset agreement of any magnitude. ITC sent a mandatory survey to 52 defense prime contractors, of whom 36 returned completed surveys. A similar data collection, also covering 1980 through 1987, was made by the Commerce Department's Bureau of Economic Analysis for OMB a few years later.

BXA's offsets database differs from OMB's information in method of collection and minimum value reporting requirements. Military exporters are required to submit a report annually to BXA for any offset agreements (as opposed to export sales contract) valued at \$5 million or greater and/or offset transactions valued at \$250,000 or more. The export contract value is also reported, but its size is incidental. BXA has reports from 32 companies as opposed to OMB's 36 companies, which reported to OMB before defense downsizing and consolidation reduced the number of companies.

OMB published this information in December 1988 in their *Offsets in Military Exports* report. The OMB information was restated and summarized in the Commerce Department's first offset report, *Offsets in Defense Trade* established in May 1996. BXA combined the OMB information with offset data submitted by defense prime contractors for 1993 to 1996. No offset data was collected from 1988 to 1992.

Chart 1 includes OMB's offset data and that received by BXA. The data is presented in constant 1996 dollars using the Commerce Department's 1996 GNP deflator as calculated by the Bureau of Economic Analysis. Three elements are shown on the graph: the value of export sales contracts (the white bar); the value of offset obligations (the black bar); and the percent offset obligations to the value of export sales contracts (the line).

Chart 1. New Offset Agreements: Selected Years (in Constant 1996 Dollars)



Source: *Offsets in Military Exports*, OMB, and BXA's Offset Reporting Data

The chart shows the great changeability in annual data for all three variables. For example, the percentages of offset obligations to new export contract values have been less than 35 percent (1993), and greater than 98 percent (1987). In a year, just one or two large contracts can have a major impact. In 1993, an export contract of nearly \$6 billion was negotiated with Taiwan with limited offsets. If this particular sale were removed, the overall percentage of new offset obligations would jump from 34.5 percent to 52.1 percent in 1993. Similarly, removal of a major Middle Eastern sale that same year would push the offset obligation to nearly 70 percent.

Invariably, higher offset percentages are correlated with greater concentrations of offset activity in Europe and other developed nations. In both 1995 and 1996, European nations accounted, for over 80 percent of total new offset obligations and a majority of the export contracts. This is in contrast to less than 50 percent in the two prior years. However, for the latter two consecutive years the percentage of offsets remained greater than 75 percent for the first time.

The overall offset to export contract ratio for the eight years from 1980 to 1987 was 57 percent. This compares with 52 percent for the four years from 1993 to 1996. However, the cumulative average percent of obligations rose each successive year after 1993 as more activity was focused on Europe. This may indicate offset obligations over time converge around the 50-60 percent range. If the OMB data were broken into two consecutive four-year periods, both offset subtotals would range in the 50-60 percent range (i.e., 56 percent from 1980-1983, and 59 percent from 1984-1987).

STATISTICAL ANALYSIS

BXA Data 1993-1996

BXA now has four years of offset data. In deference to the reader, more graphics are utilized in this report to present this data. Also, greater emphasis is placed on analysis of four-year totals and averages. Year-to-year changes in offset variables are highly volatile and unpredictable. Longer time periods help to moderate this volatility and perhaps offer a truer picture of offset trends and impacts. However, key annual data will continue to be reported.

The four regions - Europe, Middle East, Pacific Rim, and Other Areas - used to present the offset data in the last two BXA offsets reports were selected on the basis of data then available and to protect company proprietary data. It is now apparent that this arrangement is no longer necessary, especially in 1995 and 1996, when European offsets overwhelmingly dominated the data. With four years of data, selected country data can now be referenced without disclosing company proprietary data.

Data Qualifications

The BXA data from 1993 to 1996 contains: 1) new offset agreements valued at \$5 million or more [Of 173 agreements, BXA received seven agreements for less than \$5 million and four others where no offset value was reported. These agreements do not significantly impact the overall totals.] 2) export contract values related to these new agreements, and 3) offset

transactions valued at \$250,000 or more completed during the reporting period. [Of 2,277 transactions BXA reviewed, 251 had actual values of less than \$250,000. Thirty-one transactions had negative values, which were mostly accounting adjustments to previous reports, or cancellations of reported transactions. There were also 17 zero actual value entrees, but most of these had large credit values. The effect of these 251 transactions was to reduce total, actual transactions by a net \$45.6 million, and increase credit transactions by \$330.3 million.]

Offset Transaction Analysis

<u>Description</u>	<u>#</u>	<u>Actual Value</u>	<u>Credit Value</u>
Negative Values	31	(\$64,888,000)	(\$64,896,000)
Zero Actual Values	17	\$0	\$152,376,000
Less than \$250,000	203	\$19,321,695	\$242,810,001
Net Total	251	(\$45,566,305)	\$330,290,001

Summary

During 1993 to 1996, 32 U.S. companies reported entering into 173 new offset agreements, with foreign governments equal to \$15.1 billion. They had an average term of 87 months, or 7.25 years. The agreements supported \$29.1 billion in export contracts, and were concluded with 28 countries to complete the offsets. In the aggregate, the offset agreements represented more than 52 percent of the export contract values.

A total of 34 U.S. companies reported 2,277 offset transactions valued at \$9.2 billion, for which they received offset credits of \$10.7 billion. These transactions were executed in 31 countries. About 38 percent of the value of the transactions were direct offsets, 58 percent indirect, and 4 percent unspecified. About 73 percent of the transactions' value were subcontracting activity purchases, or technology transfer. Roughly two-thirds of the transactions referenced offset agreements that predated 1993; the remaining third were against agreements struck in 1993 or later.

Concentrated Nature of Offset Activity

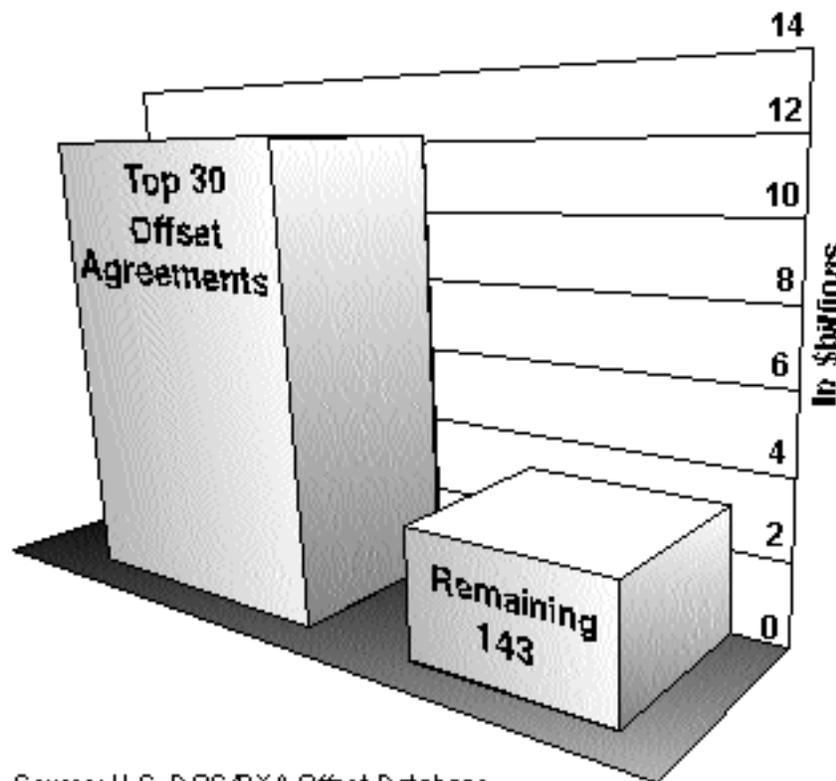
Five U.S. companies accounted for over 78 percent of the value of new offset agreements, and nearly 82 percent of export contract values. More than 70 percent of the new agreements' value were concluded with just five countries, and about 80 percent with just eight countries. The largest 10 percent of new offset agreements represented 68.5 percent of the total value of all new agreements, while the top 10 percent of export contracts were 72.5 percent of total export contracts. In addition, just 10 of 103 weapon systems referred to in the export contracts accounted for 65 percent of export contract values, and 64 percent of the value of new offset agreements.

Offset transactions are also concentrated. Five companies reported 80.5 percent of the total value, and nine reported over 91 percent. Also, five (of 32) countries accounted for 58 percent of all transactions, and eight for 72.5 percent. In addition, just five of the 150 different weapon

systems referenced in the offset transaction reports accounted for 53.4 percent of the total transaction value. The top 10 (of 922) offset recipients, including public and private entities, accounted for 24 percent of the value of total transactions.

Chart 2 compares the largest 30 offset agreements to the remaining 143 agreements. The number of agreements in each category is reflected on the x-axis and the dollar value (in \$billions) on the y-axis. The top 30 agreements totaled \$12.2 billion, or over 80 percent of all agreements. The other 143 agreements totaled \$3.0 billion. Offsets as a percentage of export contracts were about the same for the two groups; 51.7 percent for the largest 30 agreements, and 53.3 percent for the smaller 143 agreements.

Chart 2. Dominance of Large Offset Agreements



Source: U.S. DDC/EXA Offset Database

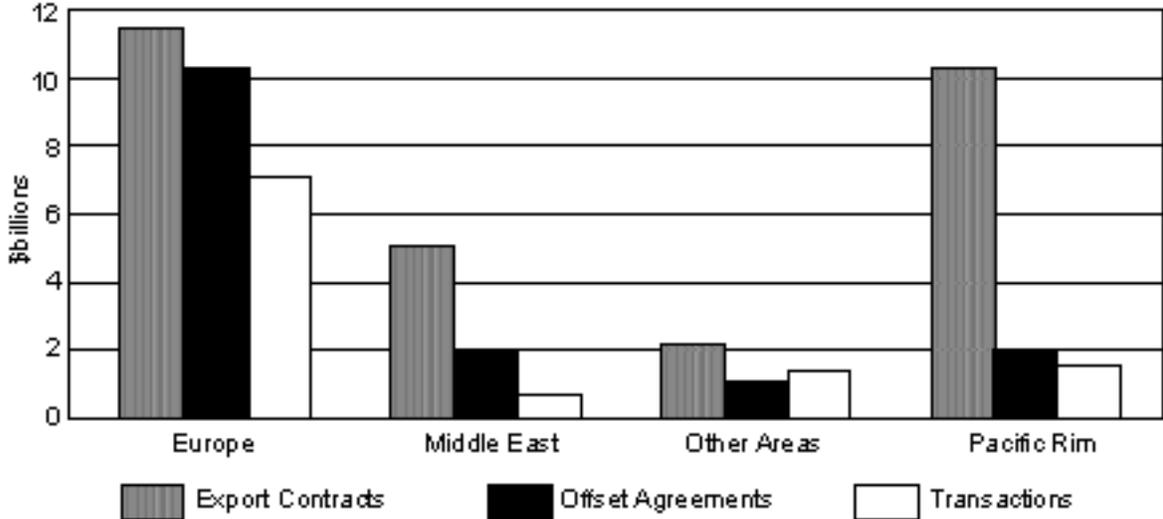
Note to Chart 2

Statistically, the mean of the 173 offset agreements was \$87.6 million, but the distribution has a very large average deviation of \$110 million and even larger standard deviation of \$236 million. This raises the question of whether these agreements could better be described as separate categories based on value as shown in Chart 2. Also, the median (or middle) value, between the 86th and 87th agreement, was about \$17.5 million, or only one-fifth of the mean, revealing the obvious: a very top-heavy distribution. If these parameters were based solely on the smaller 143 agreement group, the average deviation would drop to about \$15 million and the standard deviation to \$21 million. The mean would be just under \$22 million, and the median \$14.5 million.

