

# AEROSPACE Facts & Figures 1994-1995

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*Environmental Stewardship  
Through New Technology*

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AEROSPACE  
Facts & Figures  
1994-1995

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Aerospace Research Center  
Aerospace Industries Association of  
America, Inc.

*Executive Director, Research Center*  
Virginia C. Lopez

*Manager, Economic Data Service*  
David H. Napier

*Editorial Consultant*  
James J. Haggerty

*Design*  
AAH Graphics, Inc.

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## *Environmental Stewardship Through New Technology*

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THE U.S. AEROSPACE INDUSTRY is engaged in one of the most extraordinary technical challenges it has faced in its seventy-five years. This new goal is less dramatic and visible than aircraft that fly faster than the speed of sound, or placing a man on the moon, but it is just as revolutionary. Manufacturers are learning to use environmentally-friendly—low or non-polluting—materials, as they continue to extend the technical frontiers of aerospace. Since thousands of chemicals are used for their critical contributions to the safety, efficiency, and durability of aircraft and space vehicles, companies are literally reinventing their product and process technology. The industry is working hard to meet the challenge and is fully committed to a responsible stewardship of Earth's resources.

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## FOREWORD

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Some might find it surprising that, in 1993, the Department of Defense was still the aerospace industry's principal customer. We had not expected that to happen.

When the restructuring and downsizing of the military establishment began in 1986, the industry anticipated a continuing decline in defense sales offset to a considerable degree by rapidly increasing sales in the commercial aircraft sector. That did in fact happen for the first five or six years of the restructuring period.

Then a global recession, reduced air traffic growth, intense fare competition and rapidly escalating operating costs plunged the world's airlines into financial difficulties that, for many airlines, are still continuing. This brought on a series of 1991/92 actions by the airlines that caused cancellations and deferments of orders for jetliners already on the books, and additionally forced the airlines to postpone plans for purchase of new airplanes.

In 1993, the industry felt the initial impact of these actions. Sales of civil aircraft, having reached an all-time peak just a year earlier, fell off dramatically. At the same time, defense sales continued their downward slide for the sixth straight year. With the industry's two principal business components—defense and



commercial aircraft—both in decline at the same time, and with space sales dipping slightly, manufacturing activity fell off sharply. The industry's overall sales dropped by more than 10 percent. And the flow of new orders, military and civil, declined precipitously—by more than 25 percent. That means further reduced production in both military and civil activity in the immediate future.

I emphasize immediate because, despite the ominous sound of the figures I have recited, the industry's long term future is bright. According to the most recently published Department of Defense plan, the defense restructuring will be completed by the turn of the century; we look, thereafter, for stabilization of defense funding and a respectable level of defense business for the fewer companies remaining to share it.

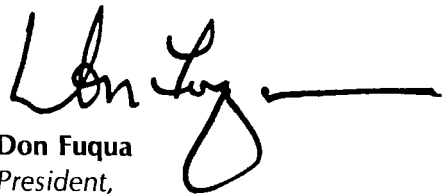
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The future is brightest in the commercial sector. We are already seeing the first evidence that the world's airlines are beginning to recover their financial health and that they will be able to resume their reequipment plans in about two years. That means we can expect sales of commercial aircraft to increase on a gradually rising curve in the latter years of this century.

All indications point to record levels of jetliner production early in the 21st century. So, for the period after 2000, we see a period of prosperity for a smaller, leaner aerospace industry with a workload driven primarily by commercial sales and backed by moderate levels of defense and space activity. But we must first manage the diffi-

cult industry downsizing augured by the predictably lower levels of manufacturing activity indicated by market projections. Our industry has been doing, and is doing, a magnificent job of positioning itself for maximum effectiveness through consolidations, productivity increasing measures and other efficiency-inducing measures; we expect to continue to do so through the coming difficult years.

We hope, too, for help from a government that is displaying new recognition of the importance of our industry and the problems it is facing. Given such help, we feel confident that the aerospace industry can emerge from this formidably difficult transition period a smaller but highly efficient industry still capable of maintaining world leadership.



**Don Fuqua**  
*President,*

*Aerospace Industries Association*

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## AEROSPACE SUMMARY

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**A**s anticipated, 1993 aerospace industry sales to the Department of Defense continued on the sharply declining curve that began in 1988. Additionally, sales of civil aircraft, which had increased every year since 1987, took a sharp dip; this was a reflection of airline financial problems that caused cancellations and deferments of orders already on the books, and postponement of contemplated reequipment programs. With the industry's two principal business components simultaneously in decline, overall sales fell more than 10 percent. In addition, the industry's backlog declined by 13 percent and the flow of new orders for aerospace equipment dropped more than 25 percent, auguring further reduced production in future years.

Here is a breakdown of the industry's performance in 1993:

**Sales.** Industry sales amounted to \$124.2 billion, compared with the previous year's \$138.6 billion. The Department of Defense was still the industry's principal customer in 1993 with sales of \$47.1 billion. Sales to non-U.S. government customers, for the most part deliveries to airlines of commercial aircraft, accounted for \$44.1 billion. In a breakdown of sales by product group, aircraft deliveries predominated. Sales of aircraft, engines,

and parts, civil and military combined, totaled \$66.5 billion or 54 percent of the industry's sales; the figure compares with \$73.9 billion in the previous year. For the second straight year, sales of civil aircraft (\$33.8 billion) topped sales of military aircraft (\$32.8 billion).

Sales of space systems, which had risen every year since 1978, dipped to \$28.9 billion from 1992's \$29.8 billion; nonetheless, space as a percentage of the industry's total sales increased from 22 to 23 percent.

Sales of missile systems fell sharply from 1992's \$11.8 billion to \$8.1 billion in 1993. Sales of aerospace-related products and services, which had maintained a stable \$22-23 billion level since 1989, experienced a drop of more than 10 percent to \$20.7 billion.

For 1993, aerospace industry sales amounted to 2.0 percent of the nation's Gross Domestic Product, down from 2.3 percent. Aerospace sales accounted for 4.0 percent of total sales by all U.S. manufacturing industries, down from 4.7 percent.

**Earnings.** After a net loss of \$1.8 billion in 1992, the aerospace industry reported a net income after taxes of \$4.6 billion for 1993. The figures, however, do not directly compare. The 1992 loss was due to the fact that many companies wrote off large amounts necessary to comply with a new government standard for

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accounting for employees' post-retirement benefits. The 1993 profit is also misleading in that it includes sales of assets and other savings accruing from industry consolidations. The most valid comparison is the industry's income from operations: for 1993 it was \$7 billion, up from \$6.9 billion.

**T**he aerospace balance sheet, as reported by the Bureau of the Census, showed a decline in net working capital, from \$15.2 billion in 1992 to \$14.2 billion in 1993. Total assets increased to \$132.7 billion, up from \$127.8 billion in the previous year.

*Orders and Backlog.* For the fourth consecutive year, new orders for aerospace systems declined sharply. Total orders, including both U.S. government and non-U.S. government business, amounted to \$73.3 billion, the lowest figure since 1980. U.S. government orders, at \$41.5 billion, constituted more than 56 percent of the total. Non-U.S. government orders, primarily for commercial transports, dropped by almost one-third, from \$46.8 billion in 1992 to \$31.8 billion in 1993. The industry's backlog at year-end was down to \$205.4 billion, more than \$30 billion below the prior year's level. More than 63 percent of the total backlog was in non-U.S. government orders, which totaled \$130.9 billion (down from

\$153.4 billion). U.S. government orders, at \$74.5 billion, were down almost 10 percent from 1992's \$82.7 billion.

*Civil Aircraft Production.* Civil aircraft production embraces manufacture of airframes, engines, components, and parts for a full spectrum of aircraft types ranging from general aviation planes (light personal craft, utility craft, air taxis, corporate aircraft) to helicopters to airline-type commercial transports. Since the mid-1980s, commercial aircraft production has accounted for upwards of 80 percent of the total dollar value of all aircraft built. In 1993, commercial transport manufacture accounted for \$24.1 billion or more than 90 percent of the \$26.4 billion worth of civil aircraft shipped; that compares with \$30.7 billion in 1992.

General aviation production, which has been on a long, steep decline since 1978, when the industry produced almost 18,000 planes, accounted for \$2.1 billion in sales and 964 aircraft shipped. Both figures represented slight rebounds from 1992, when the industry turned out 899 planes worth \$1.8 billion.

The civil helicopter segment of the industry, which was producing more than 1,000 rotary-wing aircraft in 1980–81, produced only 258 civil helicopters, down from 324.



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The total dollar value—\$113 billion—was the lowest in more than 20 years.

**T**otal backlog for all aircraft, engines, and parts, civil and military, dropped for the second straight year to \$141.4 billion, down from \$168.6 billion in 1992. Almost 80 percent of the backlog was in orders of non-U.S. government origin.