Among regions Europe dominates the global totals. In four years, European countries entered into 94 new offset agreements valued at more than \$10 billion. The agreements countered about \$11.3 billion in export contracts. New offset obligations with European nations were more than 67 percent of the total dollar value of all new offset agreements. These were attributed to less than 40 percent of all new export contracts. Non-European areas collectively contracted to purchase \$17.8 billion in U.S. weapon systems, and countered these with \$5 billion in offset agreements. These offsets were only 28 percent of export contracts, in strong contrast to the 90 percent for Europe. Two large export contracts mentioned previously accounted for nearly \$10 billion (or 56 percent) of the non-European total export contracts, and each had low levels of offset requirements.

Chart 3 presents a four-year summary of offset-related defense trade on a regional basis. The chart includes export contracts, new offset agreements, and transactions for the regions, and clearly shows Europe's dominance in both new agreements and transactions, along with its proportionately smaller share of export contracts. The large 1993 export deals with Taiwan in the Pacific Rim and Saudi Arabia in the Middle East are also reflected on the chart.

Chart 3. Export Contracts, Offset Agreements, and Transactions by Region, 4-Year totals (1993-1996)



Source: U.S. DOC/BXA Offset Database

The Other Areas Region (i.e., Israel, Canada, Australia, and New Zealand) shows a greater value for transactions than new obligations. Since most transactions are based on offset agreements entered prior to 1993, this simply indicates a slow down in defense purchases and related offset activity during the 1993-1996 period. Of all the regions, only Europe appears to have fairly balanced proportions between new agreements and offset transactions, perhaps due to the large number of agreements and transactions that would seemingly smooth out distortions. However, it could also indicate Europe has stricter offset enforcement policies.

New Offset Agreements: Summary

Table 1 presents an annual summary of new offset agreements by region.

Table 1. New Offset Agreements, 1993 to 1996

<u>Region</u>	<u>Deals</u>	<u>Export Contracts \$millions</u>	<u>Offset Agreements \$millions</u>	<u>% Offsets</u>	<u>Terms Months</u>
1993					
Europe	14	2,985.0	2,338.1	78.3%	84
Middle East	4	4,143.9	1,462.1	35.3%	96
Other Areas	4	98.5	50.5	51.3%	83
Pacific Rim	7	6,717.7	943.8	14.1%	78
Total	29	13,945.0	4,794.4	34.4%	84
1994					
Europe	20	1,508.2	764.8	50.7%	88
Middle East	6	819.2	417.3	50.9%	88
Other Areas	14	549.5	358.4	65.2%	63
Pacific Rim	9	1,915.4	508.1	26.5%	72
Total	49	4,792.4	2,048.7	42.8%	78
1995					
Europe	26	4,944.3	5,159.2	104.4%	104
Middle East	2	68.7	26.4	38.4%	72
Other Areas	9	1,378.9	547.1	39.7%	76
Pacific Rim	8	1,010.1	301.3	29.8%	80
Total	45	7,402.0	6,034.1	81.5%	93
1996					
Europe	34	1,924.1	1,919.1	99.7%	104
Middle East	1	50.0	25.0	50.0%	90
Other Areas	8	206.6	106.6	51.6%	75
Pacific Rim	7	807.1	220.0	27.3%	53
Total	50	2,987.8	2,270.7	76.0%	92
4-Year Totals					
Europe	94	11,361.8	10,181.3	89.6%	98
Middle East	13	5,081.8	1,930.8	38.0%	88
Other Areas	35	2,233.5	1,062.7	47.6%	71
Pacific Rim	31	10,450.3	1,973.2	18.9%	71
Grand Total	173	29,127.3	15,147.9	52.0%	87

Source: U.S. DOC/BXA Offsets Data Base

The value of 1996 new offset agreements was down sharply from 1995, and well below the four year averages. In 1996, reported new agreements of \$2.27 billion supported \$3 billion in new export contracts. New offset agreements were down over 60 percent from the \$6 billion reported in 1995, and more than 40 percent below the (four-year) average of \$3.8 billion. Europe was again the dominant player, with \$1.92 billion (or 85 percent) of the 1996 new agreement total. Europe's new offset obligations represented almost 100 percent of the export contracts (\$1.92 billion) they referenced. This percentage was down slightly from the 104 percent Europe logged in 1995. The 1995 agreements' data was unusual in that it was dominated by three very large offset agreements U.S. firms negotiated with European nations. These three agreements alone were nearly two-thirds of that year's total.

Worldwide, new offset agreements as a percent of export contract values fell to 76 percent from about 81 percent in 1995. The 1996 figure, however, is considerably higher than the four-year average of 52 percent. The 1995 and 1996 percentages of offsets to export contract values were the third and fourth highest levels recorded since 1980. The large differences in these numbers are explained in part by the major regional and national differences in offset requirements, combined with the apparent random occurrence of export sales to any of those places.

As part of the offsets reporting requirement, U.S. prime contractors were requested to provide the name and title of the signatories to the new offset agreements. Of the 173 new agreements reported from 1993-1996, 116 include foreign signatories information. Table 2 lists the number of signatories that were foreign companies, and those that were foreign government entities, either civil or military.

Table 2. New Offset Agreements Signatories by Category

Foreign Company	9	7.7%
Foreign Government - Civil	54	46.6%
Foreign Government - Military	53	45.7%
Total	116	100%

Source: U.S. DOC/BXA Offsets Database

These organizations ranged from very large to small firms, and included several dozen foreign government agencies, mostly from South Korea, Australia, and Greece. Government entities were about evenly split between defense and civilian agencies. Some countries, such as Israel and the Netherlands, had military subdivisions located within civilian ministries that were listed as signatories. These were counted as civilian agencies. Government entities were listed under various names, such as the Ministry of Defense, Ministry of Economic Affairs, Department of Industrial Development, Committee for Aviation and Space Industry Development, and several scientific research institutes.

Military entities comprised 46 percent of the signatories while non-military signatories totaled 54 percent. The non-military entities were either foreign companies or civil government entities. While the new agreements reports received by BXA did not include the split between direct and indirect offsets, based on country transactions data no correlation was evident between the level of direct offsets and the foreign signatory's affiliation to military or civilian government agencies.

Table 3 presents signatory information for selected countries. The countries shown represented about \$9.1 billion of the value of all new offset agreements, or almost 60 percent. Offset transactions for these countries totaled \$4 billion, which by comparison is only 43 percent of all transactions, which indicates this percentage will increase in the future. However, because of the presence of the United Kingdom, Israel, and South Korea, these countries have a higher incidence of direct offsets at \$1.96 billion (about 50 percent) than contained in the overall figures (38 percent), which implies that direct offsets will also increase.

Table 3. Selected Country Signatory Profiles

<u>Country</u>	<u>Total # of Agreements</u>	<u>Foreign Signatory</u>		<u>Affiliations</u>	
		<u>Military</u>	<u>Civil</u>	<u>Private</u>	<u>Unknown</u>
United Kingdom	19	15	1		3
Netherlands	13		12		1
Switzerland	5	1	2		2
Israel	16	1	7		8
South Korea	12	6	2		4
Canada	13	2	8	1	2
Totals	78	25	32	1	20

Source: U.S. DOC/BXA Offsets Database

Offset Transactions

Table 4 summarizes offset transactions from 1993-1996. During these four years, 34 companies reported 2,277 transactions to 922 different offset recipients in 31 different countries. [In addition to the 31 separately identified countries, a small number of transactions (\$45.7 million or less than 0.5 percent) were reported for NATO, the European Participating Group (Belgium, the Netherlands, and Norway), and for Sweden/Norway combined.] The transactions referenced 150 different weapon systems. The value of these transactions was \$9.2 billion, with a credit value of \$10.7 billion. About two-thirds of the transactions were based on offset agreements written before 1993. Of the 103 weapon systems in new offset agreements in the BXA database (1993 and later), 78 have reported transactions.

Table 4. Offset Transactions Summary, 1993-1996

<u>Transaction Data</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>4-Year Total</u>
# of Companies Reporting	23	21	20	21	34
# Reported Offset Transactions	493	550	667	621	2,277
# of Different Countries Reported	26	25	25	25	31
# of Different weapon systems	63	61	73	78	150
# of Different Transaction Recipients	259	318	373	367	922

Offset Transactions by Region

Europe	296	355	410	401	1,462
Middle East	16	22	36	30	104
Other Areas	82	94	161	126	463
Pacific Rim	45	79	60	64	248

Offset Transactions by Region (in \$millions)

Actual Values: Total	\$1,814.9	\$1,891.1	\$2,661.0	\$2,862.4	\$9,229.4
Europe	\$1,377.1	\$1,149.5	\$1,767.2	\$1,828.9	\$6,122.7
Middle East	\$53.3	\$47.3	\$135.5	\$217.8	\$453.9
Other Areas	\$211.7	\$282.3	\$484.6	\$357.9	\$1,336.5
Pacific Rim	\$172.8	\$412.0	\$273.7	\$457.8	\$1,316.3
Credit Values: Total	\$2,155.1	\$2,161.5	\$3,333.4	\$3,066.9	\$10,716.8
Europe	\$1,609.1	\$1,277.4	\$2,076.1	\$2,117.2	\$7,079.8
Middle East	\$116.7	\$109.9	\$159.3	\$229.6	\$615.5
Other Areas	\$249.9	\$283.6	\$481.0	\$358.2	\$1,372.7
Pacific Rim	\$179.4	\$490.5	\$616.9	\$361.9	\$1,648.7

Source: U.S. DOC/BXA Offsets Database

European countries accounted for 64.2 percent of the actual value and 66.3 percent of the credit value of total transactions. The top five European countries - Finland, United Kingdom, Switzerland, the Netherlands, and Spain - accounted for 51.3 percent the (actual value) world total and almost 70 percent of the European total. Israel, South Korea, Turkey, Germany, and Canada, along with the five listed European nations, make up the top 10, and collectively account for nearly 80 percent of the world total. NATO countries accounted for \$3.95 billion (43 percent) of the transactions value.

In 1996, a total of 621 offset transactions valued at \$2.86 billion were reported, with a credit value of \$3.07 billion. The 1996 values were the largest for transactions for the four years, and capped off four years of steady increases. The 1996 value was almost 8 percent more than 1995 values, although this was not as dramatic as the 40 percent increase observed between 1994 and 1995.

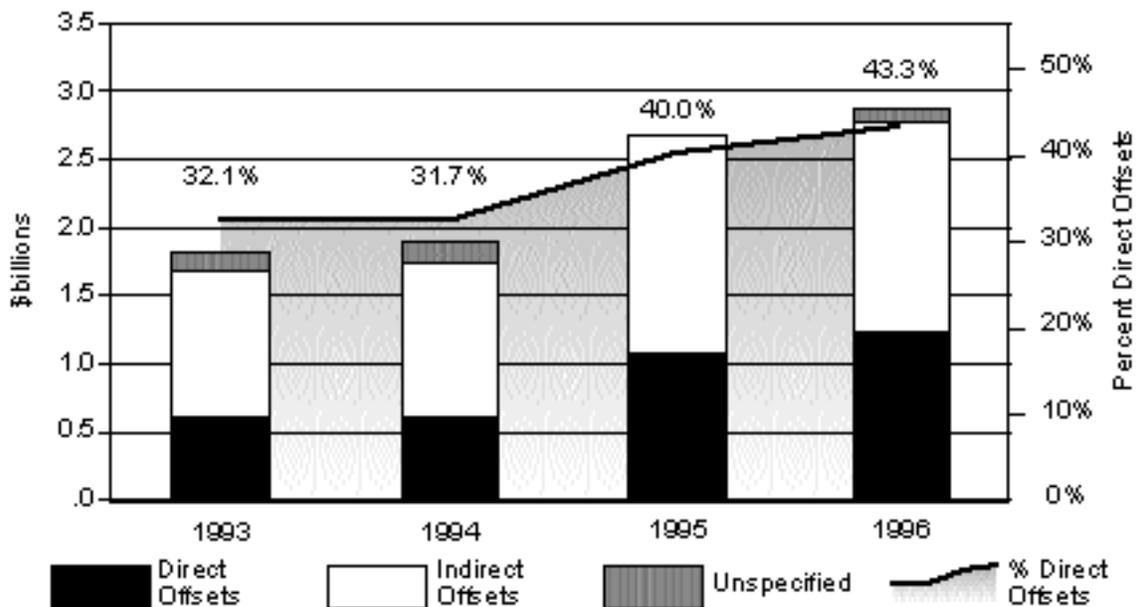
European nations accounted for the bulk of the value of offset transactions for the fourth consecutive year; in 1996 about 64 percent were with Europe. Direct offset transactions rose to about 43 percent in 1996, up from the 40 percent recorded the prior year. This was largely accounted for by substantial increases in subcontractor activity in Europe, especially in the United Kingdom, and a very large jump in direct technology transfer to the Pacific Rim. The European increases in subcontractor activity were moderated somewhat by a large decrease in the “Other Areas” region (Israel, Canada, and Australia).

The 1996 offset transactions reports were based on 78 different exported weapon systems seven of which appeared for the first time.

Offset Transactions by Type

From 1993 to 1996, 37.8 percent of the offset transactions were direct, 58.2 percent were indirect, and 4 percent were unspecified. Chart 4 shows offset transactions by type of offset for each year from 1993 to 1996. Along with total transactions, the value of direct transactions rose each year. Total transactions increased most sharply between 1994 and 1995, when they rose from \$1.89 to \$2.66 billion, a 41 percent jump. That year very steep increases were reported for both the United Kingdom and Israel. Both nations had a high level of direct aerospace offsets, which is why direct offsets shot up from about 32 to 40 percent that year. Direct offsets rose again in 1996 for the same reason.

Chart 4. Offset Transactions, Direct and Indirect (1993 to 1996)



Source: U.S. D OC/BXA Offsets Database

The absolute increase in 1995 in direct offset transactions was over \$400 million (\$600 million to \$1.06 billion), a 77 percent increase. Indirect offset transactions also rose by a substantial amount from \$1.13 to \$1.6 billion (up 42 percent), which partly balanced out the direct increases. The nearly \$500 million jump in indirect offsets was due to large increases in transactions from Finland, Switzerland and Malaysia.

Countries varied widely in how offset transactions were allocated between direct and indirect. The allocation was often closely linked to the size of the country's indigenous aerospace sector. Generally, countries with established aerospace sectors tended to fulfill offsets with aerospace and these were most often direct. In fact, almost two-thirds (63.1 percent) of all aerospace products, transactions (\$3.13 of \$4.96 billion) were direct offsets. Moreover, aerospace products accounted for 90 percent of all direct offsets. This is entirely consistent with the 90 percent plus exports of aerospace weapon systems that offset transactions refer back to.

About 29.9 percent of aerospace products offsets (\$1.48 of \$4.96 billion) were indirect, and the remaining seven percent (\$348 million), unspecified (i.e., direct or indirect portions unknown) transactions. Total aerospace product offset transactions (\$4.96 billion) represented 53.7 percent of all transactions (\$9.23 billion). About \$49 million (1 percent of the total) of aerospace product transactions referenced to non-aerospace weapon system exports; this accounted for 7.4 percent of the \$662 million in transactions referenced to non-aerospace system exports. Countries with smaller aerospace sectors tended to offset more frequently in non-aerospace areas, and most of these transactions were indirect. Offset transactions identified as non-aerospace products accounted for about 70.4 percent of total indirect offsets (\$3.78 of \$5.38 billion). Indirect aerospace transactions accounted for most of the remainder (27.6 percent) and the unknown industry category the rest (2 percent). The \$368 million in unspecified offset transactions were mostly aerospace products (94.8 percent). Table 5 summarizes the above information.

**Table 5. Offset Transactions by Industry Group and type
1993-1996 Summary (Actual Values)**

<u>Industry Groups</u>	<u>Direct Offsets</u>		<u>Indirect Offsets</u>		<u>Unspecified</u>		<u>Totals</u>
	<u>\$billions</u>	<u>%</u>	<u>\$billions</u>	<u>%</u>	<u>\$billions</u>	<u>%</u>	
Aerospace	\$3.128	89.7%	\$1.483	27.6%	\$ 348	94.8%	\$4.961
Non-Aerospace	\$0.358	10.3%	\$3.783	70.4%	\$.019	5.2%	\$4.160
Unknown	_____	_____	\$0.109	2.0%	_____	_____	\$0.109
Totals	\$3.487	100%	\$5.375	100%	\$0.367	100%	\$9.229

Source: U.S. DOC/BXA Offsets Database

Eighteen countries (of 31 total) had offset transactions exceeding \$100 million during the 1993 to 1996 period. Table 6 lists these 18 countries with percentage information shown by

industry category and type offset. These 18 countries accounted for 95.8 percent of total transactions (\$8.84 of \$9.23 billion). The five countries with the highest value of transaction Finland, Britain, Israel, South Korea, and Switzerland. The 18 countries are ranked on Table 6 by percent aerospace transactions of total transactions. All 18 countries had aerospace transactions. Australia is ranked first with 87.2 percent of reported transactions in aerospace related products.

Note that 34 percent of Australia's total transactions are direct transactions of aerospace products. Another 11.3 percent of the Australia's transactions are direct non-aerospace products, for a country total of 45.3 percent directs. Not all countries' category totals add to 100 percent (Taiwan for example) because of the unknown industry category, which is not shown on Table 6. All unknown industry transactions, however, were indirect offsets and represented only 1.2 percent of the total transactions.

**Table 6. Offset Transactions by Type and Country
Aerospace and Non-Aerospace, by Percent, 1993-1996**

<u>Country</u>	<u>Aerospace Offset Transactions</u>				<u>Non-Aerospace Transactions</u>			
	<u>%</u>	<u>%</u>	<u>%</u>	<u>Total</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>Total</u>
	<u>Direct</u>	<u>Indirect</u>	<u>Unspec.</u>	<u>%</u>	<u>Direct</u>	<u>Indirect</u>	<u>Unspec.</u>	<u>%</u>
Australia	34.0	29.9	24.3	87.2	11.3	1.4		12.8
Belgium	82.0	2.2		84.2		15.8		15.8
Israel	56.6	7.3	14.9	78.7	0.1	20.8		21.0
Taiwan	0.4	77.4		77.8	9.75	5.0		14.7
Denmark	46.6	27.9		74.4		25.6		25.6
U.K.	57.6	15.9		73.5		26.5		26.5
Turkey	36.9	31.0		67.9	1.2	30.9		32.1
France	21.3	43.6		65.0		35.1		35.1
Spain	57.2	0.8	5.8	63.7		36.2		36.2
S. Korea	34.3	25.8	3.3	63.5	33.2	3.2	0.1	36.6
Canada	3.1	39.9	5.3	58.3	5.6	36.1		41.7
Netherlands	34.2	4.5	18.8	57.4	0.1	42.5		42.6
Germany	29.2	17.3		46.4	5.8	47.6		53.4
Switzerland	26.6	11.8		38.3		59.0		59.0
Norway	17.1	17.6		34.7		52.1	13.3	65.3
Finland	20.9	9.4		30.2		68.5		68.5
Greece	18.3	7.9		26.1	0.7	72.3		72.9
Malaysia		12.8		12.8	2.4	68.6		70.9
All Countries	33.9	16.1	3.8	53.8	3.9	41.0	0.2	45.1

Source: U.S. DOC/BXA Offset Database

Twelve of the 18 countries had more than half the value of their offset transactions in aerospace products; 10 had more than 60 percent, including three of the top five; and six countries, including the United Kingdom and Israel of the top five, had more than 70 percent in aerospace. For all countries, including those not listed on the table, aerospace transactions averaged 53.8 percent.

The relative share of aerospace transactions was highest in 1994, when it exceeded 60 percent. However, direct offsets were at a four-year low in 1994 at less than 32 percent. That year Britain and Israel were not in the top five and Taiwan transactions rose rapidly due to the previous year's large export sale. The aerospace share of total offset transactions' was about per 51 per cent in 1993 and 1995, and rose to 53 percent in 1996. Direct offsets in the aerospace category represented 33.9 percent, compared with only 3.9 in the non-aerospace sector. Six countries showed less than half of their aerospace transactions as direct (Australia, Taiwan, France, Canada, Norway, and Malaysia).

Indirect credit values were generally higher relative to actual values than were credit values for direct transactions. While indirect credit values were 24.4 percent higher than their reported actual values, direct credit values were only 12.1 percent higher. Credit values for aerospace indirects (\$1.92 billion) were 29 percent higher than actual values, although most countries were well below the 29 percent figure. Five countries - Taiwan, France, Norway, Portugal, and Israel accounted for nearly all of the higher value. Credit values for direct aerospace transactions were primarily 1.3 percent higher than actual. Many countries showed credit values that were smaller than actual values. In comparison, non-aerospace credit values were 23 percent higher than actual values for indirect transactions, while direct, from a very small base, were slightly more than twice as large.

Direct Offsets May be Slightly Understated

Direct offsets may be slightly understated because of the hidden "unspecified" transactions, which could be mostly direct. About 95 percent of the unspecified offset transactions (\$348 of a total of \$367 million) were aerospace products. About two-thirds of total aerospace transactions were direct offsets. If the unspecified offsets follow this pattern, they would increase overall direct transactions by 2 or 3 percent.