*Military Aircraft Production.* Military aircraft production accounted for \$32.8 billion of total aerospace sales (roughly 26 percent) and placed this sector second in sales among the industry's product categories (behind civil aircraft production, \$33.8 billion). The sales figure for military aircraft includes research and development (R&D) work, modifications, and other activity and therefore does not coincide with the figures for new aircraft listed in the *Aircraft Production* chapter.

The number of new military aircraft produced in the United States came to 954. The total included 436 delivered to the U.S. military services; 92 exported under Foreign Military Sales programs; and 426 transferred to foreign air services through direct sales by U.S. manufacturers.

*Foreign Trade.* After eight consecutive record-setting years, the aero-

space industry's export volume declined, and with it the aerospace trade balance. But although exports and trade balance failed to set new records, they remained at levels close to the peaks. Exports totaled \$39.4 billion, down 12 percent from the previous year's \$45 billion but still the third highest export level in history. The aerospace trade balance was \$27.2 billion, down 13 percent from 1992's record \$31.4 billion. U.S. aerospace imports, which reached an all-time high of \$13.7 billion in 1992, fell in 1993 to \$12.2 billion.

*Space Systems.* The trend in sales of space equipment, on a consistent rise since 1978 until it dipped in 1992, continued downward in 1993. Sales of space systems—including civil, military, and commercial programs—amounted to \$28.9 billion, down from \$29.8 billion.

The Bureau of the Census, whose figures do not include space vehicle engines or propulsion systems, separately reported space systems sales of \$9.3 billion, a slight increase over 1992's \$9.27 billion. Census data showed that the decreasing trend in space sales is due largely to a decline in military purchases of space equipment, which fell to \$5.5 billion from \$5.9 billion. Non-military sales, which include sales to NASA and to commercial custom-

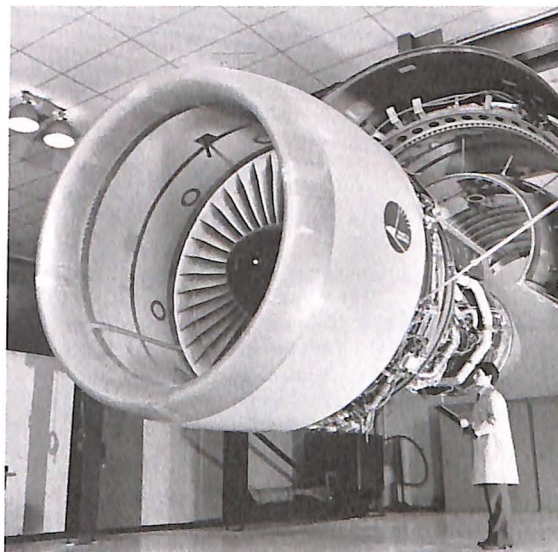
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ers, came to \$3.8 billion, up from \$3.4 billion in 1992.

Combined civil/military/commercial net new orders for space systems—according to Census data that does not include launch or in-space propulsion units—declined from \$10.5 billion in 1992 to \$9.8 billion in 1993. Again the decline was in the military sector, which placed orders for \$5 billion (down from \$6.8 billion); non-military orders amounted to \$4.8 billion (up from \$3.7 billion).

*Research and Development.* Office of Management and Budget (OMB) data showed that federal government outlays for R&D dipped slightly in Fiscal Year 1994, but OMB projected a rebound (in current dollars) to a record high in FY 1995. For FY 1994, federal R&D outlays came to \$68.1 billion, down from \$68.4 billion in the previous year. For FY 1995, OMB estimated what is technically the highest-ever level—\$69.7 billion—although in inflation-adjusted constant dollars it represents a slight decline.

**A**s usual, DoD accounts for the bulk of the estimated R&D outlays in FY 1995 (\$36.8 billion or more than 52 percent of the total). NASA's R&D outlays are estimated at \$8.3 billion, Department of Energy outlays at \$6



billion, and all other agencies combined are expected to invest \$18.6 billion.

*Employment.* The combined effects of reduced defense production activity and a temporary lull in commercial aircraft manufacturing caused further decline of the aerospace labor force in 1993. On an average annual employment basis, the labor force was reduced by more than 12 percent to a level of 966,000. This compared with 1,100,000 in the previous year—and marked the first time aerospace employment had dipped below the one million level since 1978. AIA projected that employment would be further reduced, to an estimated 850,000 in 1994.



**STANDARD INDUSTRIAL CLASSIFICATIONS APPLICABLE TO THE  
AEROSPACE INDUSTRY**

|   |  |
|---|--|
| <p><b>3721 AIRCRAFT</b><br/>                     37211 Military aircraft<br/>                     37215 Civilian aircraft<br/>                     37217 Modification, conversion, and overhaul of previously accepted aircraft<br/>                     37218 Aeronautical services on complete aircraft, nec</p> <p><b>3724 AIRCRAFT ENGINES AND ENGINE PARTS</b><br/>                     37241 Aircraft engines for military aircraft<br/>                     37242 Aircraft engines for civilian aircraft<br/>                     37243 Aeronautical services on aircraft engines<br/>                     37244 Aircraft engine parts and accessories</p> <p><b>3728 AIRCRAFT PARTS AND AUXILIARY EQUIPMENT, NEC</b><br/>                     37281 Aircraft parts and auxiliary equipment, nec<br/>                     37282 Aircraft propellers and helicopter rotors<br/>                     37283 Research and development on aircraft parts</p> <p><b>3761 GUIDED MISSILES AND SPACE VEHICLES</b><br/>                     37611 Complete guided missiles (excluding propulsion systems)<br/>                     37612 Complete space vehicles (excluding propulsion systems)<br/>                     37613 Research and development on complete guided missiles<br/>                     37614 Research and development on complete space vehicles<br/>                     37615 All other services on complete guided missiles and space vehicles</p> <p><b>3663 RADIO AND TELEVISION COMMUNICATIONS EQUIPMENT</b><br/>                     36631 Communication systems and equipment, except broadcast</p> | <p><b>3764 SPACE PROPULSION UNITS AND PARTS</b><br/>                     37645 Complete missile or space vehicle engines and/or propulsion units<br/>                     37646 Research and development on complete missile or space vehicle engines and/or propulsion units<br/>                     37647 Services on complete guided missile or space vehicle engines and/or propulsion units, nec<br/>                     37648 Missile and space vehicle engine and/or propulsion unit parts and accessories</p> <p><b>3769 SPACE VEHICLE EQUIPMENT, NEC</b><br/>                     37692 Missile and space vehicle components, parts and subassemblies, nec<br/>                     37694 Research and development on missile and space vehicle parts and components, nec</p> <p><b>3669 COMMUNICATIONS EQUIPMENT, NEC</b><br/>                     36691 Alarm systems<br/>                     36692 Traffic control equipment<br/>                     36693 Intercommunication equipment</p> <p><b>3812 SEARCH, DETECTION, NAVIGATION, GUIDANCE, AERONAUTICAL AND NAUTICAL SYSTEMS, INSTRUMENTS, AND EQUIPMENT</b><br/>                     38121 Aeronautical, nautical, and navigational instruments, not sending or receiving radio signals<br/>                     38122 Search, detection, navigation, and guidance systems and equipment</p> <p><b>3829 MEASURING AND CONTROLLING DEVICES, NEC</b><br/>                     38291 Aircraft engine instruments, except flight</p> |
|---|--|

Source: Office of Management and Budget, "Standard Industrial Classification Manual, 1987."

NOTE: The Standard Industrial Classification (SIC) is a system developed by the U.S. Government to define the industrial composition of the economy, facilitating comparability of statistics. It is revised periodically to reflect the changing industrial composition of the economy.

NEC: Not elsewhere classified.

## AEROSPACE INDUSTRY SALES BY CUSTOMER

Calendar Years 1979–1993  
(Millions of Dollars)

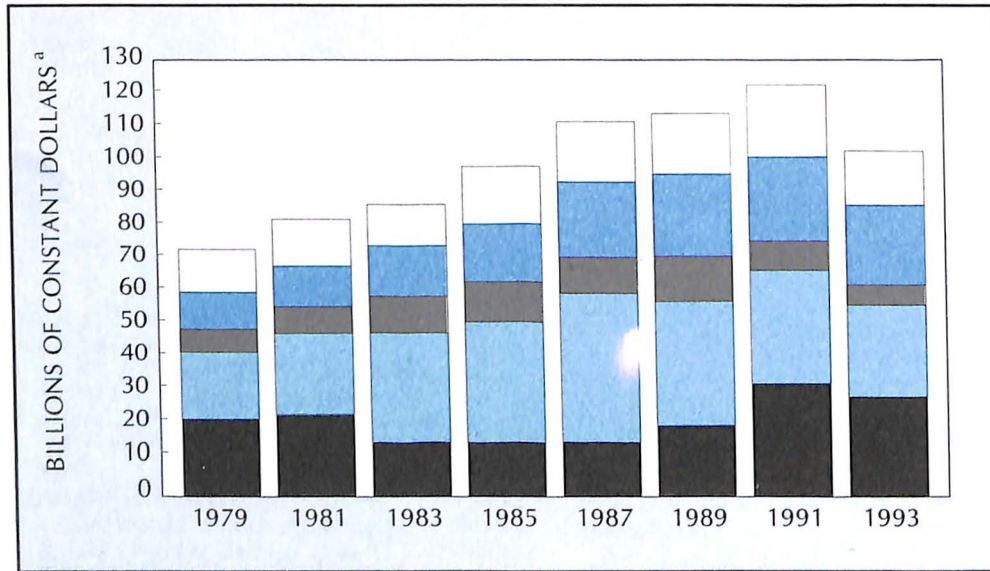
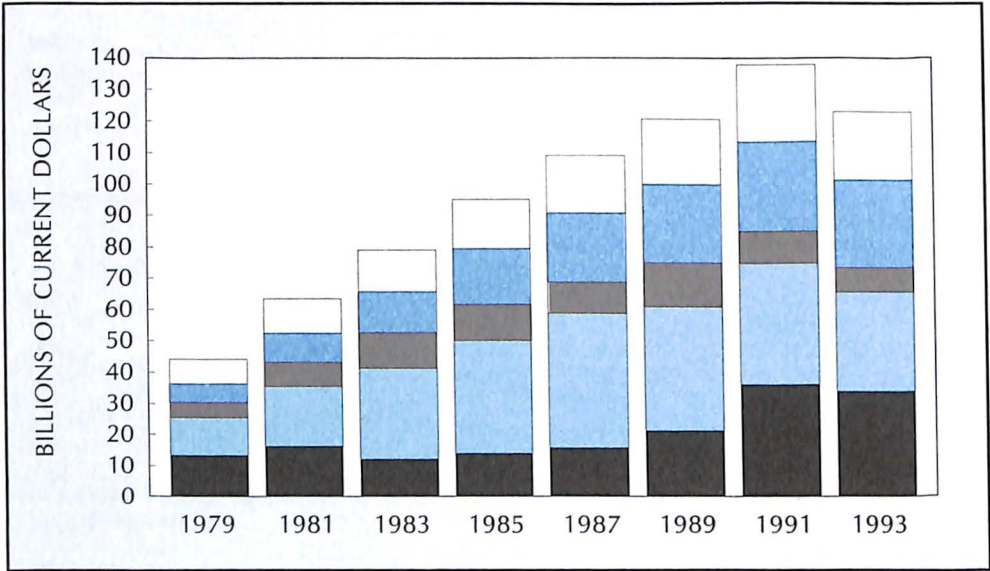
| Year                                | TOTAL SALES | Aerospace Products and Services |                  |                         |                 |          | Related Products and Services |
|-------------------------------------|-------------|---------------------------------|------------------|-------------------------|-----------------|----------|-------------------------------|
|                                     |             | Total                           | U.S. Government  |                         | Other Customers |          |                               |
|                                     |             |                                 | Dept. of Defense | NASA and Other Agencies |                 |          |                               |
| <b>CURRENT DOLLARS</b>              |             |                                 |                  |                         |                 |          |                               |
| 1979                                | \$ 45,420   | \$ 37,705                       | \$18,918         | \$ 3,453                | \$15,334        | \$ 7,715 |                               |
| 1980                                | 54,697      | 45,878                          | 22,795           | 4,106                   | 18,977          | 8,819    |                               |
| 1981                                | 63,974      | 53,090                          | 27,244           | 4,709                   | 21,137          | 10,884   |                               |
| 1982                                | 67,756      | 56,366                          | 34,016           | 4,899                   | 17,451          | 11,390   |                               |
| 1983                                | 79,975      | 66,646                          | 41,558           | 5,910                   | 19,178          | 13,329   |                               |
| 1984                                | 83,486      | 69,572                          | 45,969           | 6,063                   | 17,540          | 13,914   |                               |
| 1985                                | 96,571      | 80,476                          | 53,178           | 6,262                   | 21,036          | 16,095   |                               |
| 1986                                | 106,183     | 88,486                          | 59,161           | 6,236                   | 23,089          | 17,697   |                               |
| 1987                                | 110,008     | 91,673                          | 61,817           | 6,813                   | 23,043          | 18,335   |                               |
| 1988                                | 114,562     | 95,468                          | 61,327           | 7,899                   | 26,242          | 19,094   |                               |
| 1989                                | 120,534     | 100,445                         | 61,199           | 9,601                   | 29,645          | 20,089   |                               |
| 1990                                | 134,375     | 111,979                         | 60,502           | 11,097                  | 40,379          | 22,396   |                               |
| 1991                                | 139,248     | 116,040                         | 56,619           | 11,739                  | 48,379          | 23,208   |                               |
| 1992 <sup>r</sup>                   | 138,591     | 115,493                         | 52,202           | 12,408                  | 50,882          | 23,099   |                               |
| 1993                                | 124,205     | 103,504                         | 47,091           | 12,274                  | 44,139          | 20,701   |                               |
| <b>CONSTANT DOLLARS<sup>a</sup></b> |             |                                 |                  |                         |                 |          |                               |
| 1979                                | \$ 71,528   | \$ 59,378                       | \$29,792         | \$ 5,438                | \$24,148        | \$12,150 |                               |
| 1980                                | 77,475      | 64,983                          | 32,288           | 5,816                   | 26,880          | 12,492   |                               |
| 1981                                | 80,470      | 66,780                          | 34,269           | 5,923                   | 26,587          | 13,691   |                               |
| 1982                                | 77,083      | 64,125                          | 38,699           | 5,573                   | 19,853          | 12,958   |                               |
| 1983                                | 86,741      | 72,284                          | 45,074           | 6,410                   | 20,800          | 14,457   |                               |
| 1984                                | 83,653      | 69,711                          | 46,061           | 6,075                   | 17,575          | 13,942   |                               |
| 1985                                | 97,843      | 81,536                          | 53,878           | 6,344                   | 21,313          | 16,307   |                               |
| 1986                                | 106,396     | 88,663                          | 59,280           | 6,248                   | 23,135          | 17,732   |                               |
| 1987                                | 110,008     | 91,673                          | 61,817           | 6,813                   | 23,043          | 18,335   |                               |
| 1988                                | 112,426     | 93,688                          | 60,184           | 7,752                   | 25,753          | 18,738   |                               |
| 1989                                | 113,604     | 94,670                          | 57,680           | 9,049                   | 27,941          | 18,934   |                               |
| 1990                                | 121,606     | 101,338                         | 54,753           | 10,043                  | 36,542          | 20,268   |                               |
| 1991                                | 121,508     | 101,257                         | 49,406           | 10,243                  | 42,216          | 20,251   |                               |
| 1992 <sup>r</sup>                   | 118,050     | 98,376                          | 44,465           | 10,569                  | 43,341          | 19,675   |                               |
| 1993                                | 102,819     | 85,682                          | 38,983           | 10,161                  | 36,539          | 17,137   |                               |

Source: Aerospace Industries Association.

NOTE: See Glossary for explanation of "Aerospace Industry," "Aerospace Sales," "Other Customers," and "Related Products and Services."

<sup>a</sup> Based on AIA's aerospace composite price deflator, 1987=100.<sup>r</sup> Revised.

# Aerospace Sales by Product Group



- CIVIL AIRCRAFT
- MISSILES
- SPACE
- MILITARY AIRCRAFT
- RELATED PRODUCTS AND SERVICES

SOURCE: AEROSPACE INDUSTRIES ASSOCIATION

<sup>a</sup> BASED ON AIA'S AEROSPACE COMPOSITE PRICE DEFLATOR (1987=100)