This does not negate assertions in the two previous BXA offset reports that indirect offsets have increased. If the same logic is applied to the 1988 OMB report on offsets, it may actually reinforce the assertion. The OMB report stated that during the eight years (1980-1987) direct offsets were 36.8 percent; indirect were 41.3 percent; and unspecified were 21.9 percent. If the two-thirds rule is applied to the unspecified portion, then over 50 percent of the OMB total transactions would be direct. If the unspecified were simply made proportional to the known direct and indirect, the OMB direct transaction value would still be over 47 percent, while the BXA proportional split would be 39.3 percent.

Also, it appears logical that direct offsets should be declining. With falling defense budgets and more countries shrinking their defense industries, the opportunities for direct offsets have

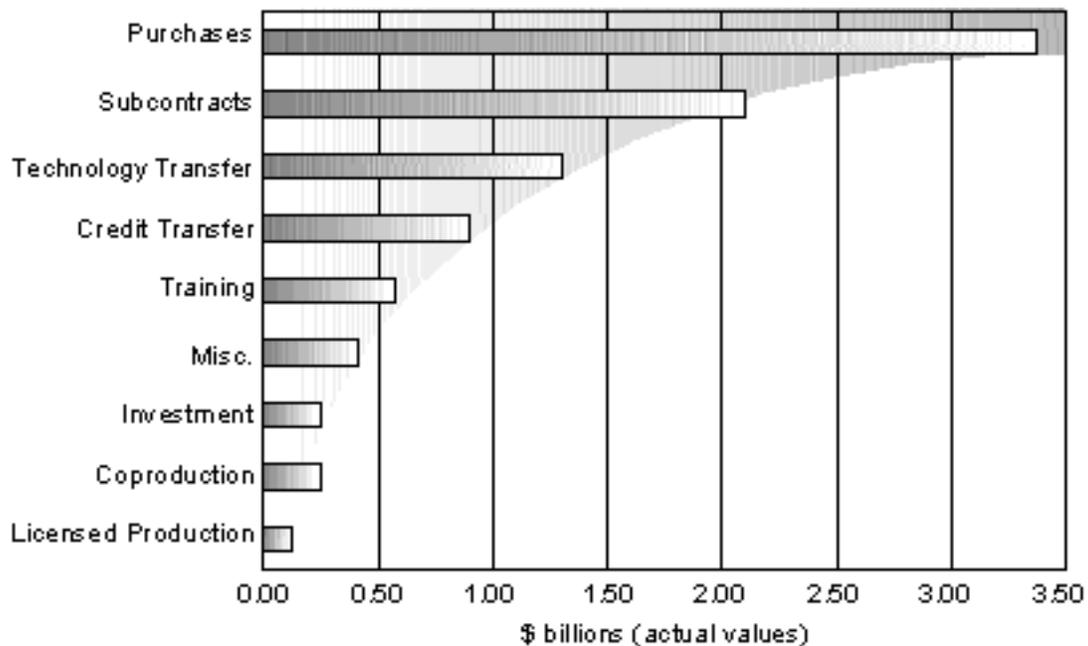
declined. Moreover, aerospace product exporters may prefer indirect offset transactions, which are less disruptive to their companies.

Note: Co-production agreements with Japan and other countries are not included in the BXA database. Co-production is direct and would increase the direct total substantially.

Offset Transactions by Description

Chart 5 shows the breakdown of offset transactions for 1993-1996 by method of fulfillment. Purchases, subcontracts, and technology transfer (in that order) dominated offset transaction activity (actual values). Their combined values (\$6.74 of \$9.23 billion) represented 73.1 percent of the four-year total of offset transactions. Purchases (\$3.36 billion), all indirect, were more than one-third (36.5 percent) of total offsets, while subcontracts (\$2.09 billion), all direct, were 22.7 percent of the total. Technology transfer was \$1.29 billion (14 percent of total). Credit transfers totaled \$900 million and were just under 10 percent of the total.

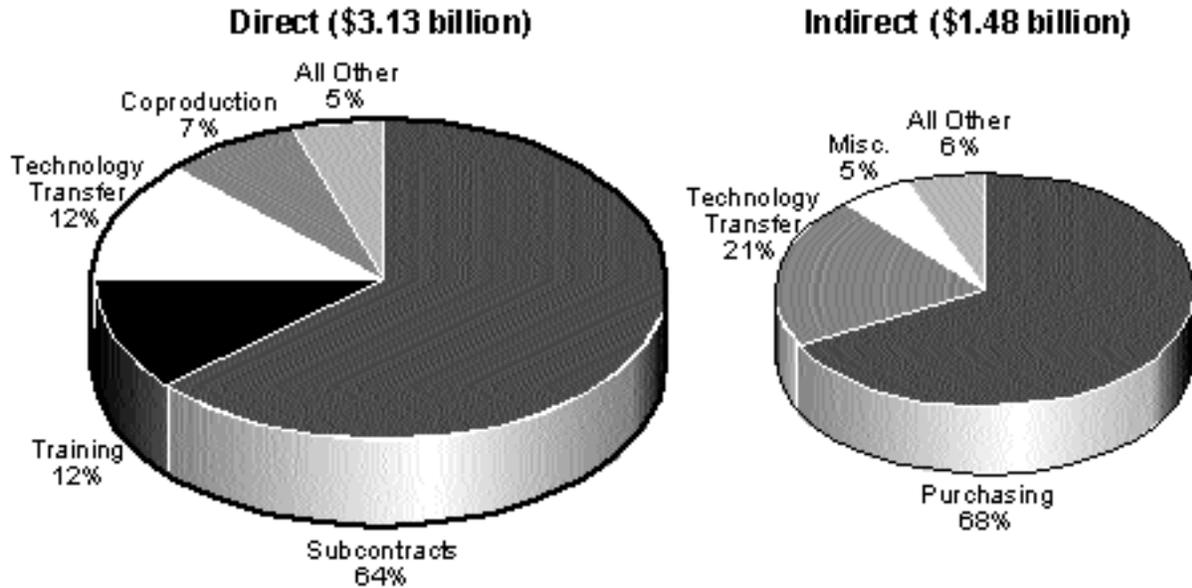
Chart 5. Offset Transaction Descriptions, 1993-1996



Source: U.S. DDC/BXA Offset Database

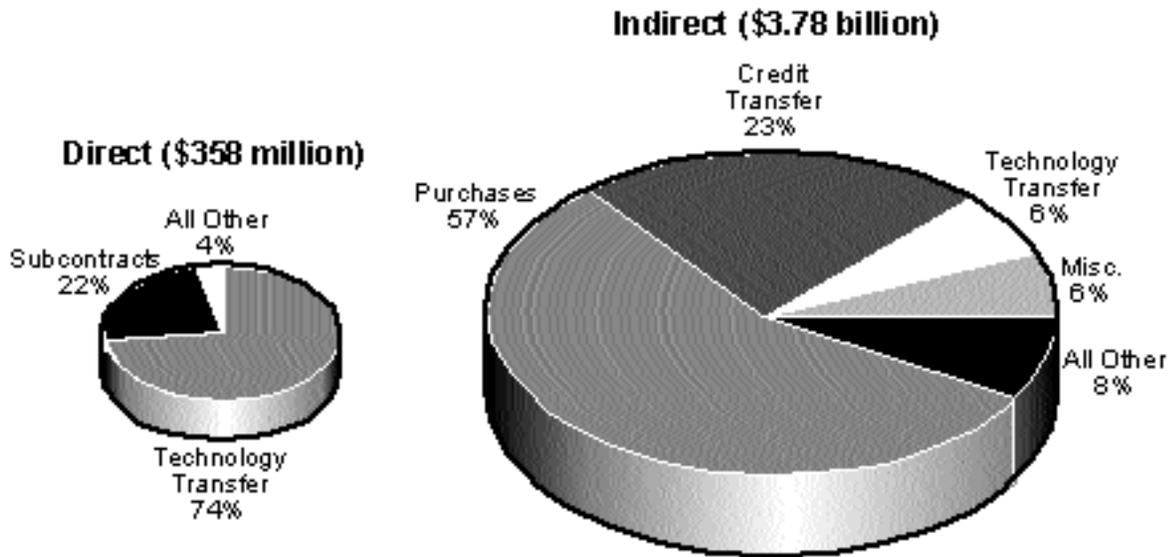
Purchases accounted for more than half of the number of all transactions (1,209 of 2,277), averaging about \$2.78 million per purchase. Individual purchase transactions could be bundles of items, such as cellular phones, or single items such as an oil rig. More expensive purchases included computer software, a cable-laying vessel, and medical supplies. Some of the less expensive purchases were food stuffs and wire cutting equipment.

Chart 6. Aerospace Offset Transactions by Type and Description, 1993-1996



Source: U.S. DOC/BXA Offset Database

Chart 7. Non-Aerospace Offset Transactions by Type and Description



Source: U.S. DOC/BXA Offset Database

Subcontracts were a distant second with 477 reported transactions, but the average transaction was considerably higher at \$4.39 million per subcontract. There were 189 technology transfer transactions and these averaged \$6.82 million. Only 48 credit transfer transactions were reported, and these averaged \$18.75 million.

In terms of credit values, the profile by offset description is about the same, although the top three categories are each somewhat less. The combined percentage of the top three credit values was 68.2 percent instead of the 73 percent recorded for actual values. The categories with the largest differences between actual and credit value were investment (plus 99 percent), miscellaneous transactions, which included mostly marketing or business assistance (plus 61.5 percent), and training (plus 43.5 percent). For all categories, credit transaction values were \$1.49 billion more than actual values, or about 16.1 percent higher. The three with the largest multiples mentioned above represented about half the increase (\$746 million), although their actual total was only 13.3 percent of overall actual transactions.

Charts 6 and 7 present offset transactions by type and description for the aerospace and non-aerospace sectors. Transactions not specified as either direct or indirect (\$368 million) and transactions of unknown industry sector (\$109 million) are not included in the charts. Together these transactions accounted for about 5 percent of the total.

Chart 6 shows direct and indirect aerospace transactions. About two-thirds of direct aerospace offset transactions (\$1.99 of \$3.13 billion) were subcontracts. Subcontracts may conceal the partial involvement of licensing, technical data exchange, training or know-how transfer needed to establish qualified subcontractors. These additional costs vary from country to country and may be quite low for countries with strong aerospace infrastructures. The United Kingdom and Israel accounted for more than half the subcontracting activity, and both countries have strong aerospace subcontractors. Also, over 99 percent of both U.K. and Israel's total direct aerospace offsets were subcontracts. It appears these countries are motivated to maintain their defense infrastructures. Germany had over 83 percent of its direct transactions in subcontracts and France had 100 percent, although the French quantity was small relative to indirect offsets. Nineteen other countries had subcontract activity, but all were small quantities.