## AEROSPACE INDUSTRY SALES BY PRODUCT GROUP

Calendar Years 1979–1993  
(Millions of Dollars)

| Year                                | TOTAL SALES | Aircraft |          |          | Missiles | Space    | Related Products & Services |
|-------------------------------------|-------------|----------|----------|----------|----------|----------|-----------------------------|
|                                     |             | Total    | Civil    | Military |          |          |                             |
| <b>CURRENT DOLLARS</b>              |             |          |          |          |          |          |                             |
| 1979                                | \$ 45,420   | \$26,382 | \$13,227 | \$13,155 | \$ 4,778 | \$ 6,545 | \$ 7,715                    |
| 1980                                | 54,697      | 31,464   | 16,285   | 15,179   | 6,469    | 7,945    | 8,819                       |
| 1981                                | 63,974      | 36,062   | 16,427   | 19,635   | 7,640    | 9,388    | 10,884                      |
| 1982                                | 67,756      | 35,484   | 10,982   | 24,502   | 10,368   | 10,514   | 11,390                      |
| 1983                                | 79,975      | 42,431   | 12,373   | 30,058   | 10,269   | 13,946   | 13,329                      |
| 1984                                | 83,486      | 41,905   | 10,690   | 31,215   | 11,335   | 16,332   | 13,914                      |
| 1985                                | 96,571      | 50,482   | 13,730   | 36,752   | 11,438   | 18,556   | 16,095                      |
| 1986                                | 106,183     | 56,405   | 15,718   | 40,687   | 11,964   | 20,117   | 17,697                      |
| 1987                                | 110,008     | 59,188   | 15,465   | 43,723   | 10,219   | 22,266   | 18,335                      |
| 1988                                | 114,562     | 60,886   | 19,019   | 41,867   | 10,270   | 24,312   | 19,094                      |
| 1989                                | 120,534     | 61,550   | 21,903   | 39,646   | 13,622   | 25,274   | 20,089                      |
| 1990                                | 134,375     | 71,353   | 31,362   | 40,091   | 14,180   | 26,446   | 22,396                      |
| 1991                                | 139,248     | 75,918   | 37,443   | 38,475   | 10,970   | 29,152   | 23,208                      |
| 1992 <sup>r</sup>                   | 138,591     | 73,905   | 39,897   | 34,008   | 11,757   | 29,831   | 23,099                      |
| 1993                                | 124,205     | 66,534   | 33,750   | 32,784   | 8,072    | 28,898   | 20,701                      |
| <b>CONSTANT DOLLARS<sup>a</sup></b> |             |          |          |          |          |          |                             |
| 1979                                | \$ 71,528   | \$41,546 | \$20,830 | \$20,717 | \$ 7,524 | \$10,307 | \$12,150                    |
| 1980                                | 77,475      | 44,567   | 23,067   | 21,500   | 9,163    | 11,254   | 12,492                      |
| 1981                                | 80,470      | 45,361   | 20,663   | 24,698   | 9,610    | 11,809   | 13,691                      |
| 1982                                | 77,083      | 40,369   | 12,494   | 27,875   | 11,795   | 11,961   | 12,958                      |
| 1983                                | 86,741      | 46,021   | 13,420   | 32,601   | 11,138   | 15,126   | 14,457                      |
| 1984                                | 83,653      | 41,989   | 10,711   | 31,278   | 11,358   | 16,365   | 13,942                      |
| 1985                                | 97,843      | 51,147   | 13,911   | 37,236   | 11,589   | 18,800   | 16,307                      |
| 1986                                | 106,396     | 56,518   | 15,749   | 40,769   | 11,988   | 20,157   | 17,732                      |
| 1987                                | 110,008     | 59,188   | 15,465   | 43,723   | 10,219   | 22,266   | 18,335                      |
| 1988                                | 112,426     | 59,751   | 18,664   | 41,086   | 10,079   | 23,859   | 18,738                      |
| 1989                                | 113,604     | 58,011   | 20,644   | 37,367   | 12,839   | 23,821   | 18,934                      |
| 1990                                | 121,606     | 64,573   | 28,382   | 36,281   | 12,833   | 23,933   | 20,268                      |
| 1991                                | 121,508     | 66,246   | 32,673   | 33,573   | 9,572    | 25,438   | 20,251                      |
| 1992 <sup>r</sup>                   | 118,050     | 62,951   | 33,984   | 28,968   | 10,014   | 25,410   | 19,675                      |
| 1993                                | 102,819     | 55,078   | 27,939   | 27,139   | 6,682    | 23,922   | 17,137                      |

Source: Aerospace Industries Association.

NOTE: See Glossary for explanation of "Aerospace Industry," "Aerospace Sales," "Other Customers," and "Related Products and Services."

a Based on AIA's aerospace composite deflator, 1987=100.

r Revised.

**SALES OF MAJOR AEROSPACE COMPANIES  
AS REPORTED BY THE BUREAU OF THE CENSUS**

Calendar Years 1979-1993  
(Millions of Dollars)

| Year                                | GRAND TOTAL | TOTAL      |          | Aircraft, Engines, & Parts |          | Missiles, Space, & Rocket Propulsion | Other Aerospace |         | Non-Aerospace |
|-------------------------------------|-------------|------------|----------|----------------------------|----------|--------------------------------------|-----------------|---------|---------------|
|                                     |             | U.S. Gov't | Other    | U.S. Gov't                 | Other    |                                      | U.S. Gov't      | Other   |               |
| <b>CURRENT DOLLARS</b>              |             |            |          |                            |          |                                      |                 |         |               |
| 1979                                | \$ 46,173   | \$23,299   | \$22,944 | \$ 8,649                   | \$16,023 | \$ 7,197                             | \$ 3,930        | \$2,659 | \$ 7,715      |
| 1980                                | 58,440      | 26,674     | 31,766   | 9,427                      | 20,097   | 8,393                                | 6,869           | 2,609   | 11,045        |
| 1981                                | 69,944      | 33,039     | 36,905   | 12,047                     | 21,527   | 9,722                                | 8,155           | 3,384   | 15,109        |
| 1982                                | 75,487      | 42,239     | 33,248   | 15,120                     | 16,766   | 11,980                               | 9,909           | 4,953   | 16,759        |
| 1983                                | 83,453      | 49,056     | 34,397   | 17,074                     | 18,805   | 12,745                               | 12,685          | 2,804   | 19,340        |
| 1984                                | 88,941      | 55,777     | 33,164   | 20,216                     | 17,069   | 13,624                               | 12,734          | 2,768   | 22,530        |
| 1985                                | 100,522     | 63,532     | 36,990   | 21,899                     | 22,041   | 16,741                               | 15,228          | 2,938   | 21,675        |
| 1986                                | 105,577     | 65,326     | 40,251   | 22,755                     | 25,002   | 17,535                               | 16,243          | 3,564   | 20,478        |
| 1987                                | 110,301     | 68,632     | 41,669   | 23,769                     | 25,293   | 20,715                               | 15,413          | 3,802   | 21,309        |
| 1988                                | 113,548     | 68,104     | 45,444   | 21,316                     | 29,426   | 21,514                               | 16,103          | 3,225   | 21,964        |
| 1989                                | 122,148     | 72,184     | 49,964   | 21,371                     | 32,454   | 22,643                               | 16,661          | 3,852   | 25,167        |
| 1990                                | 136,646     | 73,552     | 63,094   | 24,614                     | 41,675   | 22,040                               | 15,862          | 4,253   | 28,202        |
| 1991                                | 123,862     | 67,180     | 56,682   | 21,724                     | 46,816   | 23,311                               | 13,735          | 4,018   | 14,258        |
| 1992 <sup>r</sup>                   | 118,736     | 59,362     | 59,374   | 20,107                     | 47,562   | 21,349                               | 11,773          | 3,757   | 14,188        |
| 1993                                | 105,449     | 51,192     | 54,257   | 15,264                     | 42,585   | 19,809                               | 10,986          | 3,381   | 13,424        |
| <b>CONSTANT DOLLARS<sup>a</sup></b> |             |            |          |                            |          |                                      |                 |         |               |
| 1979                                | \$ 72,713   | \$36,691   | \$36,132 | \$13,620                   | \$25,233 | \$11,334                             | \$ 6,189        | \$4,187 | \$12,150      |
| 1980                                | 82,776      | 37,782     | 44,994   | 13,353                     | 28,466   | 11,888                               | 9,729           | 3,695   | 15,644        |
| 1981                                | 87,980      | 41,558     | 46,421   | 15,153                     | 27,078   | 12,229                               | 10,258          | 4,257   | 19,005        |
| 1982                                | 85,878      | 48,053     | 37,825   | 17,201                     | 19,074   | 13,629                               | 11,273          | 5,635   | 19,066        |
| 1983                                | 90,513      | 53,206     | 37,307   | 18,518                     | 20,396   | 13,823                               | 13,758          | 3,041   | 20,976        |
| 1984                                | 89,119      | 55,889     | 33,230   | 20,257                     | 17,103   | 13,651                               | 12,760          | 2,774   | 22,575        |
| 1985                                | 101,846     | 64,369     | 37,477   | 22,187                     | 22,331   | 16,961                               | 15,429          | 2,977   | 21,960        |
| 1986                                | 105,789     | 65,457     | 40,332   | 22,801                     | 25,052   | 15,570                               | 16,276          | 3,571   | 20,519        |
| 1987                                | 110,301     | 68,632     | 41,669   | 23,769                     | 25,293   | 20,715                               | 15,413          | 3,802   | 21,309        |
| 1988                                | 111,431     | 66,834     | 44,597   | 20,919                     | 28,877   | 21,113                               | 15,803          | 3,165   | 21,554        |
| 1989                                | 115,125     | 68,034     | 47,091   | 20,142                     | 30,588   | 21,341                               | 15,703          | 3,631   | 23,720        |
| 1990                                | 123,662     | 66,563     | 57,099   | 22,275                     | 37,715   | 19,946                               | 14,355          | 3,849   | 25,522        |
| 1991                                | 108,082     | 58,621     | 49,461   | 18,956                     | 40,852   | 20,341                               | 11,985          | 3,506   | 12,442        |
| 1992 <sup>r</sup>                   | 101,138     | 50,564     | 50,574   | 17,127                     | 40,513   | 18,185                               | 10,028          | 3,200   | 12,085        |
| 1993                                | 87,292      | 42,377     | 44,915   | 12,636                     | 35,252   | 16,398                               | 9,094           | 2,799   | 11,113        |

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).

a Based on AIA's aerospace composite price deflator, 1987=100.

r Revised.