Other direct transactions included training and technology transfer, each about 12 percent. Training transactions \$380 million. These were predominantly reported in Finland, South Korea, Turkey, and the U.A.E., which accounted for about 88 percent of the total. Eight other countries shared the rest. Technology transfer totaled \$367 million. Finland, Spain, and Switzerland accounted for about 77 percent of these offsets and nine others made up the rest.

Indirect aerospace offset transactions totaled \$1.48 billion, slightly less than half of the directs. Sixty-eight percent (\$1 billion) were purchases, the indirect counterpart to direct subcontracts. Leading countries included Britain, South Korea, Canada, and Turkey. These four accounted for almost 48 percent of the total. An unknown portion of these were defense-related. Technology transfer was the only other significant offset among indirect aerospace transactions, making up 21 percent. Over 90 percent of reported technology transfer were accounted for by just three countries: Taiwan, Finland, and South Korea.

Chart 7 shows non-aerospace transactions. The direct transactions were small at only \$358 million. These were predominantly technology transfer (\$265 million) and subcontracts (\$79 million). South Korea was the major factor in the technology transfer offsets, while Australia, Taiwan, and Germany dominated the subcontracting activity.

The indirect non-aerospace transactions were more than ten times greater than the direct, and were valued at \$3.78 billion. These were mostly purchases and credit transfers. The purchases (\$2.13 billion) included activity in nearly 30 countries. Finland, Switzerland, Greece, Germany, and Spain accounted for more the 60 percent of the total. Finland and the United Kingdom dominated credit transfers (\$872 million). Technology transfers were a distant third at \$239 million. Finland, Malaysia, and the Netherlands dominated these.

EUROPE AND OFFSETS

Overview

As cited earlier, Europe by far demands the most offsets on U.S. military exports. European countries accounted for over two-thirds of all new offset agreements during the 1993-1996 period. Just three European countries, the United Kingdom, the Netherlands, and Switzerland, accounted for 55 percent of all new agreements. And, in the final two years of the period, all of Europe accounted for more than 85 percent of the total.

Why is Europe so dominant in offsets? Part of the answer is that European countries, among them our NATO allies, have long been the major purchasers of the newest and often most expensive weapon systems available from the United States. In addition, Europe has a large overall defense market and requirement for sophisticated weapon systems. Offsets also have a historic basis in this trade, and they seem to have a momentum of their own. Moreover, most European nations demand particularly high levels of offsets relative to the value of the imported weapon system. This is a common practice among more advanced economies. Offsets can make good political sense by redirecting what would otherwise be large international outflows back into the domestic economy. In so doing, they may also promote technology transfer, supplement defense infrastructure, or provide commercial business opportunities. Almost all European (and other) countries have adopted formalized offset policies.

To better understand the motivation behind European offset demands, it is useful to examine the political arena as well as the economics of the European defense industry. In the short run, over capacity in the European defense industry remains a dilemma. Despite reductions in defense expenditures, European public policies have maintained an unsustainable number of defense companies.

While consolidation of the defense sector proceeded quickly in the United States, it proceeded slowly in Europe. Only Britain appears to have downsized its defense industry extensively. However, Britain maintains a formal policy of 100 percent offsets, which they call "industrial participation." The British policy appears primarily targeted at the United States, the chief source of its military imports. The policy's implementation reflects an effort to get some of the subcontract business on purchased systems, as well as to balance bilateral defense trade with the United States.

Britain is following the same approach as the United States and many other countries with large defense establishments that view exports of defense goods as a method to maintain defense infrastructure, and take pressure off scarce public expenditures. The persistent U.S. defense

surplus with Britain and other countries, and the fact that the United States has the world's singularly largest defense market, therefore, have long been points of contention.

Other European countries are driven by similar considerations, but have not followed Britain's lead in downsizing. In many cases, political considerations stalled mergers. Defense contractors remain under minimal pressure to merge or improve efficiency, either because they are state owned or because government supporters keep business coming their way. In addition, job retention is a bigger issue in Europe than in the United States, and often receives government support or protection beyond its economic justification. National sovereignty issues and pride have also inhibited cross-border cooperation.

These basic circumstances compel the Europeans to continue the practice of offsets in negotiating major weapon agreements. It has become increasingly difficult for U.S. companies to sell to the Europeans without some form of counter compensation. European governments have pressured each other in the past several years to purchase defense equipment from European companies before considering American or other options. Even countries that do not have large industrial bases are encouraged to purchase European defense equipment for the economic good of the European Union.

In brief, the justification for offset demands by European nations can be condensed into five basic arguments:

1. the traditional national security argument;
2. maintenance of domestic defense industrial infrastructure;
3. redirection of large public disbursements for imported weapons back into domestic economy;
4. an American trade surplus in defense trade; and
5. lack of international agreements governing defense trade.

These arguments will be discussed in more detail in the sub-sections that follow. On close examination, they are not entirely persuasive. In the final analysis, offsets in defense trade are permissible under international trade rules, and therefore, they occur.

The National Security Argument

Do offsets promote national security? If offsets promote national security, why do nations vary so much in their offset demands and percentage requirements? Why do some nations, including several with major external threats at their borders, require few offsets? Also, why do thresholds at which offsets kick in vary from less than \$1 million to over \$50 million for different nations? Europe's security is linked to the NATO alliance. How can offsets, which raise the price tag of weaponry, create redundancies and inefficiencies, and distort trade, contribute to this alliance?

A pillar of national security in today's world is deterrence. Advanced weapon systems, which provide a technology edge over potential enemies, contribute to this deterrence regardless of the weapon's origin. Nations that purchase American weapon systems obviously do so for the national security benefit, not to book more offsets. Moreover, it is almost always cheaper for most nations to import these systems than to develop and produce them domestically. Coproduction agreements have repeatedly demonstrated this fact.

Also, few nations can afford the cost or have the capability of maintaining a technological edge over their potential adversaries for a protracted period. This, along with other considerations, promotes collective security among friendly nations. It also promotes defense trade between allies in advanced weapon systems as a cheaper alternative to doing everything domestically. Offsets are clearly not needed to achieve this security, although in the eyes of the purchaser offsets may make the import more attractive.

A case can also be made that offsets marginally reduce national security by misallocating economic resources of both trading partners. This effectively lowers each nation's total purchasing power, although these effects are not easily traceable and may be diluted across many industrial sectors.

Maintenance of Defense Infrastructure

How important is defense infrastructure, and should every country have one? The ability to both produce and field advanced weapon systems has undeniable strategic advantages, but it is impractical for every nation to have this capability. Geopolitical circumstances impose practical limits on the size and cost of a nation's potential defense infrastructure. The United States is especially well endowed in this respect, with abundant natural resources, a skilled workforce, technically advanced manufacturing base, and the world's largest economy. As a result, American allies have benefited from the strength of the large U.S. defense infrastructure.

Offsets were originally used to help arm allies and bolster their war-ravaged economies in the early years of the Cold War. This work was accomplished long ago. Offsets are no longer needed for this purpose. It can be argued that today direct offsets may contribute to the recipient nation's defense infrastructure where they are applied, but diminish that of the donor nation. However, by increasing costs to both nations, it can also be argued, perhaps even more vehemently, that offsets stretch already lean defense budgets and actually reduce defense infrastructure in both nations.

When an expensive weapon system is imported as opposed to produced domestically, unless the offsets are 100 percent coproduction, what is the net gain to the defense infrastructure? The purchasing nation will remain partly dependent on the United States for whatever was not offset. Additionally, subcontractor production in the offsetting nation is not only more expensive, but may have little real relationship to the core expertise of that nation and force scarce public funds away from more worthwhile projects. Moreover, once the specific production is finished, then what? In the longer run the infrastructure is dependent on domestic spending. Will this kind of business be worth sustaining?

The primary sustainer of a nation's defense infrastructure is its national defense budget. Military trade, which is financed out of national defense budgets, is currently less than 4 percent of world defense spending. Military trade could be much higher if cooperation between nations were higher. As it is, trade contributes proportionately little quantitatively to defense infrastructure, although strategically it may contribute very significantly. Offsets, which generally range between 50 and 60 percent of this trade, may make an additive but much smaller contribution to the infrastructure. Moreover, in consideration that most offsets are not defense-related (indirect offsets), the possible contribution sinks to an even more modest level.

In the last decade, global defense trade actually contracted almost twice as fast as global defense spending. When global defense expenditures were at their zenith in 1987 (\$1.36 trillion in 1995 dollars), defense trade was estimated at only \$84.4 billion, or 6.1 percent. By 1995, global defense expenditures had retrenched 36.4 percent to \$864.5 billion; however, global defense trade was down 62.2 percent to just \$31.9 billion, or 3.7 percent of spending. With such small beginning and ending percentages, defense trade (i.e., imports) is apparently far less desirable than domestic defense spending.

Redirecting Public Disbursements to Domestic Economy

Do offsets have net benefits to the offsetting nation? Offsets force spending in the home country, which is generally the first preference of national governments. This alone may be the primary motive to engage in offsets, since the other justifications are of questionable value. The offset spending may take the form of investment, training, subcontracting, or any of the other forms offsets take. Technology transfer often has commercial spin-offs and unforeseen future payoffs, or multiplier effects.

Economic benefits to the offsetting nation can include increased employment, improved skills, educational benefits, investment in productivity enhancing equipment, and new exporting opportunities. Offsets may also strengthen or help preserve the offsetting nation's defense industrial base, if that is the intention. Additionally, if exchange rate concerns are at issue, offsets may be structured to placate these concerns.

Political considerations also play a prominent role. Offsets help avoid the stigma of spending taxpayers' money abroad. Also, offsets can be used to prop up financially troubled defense firms, or targeted industries, or even public works projects.

The answer to "Do offsets have net benefits?" is, sometimes. Are *benefits* maximized for the price paid for them? It is necessary to know if the benefits of the offsets exceed the benefits the foreign government could have received by spending the money (i.e., cost of the offsets) elsewhere, such as reducing taxes. First, technology transfer, training, and other offsets with multipliers probably render more benefits than offsets without multipliers. The multiplier type offsets would have a net benefit if they were not already available in the offsetting nation. Second, offsets used to prop up domestic subcontractors are equivalent to subsidies. The gains in employment are negated by losses in efficiency. Also, the apparent gain in employment is actually a washout because of employment losses from reduced spending elsewhere. There probably is no

net benefit, and, in fact, there may actually be losses to the economy. Third, countertrade is probably beneficial to the offsetting nation simple by financing and expediting the brokering between buyers and sellers. This will probably lead to some long-term relationships and perhaps increased future exports, a benefit. A problem arises, however, when sellers are not competitive and must either take a loss on the sale or be subsidized.

American Defense Trade Surplus

The American surplus in defense trade is one of the rationales European nations use to demand offsets. Several considerations make this a weak argument. First, in 1996, the E.U. ran a surplus in merchandise trade with the United States of \$15.2 billion. (This same deficit grew to \$16.7 billion in 1997.) This would have been about \$2 billion more if defense trade were balanced. Also, from 1983 to 1996, the E.U. has ran a surplus with the United States 11 of 14 years, including each year since 1993. European countries with whom U.S. firms entered into offset agreements from 1993-1996 had a combined four-year surplus of \$46.2 billion. This would grow by about \$8-9 billion if defense trade were balanced.

Table 7. U.S. Merchandise Trade, 1993 to 1996
European Countries With New Offset Agreements (1993-1996)

<u>Country</u>	<u>U.S. Exports (in millions)</u>					<u>U.S. Imports (in millions)</u>					
	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>4YR 1996</u>	<u>Total</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>4 YR Total</u>	<u>Balance</u>
Germany	18,932	19,229	22,394	23,495	84,050	28,562	31,744	36,844	38,945	136,095	-52,045
United Kingdom	26,438	26,900	28,857	30,963	113,158	21,730	25,058	26,930	28,979	102,697	10,461
France	13,267	13,619	14,245	14,456	55,587	15,279	16,699	17,209	18,646	67,833	-12,246
Italy	6,464	7,183	8,862	8,797	31,306	13,216	14,802	16,348	18,325	62,691	-31,385
Switzerland	6,806	5,624	6,227	8,373	27,030	5,973	6,373	7,594	7,793	27,733	-703
Belgium (plus Lux.)	9,439	11,168	12,840	12,774	46,221	5,402	6,642	6,288	6,980	25,312	20,909
Netherlands	12,839	13,582	16,558	16,663	59,642	5,4443	6,007	6,405	6,583	24,438	35,204
Sweden	2,354	2,518	3,080	3,431	11,383	4,534	5,041	6,256	7,153	22,984	-11,601
Spain	4,168	4,622	5,526	5,500	19,816	2,992	3,555	3,880	4,280	14,707	5,109
Norway	1,212	1,267	1,293	1,559	5,331	1,958	2,353	3,087	3,993	11,391	-6,060
Finland	848	1,068	1,250	2,439	5,605	1,608	1,801	2,270	2,389	8,068	-2,463
Denmark	1,092	1,215	1,518	1,731	5,556	1,664	2,122	1,945	2,142	7,873	-2,317
Austria	1,326	1,372	2,017	20,101	6,725	1,411	1,750	1,963	2,200	7,324	-599
Portugal	727	1,054	898	961	3,640	785	899	1,057	1,017	3,758	-118
Greece	880	829	1,519	825	4,053	348	455	397	506	1,706	2,347
Slovenia	92	96	110	131	429	229	266	289	289	1,073	-644
Sub-Total	106,884	111,346	127,194	134,108	479,532	111,134	125,567	138,762	150,220	525,683	46,151
Percent of World	23.0%	21.7%	21.8%	21.5%	21.9%	19.1%	18.9%	18.7%	18.9%	18.9%	7.8%

Source: U.S. Department of Commerce, International Trade Admin., *U.S. Foreign Trade Highlights*, 1996

A review of 16 European countries that entered into offset agreements with U.S. companies during the BXA reporting period, shows the United States had a four-year accumulated deficit of \$46.2 billion with these countries during the 1993-1996 period. The United States had deficits with 11 of these countries and surpluses with five. Table 7 presents a list of these countries with merchandise trade balances.

The largest merchandise trade deficits were with Germany, followed by Italy, France, and Sweden. The total four-year deficit with these countries was \$107.3 billion. These four nations accounted for \$638 million (6.3 percent of European total) of the new offset agreements and \$646 million of the offset transactions (10.6 percent of European total).

The largest merchandise trade surpluses were with the Netherlands, followed by Belgium, the United Kingdom, and Spain. The total four-year surplus with these countries was \$71.7 billion. These four nations accounted for \$6.9 billion of new offset agreements (69 percent of the European total) and \$2.1 billion of the offset transactions (34 percent of European total).

Second, sectoral trade, of which defense trade is one example, is rarely balanced, and to a degree reflects the strengths and specialization differences among nations. To balance sector trade by government mandate would nullify the gains from trade, and actually reduce potential Gross Domestic Products (GDPs) of both trading partners. Most sectors contain a diverse range of products so that a two-way trade may occur within sectors. Also, government inputs influence trade; these include R&D, infrastructure, subsidies, tariffs and other forms of protection, and the legal environment. With that said, in 1996, the United States had surpluses in selected sectors with the EC in:

Office Equipment, including Computers:	\$ 9.8 billion (\$15 - 5.2 billion)
Aircraft and Parts:	\$5.2 billion (\$12.7 - 7.5 billion)
Medical Instruments and Supplies:	\$2.5 billion (\$4.9 - 2.4 billion)

And, Europe had surpluses in selected sectors in selected sectors in:

Motor Vehicles:	\$10.6 billion (\$5.4 - 16 billion)
Steel Mill Products:	\$4.2 billion (\$0.4 - 4.6 billion)
Pharmaceuticals:	\$3.0 billion (\$4.5 - 7.5 billion)

Source: U.S. Department of Commerce, International Trade Admin., *U.S. Foreign Trade Highlights*, 1996

Third, military trade occurs for various reasons, such as special alliances, contiguous borders, regional instability, or foreign dependence, but a primary reason is the strategic value of the weapons traded. Only a few nations produce advanced weapon systems, and these nations tend to have military trade surpluses. Just about all other countries have military trade deficits. Notable surplus nations include the United States, France, the United Kingdom, and Germany.

U.S. military research and development expenditures are three times that of all European nations combined. This indicates the United States heads the list of countries likely to be counted

among surplus nations. Also, of the surplus nations, only the United States is truly capable of meeting virtually all defense requirements domestically. So, in addition to heading the surplus category, the United States also heads the list of countries least dependent on imports.

As cited previously, when defense budgets fell, defense trade fell even faster. Russia registered the greatest defense trade declines, from more than half the world's total to only a small fraction today. At the same time, the combined defense exports of the United States and Europe also declined somewhat in value, but grew from less than half the world total to over 80 percent currently. Imports into these two regions also declined, lessening the impact on the levels of defense trade surpluses.

Almost 80 percent of the U.S. military trade surplus with the world comes from countries outside of Europe. Over the years, the U.S. surplus with the rest of the world (excluding Europe) averages about three times the value of Europe's surplus with the world (excluding the United States). This indicates the United States has a competitive edge over Europe in third-country competitions.

Fourth, direct and defense-related indirect offsets themselves cancel out much of the U.S. defense surplus with Europe, particularly with countries such as the United Kingdom and the Netherlands, which demand 100 percent offsets on big ticket items. For example, from 1993-1995, the defense trade surplus with Europe was \$7.1 billion. (Three years are used instead of four because the final trade figures for 1996 are not available.) New offset agreements during the same period totaled \$8.3 billion, and offset transactions were \$4.3 billion. About one-third of the offset transactions were direct; however, about two-thirds were aerospace products, a large percentage of which were probably defense-related.

Table 8 presents European and U.S. military trade from 1987 to 1996. The United States and Western European nations export roughly the same amount of military items and have overall trade surpluses' with the rest of the world. About 30 percent of Europe's exports (and imports) are intra-European. However, this would not change Europe's external defense surplus since both exports and imports would be debited the same amount. The United States had a surplus with Europe each year, although the trend in both the magnitude of the trade and the surplus is downward. U.S. imports from the world are not shown on the table, but estimates were made by the U.S. Arms Control and Disarmament Agency to be roughly twice the value shown as the United States imported from Europe.

The Netherlands and the United Kingdom purchased major U.S. weapons systems over the last five years even when European options were available. France has purchased major U.S. defense weapons systems only when no French or European option was available. The French defense procurement policy has been to buy equipment from French sources first, then to pursue European cooperative solutions, and lastly to import a non-European item. This reflects a desire to retain a defense industrial base and maintain autonomy in national security matters.

Table 8. Arms Trade Between United States and Western Europe, 1987-1995
(in constant 1995 dollars - millions)

Year	U.S.	U.S.	U.S.	U.S. Trade Surplus		European Trade with World		
	Exports to World	Exports To Europe	Imports Fm Europe	Europe	World	Exports	Imports	Surplus
1987	22,650	5,000	1,424	3,576	19,802	21,188	15,142	6,046
1988	17,480	5,000	1,748	3,252	13,984	20,515	15,946	4,569
1989	19,050	7,000	1,019	5,982	17,012	21,042	15,519	5,523
1990	16,320	5,000	1,035	3,966	14,250	21,414	13,613	7,801
1991	15,910	4,000	1,050	2,950	13,810	15,032	13,007	2,025
1992	14,200	2,800	861	1,940	12,478	14,332	10,600	3,732
1993	15,940	2,900	734	2,166	14,472	11,554	9,753	1,801
1994	13,800	2,900	564	2,336	12,672	11,778	9,311	2,467
1995	15,600	3,100	500	2,600	14,600	14,091	8,635	5,456
1996	17,000	-	-	-	-	-16,391	8,500	7,891

Source: International Institute for Strategic Studies, London, *The Military Balance*, 1997/1998

Germany and Italy have made limited purchases of U.S. defense equipment in recent years because of significantly reduced defense procurement budgets and commitments to European cooperative projects. Both countries have now adopted an open defense procurement policy and competitively buy a mixture of American and European products, albeit with offset demands.

Of the major European defense system exporters, the British global market share has increased since the 1991 Gulf War due primarily to arms purchases by several Gulf States. Arms deliveries by France and Germany have decreased from past levels.

Undercount of Defense Trade Numbers

It should be noted that worldwide defense trade numbers are understated due to an undercount of traded military components and services and other items. These include metal parts and components, electronic components, instrumentation, chemicals, technical data, repair services, and a host of other items that are typically counted as commercial products in the official trade statistics, but used for military purposes. It is difficult to even estimate these. The U.S. State Department issues export licenses for items on the Munitions List for about \$25 billion a year. However, these licenses are valid for four years, and not all that is licensed is exported. A similar undercount undoubtedly applies to U.S. military imports. The undercount problem almost certainly applies to the statistical collections of other countries.

With these caveats, the latest available military trade statistics (1996) are published in *The Military Balance*, 1997-1998, an annual compilation by the International Institute for Strategic Studies (IISS) in London. The IISS data is gathered from all over the world; one source is the Arms Control and Disarmament Agency (ACDA) at the U.S. State Department. ACDA, which

publishes world defense trade numbers also, is making an effort to improve accountability of the Munitions List licenses, which the Agency reports could increase the U.S. military export numbers significantly. At the time of this writing, however, a reliable method for tabulating or estimating these numbers had not been adopted. The U.S. export numbers reported in *The Military Balance* are primarily Foreign Military Sales deliveries reported by the U.S. Defense Security Assistance [Cooperation] Agency. This is a separate publication, which is also provided to ACDA

Defense Trade Exemption from International Controls

Under the World Trade Organization (WTO), defense trade, including offsets, is one of the last bastions of legitimate government market intervention. The practice of offsets in defense trade is currently exempt under Article XXIII of the WTO from rules governing commercial trade.

However, it is recognized that offsets result in trade distortions and inefficiencies under the economic principles on which WTO policies are based. Under Article XVI the WTO prohibits the practice of offsets in government procurement of commercial items. Thus, if governments choose to exercise the military exemption, in principle they are also willing to live with any trade distortions and added costs associated with that option.