**ORDERS AND BACKLOG OF MAJOR AEROSPACE COMPANIES  
AS REPORTED BY THE BUREAU OF THE CENSUS**

Calendar Years 1979-1993  
(Millions of Dollars)

| Year                             | GRAND TOTAL            | TOTAL               |                     | Aircraft, Engines, & Parts |           | Missiles, Space, & Rocket Propulsion | Other Aerospace |          | Non-Aerospace |
|----------------------------------|------------------------|---------------------|---------------------|----------------------------|-----------|--------------------------------------|-----------------|----------|---------------|
|                                  |                        | U.S. Gov't          | Other               | U.S. Gov't                 | Other     |                                      | U.S. Gov't      | Other    |               |
| <b>NET NEW ORDERS</b>            |                        |                     |                     |                            |           |                                      |                 |          |               |
| 1979 <sup>a</sup>                | \$ 67,561 <sup>a</sup> | \$ 28,107           | \$ 37,101           | \$ 8,762                   | \$ 30,695 | \$ 7,609                             | \$ 5,184        | \$ 4,487 | \$ 8,471      |
| 1980                             | 69,624                 | 33,496              | 36,128              | 16,555                     | 18,123    | 9,818                                | 8,528           | 4,081    | 12,519        |
| 1981                             | 74,922                 | 42,431              | 32,491              | 16,946                     | 17,911    | 12,376                               | 9,350           | 3,250    | 15,089        |
| 1982 <sup>a</sup>                | 89,168 <sup>a</sup>    | 58,849 <sup>a</sup> | 30,319 <sup>a</sup> | 20,547                     | 13,591    | 13,988                               | 13,643          | 4,762    | 20,369        |
| 1983                             | 91,647                 | 60,290              | 31,357              | 22,171                     | 16,428    | 14,248                               | 15,209          | 2,641    | 20,950        |
| 1984                             | 104,863                | 66,968              | 37,895              | 25,829                     | 21,273    | 16,485                               | 14,050          | 3,461    | 23,765        |
| 1985                             | 110,968                | 70,240              | 40,728              | 23,751                     | 26,191    | 20,328                               | 14,730          | 2,800    | 23,168        |
| 1986                             | 110,836                | 68,001              | 42,835              | 21,642                     | 26,315    | 20,445                               | 16,439          | 3,907    | 22,088        |
| 1987                             | 121,224                | 66,264              | 54,960              | 17,019                     | 35,328    | 26,272                               | 13,899          | 4,658    | 24,048        |
| 1988                             | 147,128                | 67,850              | 79,278              | 19,611                     | 62,537    | 20,240                               | 18,174          | 3,293    | 23,273        |
| 1989                             | 173,635                | 80,633              | 93,002              | 25,421                     | 71,170    | 26,820                               | 17,713          | 4,046    | 28,465        |
| 1990                             | 145,965                | 56,264              | 89,701              | 15,541                     | 66,845    | 20,207                               | 13,014          | 3,487    | 26,871        |
| 1991                             | 122,485                | 66,410              | 56,075              | 22,674                     | 44,816    | 24,955 <sup>r</sup>                  | 10,953          | 4,736    | 14,351        |
| 1992 <sup>r</sup>                | 100,306                | 53,485              | 46,821              | 16,012                     | 33,729    | 22,849                               | 10,748          | 3,709    | 13,259        |
| 1993                             | 73,318                 | 41,546              | 31,772              | 11,585                     | 18,900    | 16,218                               | 10,817          | 3,166    | 12,632        |
| <b>BACKLOG AS OF DECEMBER 31</b> |                        |                     |                     |                            |           |                                      |                 |          |               |
| 1979 <sup>a</sup>                | \$ 78,548 <sup>a</sup> | \$ 36,136           | \$ 42,123           | \$ 17,316                  | \$ 33,168 | \$ 7,388                             | \$ 5,613        | \$ 5,112 | \$ 9,662      |
| 1980                             | 89,732                 | 37,199              | 52,533              | 17,435                     | 39,800    | 8,941                                | 8,421           | 5,127    | 10,008        |
| 1981                             | 94,710                 | 46,591              | 48,119              | 21,292                     | 35,022    | 11,255                               | 9,052           | 4,940    | 13,149        |
| 1982 <sup>a</sup>                | 108,391 <sup>a</sup>   | 63,201 <sup>a</sup> | 45,190 <sup>a</sup> | 26,644                     | 31,920    | 13,262                               | 13,268          | 4,269    | 16,760        |
| 1983                             | 116,585                | 74,435              | 42,150              | 30,688                     | 29,684    | 14,962                               | 18,489          | 3,684    | 19,078        |
| 1984                             | 132,507                | 85,626              | 46,881              | 36,312                     | 33,877    | 17,823                               | 19,684          | 4,498    | 20,313        |
| 1985                             | 142,953                | 92,334              | 50,619              | 38,150                     | 38,041    | 21,410                               | 18,937          | 4,609    | 21,806        |
| 1986                             | 148,212                | 95,009              | 53,203              | 37,041                     | 38,350    | 24,320                               | 19,133          | 4,952    | 23,416        |
| 1987                             | 158,650                | 92,439              | 66,211              | 30,323                     | 49,692    | 30,544                               | 17,888          | 5,653    | 24,550        |
| 1988                             | 191,518                | 92,394              | 99,124              | 28,412                     | 82,868    | 29,078                               | 19,822          | 5,496    | 25,842        |
| 1989                             | 252,401                | 107,797             | 144,604             | 36,320                     | 122,830   | 33,771                               | 23,558          | 8,280    | 27,642        |
| 1990                             | 250,079                | 82,017              | 168,062             | 26,911                     | 146,029   | 31,648                               | 17,865          | 5,635    | 21,991        |
| 1991                             | 245,241                | 86,566              | 158,675             | 31,176                     | 142,500   | 32,657                               | 16,365          | 5,755    | 16,788        |
| 1992 <sup>r</sup>                | 236,076                | 82,655              | 153,421             | 32,369                     | 136,208   | 32,933                               | 14,040          | 5,705    | 14,821        |
| 1993                             | 205,419                | 74,489              | 130,930             | 28,689                     | 112,681   | 29,337                               | 15,194          | 5,489    | 14,029        |

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)" Series MA37D (Annually).

a 1979 and 1982 Orders and Backlog Totals are final revisions for which product group detail is not available.

r Revised.

**AEROSPACE SALES AND THE NATIONAL ECONOMY**

Calendar Years 1979–1993

(Billions of Dollars)

| Year                                | Gross Domestic Product | Industry Sales             |                            |            | Aerospace Sales As Percent of         |                         |                          |              |
|-------------------------------------|------------------------|----------------------------|----------------------------|------------|---------------------------------------|-------------------------|--------------------------|--------------|
|                                     |                        | Manufacturing <sup>r</sup> | Durable Goods <sup>r</sup> | Aero-space | GDP                                   | Manufacturing           | Durable Goods            |              |
| <b>CURRENT DOLLARS</b>              |                        |                            |                            |            |                                       |                         |                          |              |
| 1979                                | \$2,488.6              | \$1,727.2                  | \$ 910.5                   | \$ 45.4    | 1.8 %                                 | 2.6%                    | 5.0 %                    |              |
| 1980                                | 2,708.0                | 1,853.2                    | 929.3                      | 54.7       | 2.0                                   | 3.0                     | 5.9                      |              |
| 1981                                | 3,030.6                | 2,016.9                    | 1,003.9                    | 64.0       | 2.1                                   | 3.2                     | 6.4                      |              |
| 1982                                | 3,149.6                | 1,959.3                    | 950.0                      | 67.8       | 2.2                                   | 3.5                     | 7.1                      |              |
| 1983                                | 3,405.0                | 2,071.3                    | 1,026.5                    | 80.0       | 2.3                                   | 3.9                     | 7.8                      |              |
| 1984                                | 3,777.2                | 2,288.0                    | 1,174.7                    | 83.5       | 2.2                                   | 3.6                     | 7.1                      |              |
| 1985                                | 4,038.7                | 2,332.3                    | 1,214.1                    | 96.6       | 2.4                                   | 4.1                     | 8.0 <sup>f</sup>         |              |
| 1986                                | 4,268.6                | 2,334.6                    | 1,237.8                    | 106.2      | 2.5                                   | 4.5                     | 8.6                      |              |
| 1987                                | 4,539.9                | 2,474.0                    | 1,296.2                    | 110.0      | 2.4                                   | 4.4                     | 8.5                      |              |
| 1988                                | 4,900.4                | 2,681.0                    | 1,414.8                    | 114.6      | 2.3                                   | 4.3                     | 8.1                      |              |
| 1989                                | 5,250.8                | 2,790.3                    | 1,458.5                    | 120.5      | 2.3                                   | 4.3                     | 8.3                      |              |
| 1990                                | 5,546.1 <sup>r</sup>   | 2,870.0                    | 1,466.0                    | 134.4      | 2.4                                   | 4.7                     | 9.2 <sup>f</sup>         |              |
| 1991 <sup>r</sup>                   | 5,724.8                | 2,825.8                    | 1,430.0                    | 139.2      | 2.4                                   | 4.9                     | 9.7                      |              |
| 1992 <sup>r</sup>                   | 6,020.2                | 2,931.9                    | 1,505.8                    | 138.6      | 2.3                                   | 4.7                     | 9.2                      |              |
| 1993                                | 6,343.3                | 3,100.1                    | 1,628.9                    | 124.2      | 2.0                                   | 4.0                     | 7.6                      |              |
|                                     |                        |                            |                            |            | <b>Real Annual Growth<sup>b</sup></b> |                         |                          |              |
| <b>CONSTANT DOLLARS<sup>a</sup></b> |                        |                            |                            |            | <b>GDP</b>                            | <b>Mfg.<sup>r</sup></b> | <b>Durs.<sup>r</sup></b> | <b>Aero.</b> |
| 1979                                | \$3,796.5              | \$2,634.9                  | \$1,389.1                  | \$ 71.5    | 2.5                                   | 4.3%                    | 3.0%                     | 9.1%         |
| 1980                                | 3,776.3                | 2,584.3                    | 1,296.0                    | 77.5       | (0.5)                                 | (1.9)                   | (6.7)                    | 8.3          |
| 1981                                | 3,843.0                | 2,557.5                    | 1,273.1                    | 80.5       | 1.8                                   | (1.0)                   | (1.8)                    | 3.9          |
| 1982                                | 3,760.3                | 2,339.2                    | 1,134.2                    | 77.1       | (2.2)                                 | (8.5)                   | (10.9)                   | (4.2)        |
| 1983                                | 3,906.6                | 2,376.5                    | 1,177.7                    | 86.7       | 3.9                                   | 1.6                     | 3.8                      | 12.5         |
| 1984                                | 4,150.8 <sup>r</sup>   | 2,514.3                    | 1,290.9                    | 83.7       | 6.2                                   | 5.8                     | 9.6                      | (3.6)        |
| 1985                                | 4,279.6                | 2,471.5                    | 1,286.5                    | 97.8       | 3.1 <sup>f</sup>                      | (1.7)                   | (0.3)                    | 17.0         |
| 1986                                | 4,404.3                | 2,408.8                    | 1,277.2                    | 106.4      | 2.9                                   | (2.5)                   | (0.7)                    | 8.7          |
| 1987                                | 4,539.9                | 2,474.0                    | 1,296.2                    | 110.0      | 3.1                                   | 2.7                     | 1.5                      | 3.4          |
| 1988                                | 4,718.7                | 2,581.6                    | 1,362.4                    | 112.4      | 3.9                                   | 4.4                     | 5.1                      | 2.2          |
| 1989                                | 4,839.4                | 2,571.7                    | 1,344.2                    | 113.6      | 2.6                                   | (0.4)                   | (1.3)                    | 1.0          |
| 1990 <sup>r</sup>                   | 4,895.1                | 2,533.1                    | 1,293.9                    | 121.6      | 1.1                                   | (1.5)                   | (3.7)                    | 7.0          |
| 1991 <sup>r</sup>                   | 4,863.9                | 2,400.9                    | 1,215.0                    | 121.5      | (0.6)                                 | (5.2)                   | (6.1)                    | (0.1)        |
| 1992 <sup>r</sup>                   | 4,971.3                | 2,421.1                    | 1,243.4                    | 118.1      | 2.2                                   | 0.8                     | 2.3                      | (2.8)        |
| 1993                                | 5,103.2                | 2,494.1                    | 1,310.4                    | 102.8      | 2.7                                   | 3.0                     | 5.4                      | (12.0)       |

Source: Council of Economic Advisors, "Economic Indicators" (Monthly); Bureau of Census; and Aerospace Industries Association.

a Aerospace industry constant dollar sales based on AIA's aerospace composite price deflator, 1987=100. Others based on GDP implicit price deflator, 1987=100.

b Parentheses indicate negative real annual growth.

r Revised.

**GROSS DOMESTIC PRODUCT,  
FEDERAL BUDGET, AND DEFENSE BUDGET**

Fiscal Years 1962–1995  
(Billions of Dollars)

| Year              | Fiscal Year<br>GDP <sup>f</sup> | Federal Budget Outlays    |                                  | Defense Outlays <sup>c</sup><br>as percent of |                   |
|-------------------|---------------------------------|---------------------------|----------------------------------|---|-------------------|
|                   |                                 | Net<br>Total <sup>a</sup> | National<br>Defense <sup>b</sup> | GDP   | Federal<br>Budget |
| 1962              | \$ 555.2                        | \$ 106.8                  | \$ 52.3                          | 9.4%  | 49.0%             |
| 1963              | 584.8                           | 111.3                     | 53.4                             | 9.1   | 48.0              |
| 1964              | 625.3                           | 118.5                     | 54.8                             | 8.8 <sup>f</sup>                              | 46.2              |
| 1965              | 671.0                           | 118.2                     | 50.6                             | 7.5   | 42.8              |
| 1966              | 735.4                           | 134.5                     | 58.1                             | 7.9   | 43.2              |
| 1967              | 793.3                           | 157.5                     | 71.4                             | 9.0   | 45.4              |
| 1968              | 847.2                           | 178.1                     | 81.9                             | 9.7 <sup>f</sup>                              | 46.0              |
| 1969              | 925.7                           | 183.6                     | 82.5                             | 8.9   | 44.9              |
| 1970              | 985.4                           | 195.6                     | 81.7                             | 8.3   | 41.8              |
| 1971              | 1,050.9                         | 210.2                     | 78.9                             | 7.5   | 37.5              |
| 1972              | 1,147.8                         | 230.7                     | 79.2                             | 6.9   | 34.3              |
| 1973              | 1,274.0                         | 245.7                     | 76.7                             | 6.0   | 31.2              |
| 1974              | 1,403.6                         | 269.4                     | 79.3                             | 5.7   | 29.5              |
| 1975              | 1,509.8                         | 332.3                     | 86.5                             | 5.7   | 26.0              |
| 1976              | 1,684.2                         | 371.8                     | 89.6                             | 5.3   | 24.1              |
| Tr. Qtr.          | 445.0                           | 96.0                      | 22.3                             | 5.0   | 23.2              |
| 1977              | 1,917.2                         | 409.2                     | 97.2                             | 5.1   | 23.8              |
| 1978              | 2,155.0                         | 458.7                     | 104.5                            | 4.8   | 22.8              |
| 1979              | 2,429.5                         | 503.5                     | 116.3                            | 4.8   | 23.1              |
| 1980              | 2,644.1                         | 590.9                     | 134.0                            | 5.1   | 22.7              |
| 1981              | 2,964.4                         | 678.2                     | 157.5                            | 5.3   | 23.2              |
| 1982              | 3,122.2                         | 745.8                     | 185.3                            | 5.9   | 24.8              |
| 1983              | 3,316.5                         | 808.4                     | 209.9                            | 6.3   | 26.0              |
| 1984              | 3,695.0                         | 851.8                     | 227.4                            | 6.2   | 26.7              |
| 1985              | 3,967.7                         | 946.4                     | 252.7 <sup>b</sup>               | 6.4   | 26.7              |
| 1986              | 4,219.0                         | 990.3                     | 273.4                            | 6.5   | 27.6              |
| 1987              | 4,452.4                         | 1,003.9                   | 282.0                            | 6.3   | 28.1              |
| 1988              | 4,808.4                         | 1,064.1                   | 290.4                            | 6.0   | 27.3              |
| 1989              | 5,173.3                         | 1,143.2 <sup>f</sup>      | 303.6                            | 5.9   | 26.6 <sup>f</sup> |
| 1990              | 5,481.5                         | 1,252.7 <sup>f</sup>      | 299.3                            | 5.5   | 23.9              |
| 1991              | 5,673.3                         | 1,323.8 <sup>f</sup>      | 273.3 <sup>c</sup>               | 4.8 <sup>f</sup>                              | 20.6 <sup>f</sup> |
| 1992              | 5,937.2                         | 1,380.9                   | 298.4 <sup>c</sup>               | 5.0 <sup>f</sup>                              | 21.6              |
| 1993              | 6,294.8                         | 1,408.2                   | 291.1 <sup>c</sup>               | 4.6   | 20.7              |
| 1994 <sup>E</sup> | 6,641.2                         | 1,483.8                   | 279.8                            | 4.2   | 18.9              |
| 1995 <sup>E</sup> | 7,022.0                         | 1,518.9                   | 270.7                            | 3.9   | 17.8              |

Source: Office of Management and Budget. "The Budget of the United States Government" (Annually).

a "Net Total" is government-wide total less intragovernmental transactions.

b "National Defense" includes the military budget of DoD and other defense-related activities. Beginning in 1985, the Federal Budget reflects establishment of a military retirement trust fund. Data for prior years adjusted for comparable treatment of military retired pay.

c 1991–1993 reflects transfers from the Defense Cooperation Account funded by foreign government and private cash contributions reducing total U.S.-funded military outlays.