Contrasts in the U.S. and European Defense Industrial Bases

European defense expenditures are about two-thirds those of the United States. However, Europe has two to three times more suppliers. For example, the United States has three major suppliers in the military aircraft sector, while six European nations each have at least one major supplier.

In terms of defense revenue, U.S. companies tend to outpace their European counterparts. In 1997, the United States had seven of the world's top 10 defense firms (up from six in 1996), while Europe had the remaining three. The top 10 are shown in Table 9 with defense and total revenues. The seven U.S. firms represent about three-fourths of both the defense and total revenues of the 10 firms shown.

Defense Budgets

European countries' defense budgets in 1996 totaled \$173 billion; this was about 65 percent of the U.S. total of \$266 billion. France led European nations in defense spending at \$47 billion. Germany was second at \$39.2 billion and the United Kingdom third at \$33.5 billion and Italy was fourth at \$23.8 billion. These four countries represented about 71 percent of the European total in 1996.

Total 1996 procurement expenditures in Europe were \$39.6 billion and research and development spending was \$12.3 billion. This compares with U.S. procurement of \$42.4 billion and \$35 billion in R&D spending. The European total of \$52 billion was about 30 percent of total

European defense spending. The U.S. combined total of procurement and R&D was slightly less, at about 29 percent of the total U.S. defense budget. The most significant difference between Europe and the United States is relative expenditures on R&D.

**TABLE 9. Top Ten World Defense Companies
(in \$millions)**

Top Ten World Defense Companies	1997 Defense Revenue	1997 Total/Revenue
1. Lockheed Martin Corporation (U.S.)	18,500.0	28,000.0
2. Boeing Company (U.S.)	13,775.0	45,800.0
3. British Aerospace plc (U.K.)	10,091.0	13,673.0
4. Northrop Grumman Corporation (U.S.)	8,200.0	9,200.0
5. Raytheon Co. (U.S.)	6,270.0	13,700.0
6. General Electric Company (GEC) plc (U.K.)	5,773.6	18,388.1
7. Thompson Group (France)	4,184.1	6,422.9
8. TRW Inc. (U.S.)	3,800.0	10,800.0
9. General Dynamics Corp. (U.S.)	3,650.0	4,062.0
10. United Technologies Corp. (U.S.)	3,311.0	24,713.0
Total	77,554.7	174,759.0

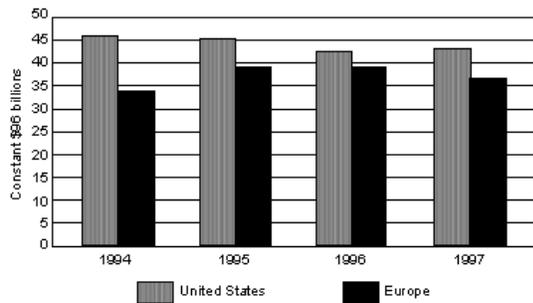
Overall, European nations have decreased their defense research and development spending over the last three years, at about one-third of the relatively stable U.S. research and development funding.

**Table 10. Comparative GDPs and Defense Expenditures, 1996
(Billion Dollars)**

	United States	Top 4 Western Europe	Western Europe	France	Germany	United Kingdom	Italy
GDP	7,600	8,650	6,000	1,500	2,200	1,200	1,100
Defense Expenditures	266.0	173.3	143.2	47.2	39.2	33.5	23.8
Military Exports	17.0	16.4	15.3	5.6	0.7	8.8	0.2
% Def. of GDP	3.5%	2.0%	2.3%	3.1%	1.8%	2.8%	2.2%
% of GDP in 1987	6.1%			3.9%	3.1%	4.6%	3.6%

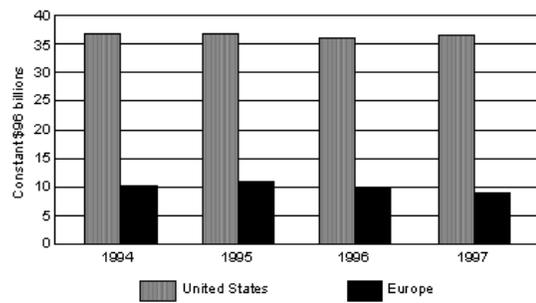
Source: International Institute for Strategic Studies

Chart 8. Defense Procurement U.S. vs. Europe



Source: International Institute for Strategic Studies

Chart 9. Defense R&D: U.S. vs. Europe



Source: International Institute for Strategic Studies

Spending cuts by European member-states, especially those announced by France and Germany, are evidence that their current priority is to meet the single currency (the Euro) economic targets criteria at the expense of defense programs.

The United States is able to source virtually all its military needs from domestic industry, with defense imports typically accounting for 2 or 3 percent of defense expenditures. Most U.S. defense imports are subsystems and components rather than entire weapon systems, and are supplied largely by the United Kingdom. As stated previously, the United Kingdom is consistently the largest buyer of U.S. equipment in Europe. France and Sweden have attempted to pursue a policy of almost exclusive procurement from indigenous sources, but are often dependent on foreign subcontractors for certain components.

Europe's defense industry is badly splintered among small national markets, with far too much duplication of a limited research and development effort. Because of this, the European defense producers are faced with trying to market less up-to-date weaponry at higher prices than are available from their U.S. counterparts.

Escalating weapon systems costs also continue to be a dominant feature of NATO alliance equipment programs. In 1996, NATO Europe member states spent just over \$158 billion on defense, slightly down from 1995 levels, and accounted for around 40 percent of NATO's spending overall. The U.S. share is some 58 percent. NATO Europe defense spending fell about 9 percent in real terms in 1997, to about \$145 billion. Budgetary constraints limit the ability of European defense companies to exploit new technologies, which could enhance capabilities. This will undoubtedly have adverse effects on their competitiveness in the long term.

While the United States has two major aircraft procurement programs under way, Europe has three: the Eurofighter, the Saabknade Gripen, and the Dassault Rafael. Europe also has four tank programs, compared with one U.S. program, and eleven missile makers, while the United States has only four. These and other defense programs in Europe share total defense spending of about \$130 billion.

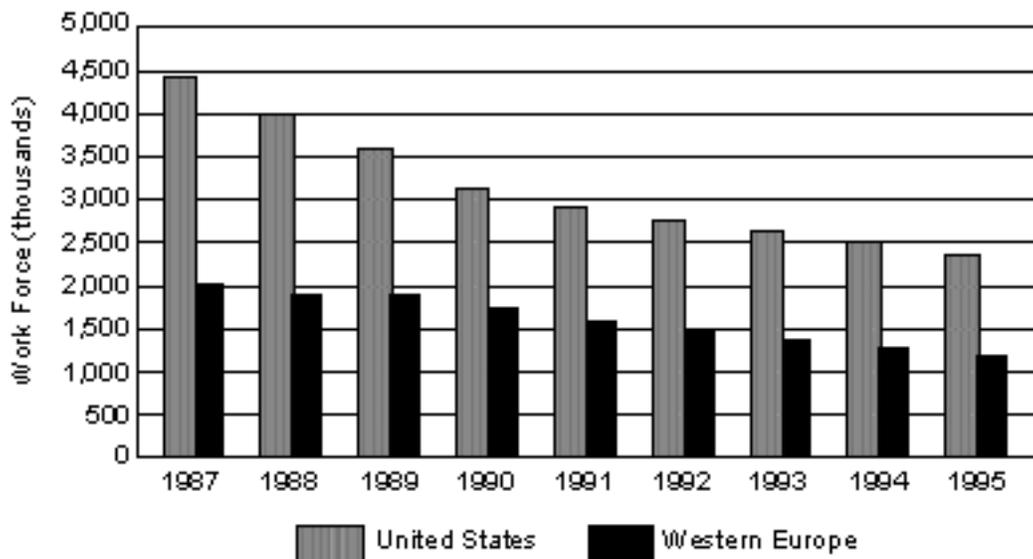
The entire cost of the French Rafael will be undertaken by Dassault, but it is highly likely that it will end up a collaborative effort with Aerospatiale and perhaps other aerospace companies

outside of France. The JAS 39 Gripen, undertaken by Saab of Sweden, is actually a joint venture with British Aerospace (BA). BA manufactures the wing assemblies and other items. Gripen fighters manufactured for export will be produced with a 50/50 share of revenue and profit with BA. The Gripen uses a derivative of a General Electric designed engine, the F404.

Defense Industry Employment

Defense employment in the United States and Western Europe has dropped significantly along with the declines in national defense budgets. During the nine year period from 1987 to 1995, the U.S. workforce fell 47 percent, from 4.4 to 2.35 million, displacing more than 2 million workers. Europe also experienced a workforce decline, although to a lesser degree. In the same time span, the European workforce fell from 2 to 1.2 million, a drop of 40 percent. The percentage of labor reductions for the top three European nations was uneven. The United Kingdom's defense industrial workforce fell 44 percent, while Germany's workforce fell by 30 percent, and France experienced a 29 percent decline.

**Chart 10. Trends in Defense Industrial Employment
U.S. and Europe, 1987-1995**



Source: International Institute for Strategic Studies

A paper titled *The Effects of Offsets, Outsourcing and Foreign Competition on Output and Employment in the U.S. Aerospace Industry*, was submitted by Robert E. Scott of the Economic Policy Institute to the National Research Council's Symposium on *Trends and Challenges in Aerospace Offsets* in January, 1998. The paper presented employment trends and analysis in the North American, European and Japanese aerospace industries. Dr. Scott showed that the United States experienced a much larger percentage and numerical drop in aerospace employment between 1989 and 1995 than did the rest of world. The data combined military and civilian aerospace jobs. U.S. employment fell from 992,000 to 580,000, while that of the E.U. fell from 485,740 to 348,061. In percentage terms the U.S. drop was 41.5 percent, compared with 28.3

percent for the E.U. The United Kingdom fell from 189,911 to 110,549, a 58 percent decline. In actual numbers, the U.S. fell 412,000 in contrast to the (E.U. which loss fewer than 138,000 jobs, only one third the American total. At least 333,000 (81 percent) of the U.S. decline was military-related employment.

Dr. Scott attributed the U.S. decline to a drop in sales (about 65 percent), productivity increases (about 25 percent), and increased imports (about 10 percent).

Table 11. Aerospace Employment Trends in Selected Locations, 1989 and 1995
(in thousands of employees)

<u>Year</u>	<u>U.K</u>	<u>Other E.U.</u>	<u>Total E.U.</u>	<u>Canada</u>	<u>Japan</u>	<u>U.S.</u>	<u>Total</u>
1989	189.9	295.8	485.7	66.1	38.3	992.0	1,582.1
1995	110.5	237.5	348.1	57.3	38.3	580.0	1,023.7
Decline	79.4	58.3	137.6	8.8	0	412.0	558.4
% Decline	-58.2%	-19.7%	-28.3%	-13.3%	0.0%	-41.5%	-35.3%
% of Total Decline	14.2%	10.4%	24.6%	1.8%	0.0%	73.8%	-

Source: *The Effects of Offsets, Outsourcing and Foreign Competition on Output and Employment in the U.S. Aerospace Industry*, Robert Scott, Economic Policy Institute, January 1998.