E Estimate.

f Revised.

Tr. Qtr. See Glossary.



## FEDERAL OUTLAYS DEFENSE, NASA, AND AEROSPACE PRODUCTS & SERVICES

Fiscal Years 1967–1995

(Millions of Dollars)

| Year              | TOTAL<br>National<br>Defense | TOTAL<br>NASA | Federal Outlays<br>for Aerospace<br>Products & Services |                     |                     | Aero-<br>space as<br>Percent<br>of Total<br>National<br>Defense<br>and NASA |
|-------------------|------------------------------|---------------|---|---------------------|---------------------|---|
|                   |                              |               | TOTAL   | DoD <sup>a</sup>    | NASA                |   |
| 1967              | \$ 71,417                    | \$ 5,426      | \$15,478  | \$10,341            | \$ 5,137            | 20.1  |
| 1968              | 81,926                       | 4,724         | 16,279  | 11,681              | 4,598               | 18.8  |
| 1969              | 82,497                       | 4,252         | 15,872  | 11,686              | 4,186               | 18.3  |
| 1970              | 81,692                       | 3,753         | 14,559  | 10,860              | 3,699               | 17.0  |
| 1971              | 78,872                       | 3,382         | 12,918  | 9,580               | 3,338               | 15.7  |
| 1972              | 79,174                       | 3,423         | 12,309  | 8,936               | 3,373               | 14.9  |
| 1973              | 76,681                       | 3,315         | 11,360  | 8,089               | 3,271               | 14.2  |
| 1974              | 79,347                       | 3,256         | 11,168  | 7,987               | 3,181               | 13.5  |
| 1975              | 86,509                       | 3,267         | 11,544  | 8,373               | 3,181               | 12.9  |
| 1976              | 89,619                       | 3,669         | 12,364  | 8,816               | 3,548               | 13.3  |
| Tr. Qtr.          | 22,269                       | 951           | 2,855   | 1,959               | 926                 | 12.3  |
| 1977              | 97,241                       | 3,945         | 13,229  | 9,389               | 3,840               | 13.1  |
| 1978              | 104,495                      | 3,983         | 13,926  | 10,067              | 3,859               | 12.8  |
| 1979              | 116,342                      | 4,197         | 16,686  | 12,622              | 4,064               | 13.8  |
| 1980              | 133,995                      | 4,852         | 20,269  | 15,558              | 4,711               | 14.6  |
| 1981              | 157,513                      | 5,421         | 24,276  | 19,002              | 5,274               | 14.9  |
| 1982              | 185,309                      | 6,035         | 29,501  | 23,575              | 5,926               | 15.4  |
| 1983              | 209,903                      | 6,664         | 35,364  | 28,808              | 6,556               | 16.3  |
| 1984              | 227,413                      | 7,048         | 39,663  | 32,723              | 6,940               | 16.9  |
| 1985              | 252,748                      | 7,318         | 44,483  | 37,335              | 7,148               | 17.1  |
| 1986              | 273,375                      | 7,404         | 49,773  | 42,558              | 7,215               | 17.7  |
| 1987              | 281,999                      | 7,591         | 51,871  | 44,429              | 7,442               | 17.9  |
| 1988              | 290,361                      | 9,092         | 48,848  | 3,922               | 8,926               | 16.3  |
| 1989              | 303,559                      | 11,052        | 52,933  | 42,072              | 10,861              | 16.8  |
| 1990              | 299,331                      | 12,429        | 53,194 <sup>r</sup>                                     | 40,992              | 12,202 <sup>r</sup> | 17.1  |
| 1991 <sup>b</sup> | 273,292                      | 13,878        | 53,630 <sup>r</sup>                                     | 40,089 <sup>r</sup> | 13,541 <sup>r</sup> | 18.7  |
| 1992 <sup>b</sup> | 298,350                      | 13,961        | 50,569 <sup>r</sup>                                     | 37,085              | 13,484 <sup>r</sup> | 16.2  |
| 1993 <sup>b</sup> | 291,086                      | 14,306        | 45,496  | 31,763              | 13,733              | 14.9  |
| 1994 <sup>E</sup> | 279,824                      | 14,183        | 41,331  | 27,700              | 13,631              | 14.1  |
| 1995 <sup>E</sup> | 270,725                      | 14,411        | 38,856  | 24,902              | 13,954              | 13.6  |

Source: Office of Management and Budget, "The Budget of the United States Government" (Annually); Department of Defense, "Status of Funds" (Annual Summaries); and NASA, "Pocket Statistics" (Annually).

NOTE: "National Defense" includes the military budget of the Department of Defense and other defense-related activities. "TOTAL NASA" includes all categories of the NASA budget; NASA construction is not included in "Aerospace Products and Services." See additional explanation with following table.

a Outlays for aircraft and missile procurement. Does not include RDT&E, which DoD has not reported by product group since 1977, and which, for comparability, has been subtracted from data previously reported in this table for earlier years. Also included are revisions to missile procurement data.

b 1991–1993 reflects transfers from the Defense Cooperation Account funded by foreign government and private cash contributions reducing total U.S.-funded military outlays.

E Estimate. Latest year reflects Administration's budget proposal.

r Revised.

Tr. Qtr. See Glossary.

## FEDERAL OUTLAYS FOR AEROSPACE PRODUCTS AND SERVICES

Fiscal Years 1967–1995

(Millions of Dollars)

| Year              | TOTAL               | Department of Defense <sup>a</sup> |          |                     | NASA <sup>b</sup>   |
|-------------------|---------------------|------------------------------------|----------|---------------------|---------------------|
|                   |                     | TOTAL                              | Aircraft | Missiles            |                     |
| 1967              | \$15,478            | \$10,341                           | \$ 8,411 | \$ 1,930            | \$ 5,137            |
| 1968              | 16,279              | 11,681                             | 9,462    | 2,219               | 4,598               |
| 1969              | 15,872              | 11,686                             | 9,177    | 2,509               | 4,186               |
| 1970              | 14,559              | 10,860                             | 7,948    | 2,912               | 3,699               |
| 1971              | 12,918              | 9,580                              | 6,549    | 3,031               | 3,338               |
| 1972              | 12,309              | 8,936                              | 5,927    | 3,009               | 3,373               |
| 1973              | 11,360              | 8,089                              | 5,066    | 3,023               | 3,271               |
| 1974              | 11,168              | 7,987                              | 5,006    | 2,981               | 3,181               |
| 1975              | 11,554              | 8,373                              | 5,484    | 2,889               | 3,181               |
| 1976              | 12,364              | 8,816                              | 6,520    | 2,296               | 3,548               |
| Tr. Qtr.          | 2,885               | 1,959                              | 1,557    | 402                 | 926                 |
| 1977              | 13,229              | 9,389                              | 6,608    | 2,781               | 3,840               |
| 1978              | 13,926              | 10,067                             | 6,971    | 3,096               | 3,859               |
| 1979              | 16,686              | 12,622                             | 8,836    | 3,786               | 4,064               |
| 1980              | 20,269              | 15,558                             | 11,124   | 4,434               | 4,711               |
| 1981              | 24,276              | 19,002                             | 13,193   | 5,809               | 5,274               |
| 1982              | 29,501              | 23,575                             | 16,793   | 6,782               | 5,926               |
| 1983              | 35,364              | 58,808                             | 21,013   | 7,795               | 6,556               |
| 1984              | 39,663              | 32,723                             | 23,196   | 9,527               | 6,940               |
| 1985              | 44,483              | 37,335                             | 26,586   | 10,749              | 7,148               |
| 1986              | 49,773              | 42,558                             | 30,828   | 11,730              | 7,215               |
| 1987              | 51,871              | 44,429                             | 32,956   | 11,473 <sup>c</sup> | 7,442               |
| 1988              | 48,848              | 39,922                             | 28,246   | 11,676              | 8,926               |
| 1989              | 52,933              | 42,072                             | 27,569   | 14,503              | 10,861              |
| 1990              | 53,194 <sup>r</sup> | 40,992                             | 26,142   | 14,851              | 12,202 <sup>r</sup> |
| 1991              | 53,630 <sup>r</sup> | 40,089                             | 25,689   | 14,400              | 13,541 <sup>r</sup> |
| 1992              | 50,569 <sup>r</sup> | 37,085                             | 23,581   | 13,504              | 13,484 <sup>r</sup> |
| 1993              | 45,496              | 31,763                             | 20,359   | 11,404              | 13,733              |
| 1994 <sup>E</sup> | 41,331              | 27,700                             | 18,328   | 9,372               | 13,631              |
| 1995 <sup>E</sup> | 38,856              | 24,902                             | 17,005   | 7,897               | 13,954              |

Source: Department of Defense, "Status of Funds" (Annual Summaries); Office of Management and Budget, "The Budget of the United States Government" (Annually); and NASA, "Pocket Statistics" (Annually).

a Outlays for aircraft and missile procurement. Does not include RDT&E, which DoD has not reported by product group since 1977, and which for comparability, has been subtracted from data previously reported in this table for earlier years.

b Includes Research & Development and Research & Program Management, and effective with 1984 data, Space Flight, Control, and Data Communications; excludes Construction of Facilities.

c Beginning in 1978, DoD combined Navy Missile Procurement with torpedoes and other related products into Navy Weapons Procurement, of which missiles comprise approximately 80 percent.