The Maastricht Treaty

The incentive to restructure in Europe goes beyond the military. The entry into force of the Maastricht Treaty on November 1, 1993, marked the beginning of a new stage in which the European Union (E.U.) is carrying forward its economic and monetary integration as well as the establishment of a common foreign and security policy. The most contentious aspect of the Treaty was its call for the implementation of a single European currency, the Euro, by January 1, 1999.

All E.U. members were faced with strict adherence to the Maastricht Treaty's convergence criteria of keeping:

1. national budget deficits below 3 percent (of GDP);
2. a government debt of no more than 60 percent of GDP;
3. an inflation rate within 1.5 percentage points of the three E.U. members with the lowest inflation.

To meet this goal, Germany, for instance, instituted an austerity plan to reduce its national budget deficit. This resulted in a sharp rise in German unemployment by the beginning of 1997, after sluggish growth (1.4 percent) in 1996. With higher unemployment and pressure from labor

unions, public spending in Germany increased, placing the 3 percent goal in jeopardy. However, growth increased to 2.2 percent for the year in 1997 and the goal was reached.

The Europeans hope to phase in monetary union over a three-year period beginning in 1999. With average E.U. economic growth for 1996 at only 1.7 percent, reducing unemployment proved extremely difficult. While structural problems lay at the heart of the high unemployment, efforts to achieve the Maastricht criteria prevented public spending from stimulating demand.

The problem of meeting the Treaty terms was eased somewhat in 1997, when E.U. wide growth increased to 2.6 percent. In early May 1998, 11 E.U. members, meeting the criteria, signed on to the European Monetary Union. Only Greece failed to meet the requirement, but may apply again at a later date. Three other nations, Denmark, Sweden, and Britain, opted out of the monetary union for the time being.

The terms of the Maastricht Treaty have also caused governments to redirect resources out of the defense sector. This adds pressure on these governments to depend more on policies such as offsets in international military trade. The problems may also jeopardize ongoing cooperative military programs and/or discourage new ones. For example, the number of Eurofighters on order has fallen, and this circumstance could eventually cause the program to fail.

TRADE POLICIES AND OFFSETS

U.S. Foreign Military Financing Program

Current U.S. policy permits foreign governments to demand offsets on U.S. military export sales financed, or partly financed through the Foreign Military Financing Program (FMFP), which is primarily a loan program. The FMFP features lenient repayment terms to begin with, and Congress usually waives the loan, so it becomes a direct grant. During the four-year period FY1993 to FY1996, \$15.6 billion was funneled through this program. The U.S. program is unique in that no other arms supplier provides a combination of grant aid and offsets. The policy should be changed to limit or eliminate offsets as a condition of receiving FMFP funding.

The primary recipients of this aid have been Turkey, Greece, Egypt, and Israel. Since 1987, Israel and Egypt have received FMFP direct grants (repayment waived) valued at \$1.8 and \$1.3 billion each year. Additionally, since 1991, Israel was authorized to spend \$475 million of the \$1.8 billion for procurement within Israel. Prior to 1993, Turkey and Greece received both FMFP grants and loans. From FY1993 to FY1996 Turkey received about \$1.5 billion in direct loans from DoD on liberal terms. Greece received over \$1 billion in direct DoD loans.

All four nations have obtained offsets for FMFP sales of U.S. weapons. A 1994 General Accounting Office study reported these countries demanded \$4.7 billion in offsets in preceding years. The study found that these FMFP recipients developed their own industrial bases and other aspects of their economies through these offset requirements at U.S. taxpayer expense. Stronger prohibitions on offsets in these sales might reduce these subsidies to foreign governments in association with military exports.

Agreement on Government Procurement

The Agreement on Government Procurement opens markets and strengthens competitive bidding practices to governments. The underlying principle is that signatory governments must treat products and services no less favorably than they treat their own domestic products, services, and suppliers. Criteria for making a contract award are the lowest price or the economically most advantageous tender based on various factors, such as quality, technical merit, delivery costs, and price.

Article XVI of the World Trade Organization (WTO) Agreement on Government Procurement prohibits offsets in reference to non-military items. Government entities covered by the Agreement “shall not, in the qualification and selection of suppliers, products or services, or in the evaluation of tenders and award of contracts, impose, seek or consider offsets.” Countries may exempt certain types of procurement from coverage by the Agreement at the time they become signatories.

Article XVI

- 1. Entities shall not, in the qualification and selection of suppliers, products or services, or in the evaluation of tenders and award of contracts, impose, seek or consider offsets.*
- 2. Nevertheless, having regard to general policy considerations, including those relating to development, a developing country may at the time of accession negotiate conditions for the use of offsets, such as requirements for the incorporation of domestic content. Such requirements shall be used only for qualification to participate in the procurement process and not as criteria for awarding contracts. Conditions shall be objective, clearly defined and non-discriminatory. They shall be set forth in the country's Appendix I and may include precise limitations on the imposition of offsets in any contract subject to this Agreement. The existence of such conditions shall be notified to the Committee and included in the notice of intended procurement and other documentation.*

Developing countries may negotiate, at the time of their accession, conditions for the use of offsets provided these are used only for the qualification to participate in the procurement process and not as criteria for awarding contracts. Signatories agreed that the granting of an offset or the requirement that technology be licensed as a condition for the award of a contract, although not forbidden outright, would be used only in a limited and nondiscriminatory manner.

Major defense agencies are entities generally covered under the Agreement. Government purchases related to the protection of national security interests, however, are excluded under Article XXIII. Therefore, the prohibitions against the use of offsets would not apply under such contracts. This clearly allows foreign governments to take exception to the agreement to protect national security interests:

Article XXIII Exceptions to the Agreement

1. *Nothing in this Agreement shall be construed to prevent any Party from taking any action or not disclosing any information which it considers necessary for the protection of its essential security interests relating to the procurement of arms, ammunition or war materials, or to procurement indispensable for national security or for national defence purposes.*

2. *Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent any party from imposing or enforcing measures: necessary to protect public morals, order or safety, human, animal or plant life or health or intellectual property or relating to the products or services of handicapped persons, of philanthropic institutions or of prison labour.*

This agreement was of interest to developed countries with advanced technological and manufacturing capabilities. At the end of 1997 there were twenty-six signatories: Aruba; Canada; the European Union - Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Spain, Portugal, Sweden, and the United Kingdom; Hong Kong; Israel; Japan; South Korea; Liechtenstein; Norway; Singapore; Switzerland; and the United States. Additionally, Chinese Taipei and Panama are currently negotiating accession to the Agreement.

FINDINGS

- In the four years (1993-1996) new offset agreements totaled \$15.1 billion and supported \$29.1 billion in export contracts. The offset agreements represented about 52 percent of the export contract values; for the last two years, the average offset was about 80 percent.
- Offset transactions were valued at \$9.2 billion and offset credits \$10.7 billion over the same time period. About 38 percent of the transactions were direct offsets, 58 percent indirect, and 4 percent unspecified. About 73 percent of the actual value of transactions were subcontracting activity, purchases, or technology transfer.
- Over 90 percent of the new offset agreements and offset transactions referenced exports of U.S. aerospace weapon systems. However, almost half the actual offset transactions were fulfilled with non-aerospace products. More than 90 percent of *direct* offsets were aerospace products, and more than 70 percent of *indirect* offsets were fulfilled with non-aerospace products.

- Nearly 83 percent of the offset transactions were manufactured products. Three-fourths of the offset transactions fell into three major industry groupings:

1. SIC 37 - Transportation Equipment (48 percent); sub-group SIC 372 - Aircraft and Parts alone accounted for 33 percent;

2. SIC 36 - Electronic and Electrical Equipment (16 percent); and

3. SIC 35 - Industrial Machinery (9 percent).

- Thirty-two U.S. defense prime contractors reported entering into new offset agreements during 1993-1996 period. Five of these companies accounted for over 78 percent of the value of new offset agreements and nearly 82 percent of export contract values. Five countries - the United Kingdom, the Netherlands, Switzerland, Saudi Arabia, and Taiwan - accounted for 72 percent of the value new offset agreements.

- From 1993 to 1996, an estimated 30-40 percent of the total value of military export contracts were negotiated with offset agreements. Most military export contracts are below country thresholds for applying offsets, which average about \$7.6 million, as well as BXA's minimum data reporting requirement. However, virtually all large aerospace export contracts included offsets.

- The motivation behind offset demands is primarily the desire to redirect public funds back into the foreign purchaser's economy. National security considerations play a diminished role in the offset decision making process in the post-Cold War period.

- Offsets have the effect of increasing the cost of the exported weapon system, which ultimately must be passed on to the foreign purchaser. These increased costs are incurred when shifting parts production to newly established overseas suppliers, and/or fees for transferring technology, or various other administrative expenses. Co-production is the most costly form of offset, as it typically involves the replication of an entire production or assembly facility to produce a limited number of military items.

- The U.S. primes have become more competitive because of consolidation and downsizing. As stronger competitors, U.S. firms have increased their share of a smaller international defense market.

- As a measure to reduce the inefficiencies inherent in offsets, the development of expensive weapon systems could be effectively accomplished through international partnering with allies. This would spread costs and benefits and reduce duplication. It would also provide added incentives to market the weapon systems more widely. The Joint Strike Fighter program, with British, Dutch and Canadian participation, is an excellent example of this type of cooperation.

- The existing World Trade Organization agreements provide an exemption for national governments to demand offsets in military related trade. However, the 1992 U.S.-EU Agreement

on Trade in Large Civil Aircraft prohibits offsets in the trade of large civil aircraft. This could be helpful if any consideration is given to a future WTO agreement on military offsets.

- Europe's ability produce state-of-the-art weaponry at a reasonable cost is ultimately contingent upon transnational cooperation and greater integration of the European defense industry. Meeting the economic targets of the Maastricht Treaty has caused European governments to redirect resources out of the defense sector. This adds pressure on these governments to depend more on policies such as offsets to stimulate domestic economies. The continued use of offsets is inhibiting European cooperation and integration.
- The United States spends three times more on military R&D than European nations, contributing to the U.S. lead in sophisticated weapon systems and competitiveness.
- From 1987 to 1995, the U.S. defense workforce fell 47 percent from 4.4 to 2.4 million workers, while the European workforce fell 40 percent from 2 to 1.2 million. This indicates that the U.S. has adapted more quickly to the declining world defense market. Overcapacity in the European defense industry continues to plague the Europeans and pressures them to continue the practice of demanding offsets.
- The U.S. has a positive but declining of defense trade balance with Europe, which has been cited by the European governments as a rationale for high levels of offsets. However, the U.S. has a negative balance in merchandise trade with Europe, which includes both commercial and military trade. The defense surplus has ranged from \$2-3 billion since 1993, while the merchandise deficit was \$15.2 billion in 1996 alone. (This same deficit grew to \$16.7 billion in 1997.) When offsets are included in the calculation, the U.S. defense trade surplus is effectively cut in half.