E Estimate. Latest year reflects Administration's budget proposal.

r Revised.

Tr. Qtr. See Glossary.

**DEPARTMENT OF DEFENSE**  
**TOTAL MILITARY OUTLAYS BY FUNCTIONAL TITLE<sup>a</sup>**  
 Fiscal Years 1986–1995  
 (Millions of Dollars)

|                                      | 1986             | 1987             | 1988             | 1989             |
|--------------------------------------|------------------|------------------|------------------|------------------|
| <b>TOTAL</b> .....                   | \$265,480        | \$273,966        | \$281,935        | \$294,880        |
| <b>Procurement—TOTAL</b> .....       | <u>\$ 76,517</u> | <u>\$ 80,744</u> | <u>\$ 77,166</u> | <u>\$ 81,620</u> |
| Aircraft .....                       | 30,828           | 32,956           | 28,246           | 27,569           |
| Missiles <sup>b</sup> .....          | 11,730           | 11,473           | 11,676           | 14,503           |
| Ships .....                          | 9,501            | 9,316            | 8,878            | 10,587           |
| Weapons <sup>b</sup> .....           | 4,343            | 4,962            | 4,727            | 4,384            |
| Ammunition .....                     | 1,933            | 2,111            | 2,250            | 1,993            |
| Other <sup>c</sup> .....             | 18,182           | 19,926           | 21,389           | 22,585           |
| <b>Military Personnel—TOTAL</b> .... | <u>71,511</u>    | <u>72,020</u>    | <u>76,337</u>    | <u>80,676</u>    |
| Active Forces .....                  | 63,139           | 63,810           | 67,642           | 71,571           |
| Reserve Forces .....                 | 8,373            | 8,210            | 8,694            | 9,104            |
| RDT&E .....                          | 32,283           | 33,596           | 34,792           | 37,002           |
| Operations & Maintenance .....       | 75,288           | 76,205           | 84,475           | 87,001           |
| Military Construction .....          | 5,067            | 5,853            | 5,874            | 5,275            |
| Family Housing .....                 | 2,819            | 2,908            | 3,082            | 3,257            |
| Other <sup>d</sup> .....             | 1,995            | 2,640            | 210              | 50               |

Source: Department of Defense, "Status of Funds" (Annual Summaries) and Office of Management and Budget, "The Budget of the United States Government" (Annually).

NOTE: Data in parentheses are credit items. Detail may not add to totals because of rounding.

- a Includes all items in the DoD military budget; excludes the DoD civil budget for the Army Corps of Engineers and other non-defense related activities.
- b Beginning in 1978, DoD combined Navy Missiles Procurement with torpedoes and other related products into Navy Weapons Procurement. Missiles comprise approximately 80 percent of the value of this category.
- c Includes Communications and Electronics.
- d 1991–1993 reflects transfers from the Defense Cooperation Account funded by foreign government and private contributions reducing total U.S.-funded military outlays.
- E Estimate. Latest year reflects Administration's budget proposal.
- r Revised.

**DEPARTMENT OF DEFENSE**  
**TOTAL MILITARY OUTLAYS BY FUNCTIONAL TITLE<sup>a</sup> (Continued)**  
 Fiscal Years 1986–1995  
 (Millions of Dollars)

| 1990             | 1991                    | 1992                         | 1993                   | 1994 <sup>E</sup> | 1995 <sup>E</sup> |
|------------------|-------------------------|------------------------------|------------------------|-------------------|-------------------|
| \$289,755        | \$262,389 <sup>dr</sup> | \$286,842 <sup>dr</sup>      | \$278,561 <sup>d</sup> | \$267,360         | \$259,228         |
| <u>\$ 80,972</u> | <u>\$ 82,028</u>        | <u>\$ 74,881<sup>r</sup></u> | <u>\$ 69,936</u>       | <u>\$ 60,814</u>  | <u>\$ 55,138</u>  |
| 26,142           | 25,689                  | 23,581                       | 20,359                 | 18,328            | 17,005            |
| 14,851           | 14,400                  | 13,504                       | 11,404                 | 9,372             | 7,897             |
| 11,016           | 11,512                  | 11,035                       | 10,136                 | 9,018             | 8,288             |
| 3,873            | 3,716                   | 3,324                        | 3,061                  | 2,322             | 1,587             |
| 2,003            | 2,103                   | 1,996                        | 1,383                  | 983               | 1,110             |
| 23,088           | 24,609                  | 21,442                       | 23,593                 | 20,790            | 19,250            |
| <u>75,622</u>    | <u>83,439</u>           | <u>81,171</u>                | <u>75,904</u>          | <u>70,980</u>     | <u>70,260</u>     |
| 66,541           | 74,571                  | 71,433                       | 66,494                 | 61,600            | 61,052            |
| 9,081            | 8,868                   | 9,738                        | 9,410                  | 9,380             | 9,208             |
| 37,458           | 34,589                  | 34,632                       | 36,968                 | 35,546            | 36,054            |
| 88,340           | 101,769                 | 91,984 <sup>r</sup>          | 94,094                 | 88,695            | 87,953            |
| 5,080            | 3,497                   | 4,262                        | 4,831                  | 5,143             | 4,997             |
| 3,501            | 3,296                   | 3,271                        | 3,255                  | 3,484             | 3,521             |
| (1,218)          | (46,229) <sup>dr</sup>  | (3,308) <sup>dr</sup>        | (6,428) <sup>d</sup>   | 2,699             | 1,305             |

**FEDERAL PRICE DEFLATORS FOR GDP, DEFENSE, PPI, AND CPI  
(1964–1995)**

| Year              | GDP                         |                             | Federal Government<br>Defense Purchases            |  | PPI,<br>Capital<br>Equip-<br>ment | CPI,<br>(Urban)<br>All<br>items |
|-------------------|-----------------------------|-----------------------------|--|--|-----------------------------------|---------------------------------|
|                   | FY GDP<br>(FY 1987<br>=100) | CY GDP<br>(CY 1987<br>=100) | Durable<br>Goods <sup>r</sup><br>(CY 1987<br>=100) | Goods &<br>Services<br>(CY 1987<br>=100) | (CY 1982<br>=100)                 | (CY 82–84<br>=100)              |
| 1964              | 27.64                       | 27.7                        | NA   | NA                                       | 33.4                              | 31.0                            |
| 1965              | 28.27                       | 28.4                        | NA   | NA                                       | 33.8                              | 31.5                            |
| 1966              | 29.07                       | 29.4                        | NA   | NA                                       | 34.6                              | 32.4                            |
| 1967              | 30.06                       | 30.3                        | NA   | NA                                       | 35.8                              | 33.4                            |
| 1968              | 31.20                       | 31.8                        | NA   | NA                                       | 37.0                              | 34.8                            |
| 1969              | 32.79                       | 33.4 <sup>r</sup>           | NA   | NA                                       | 38.3                              | 36.7                            |
| 1970              | 34.57                       | 35.2 <sup>r</sup>           | NA   | NA                                       | 40.1                              | 38.8                            |
| 1971              | 36.34                       | 37.1 <sup>r</sup>           | NA   | NA                                       | 41.7                              | 40.5                            |
| 1972              | 38.23                       | 38.8                        | 38.8   | 36.9                                     | 42.8                              | 41.8                            |
| 1973              | 40.22                       | 41.3                        | 41.8   | 40.5                                     | 44.2                              | 44.4                            |
| 1974              | 43.27                       | 44.9                        | 44.3   | 44.5                                     | 50.5                              | 49.3                            |
| 1975              | 47.58                       | 49.2                        | 47.1   | 48.5                                     | 58.2                              | 53.8                            |
| 1976              | 51.22                       | 52.3                        | 51.7   | 51.9                                     | 62.1                              | 56.9                            |
| 1977              | 55.38                       | 55.9                        | 55.5   | 55.6                                     | 66.1                              | 60.6                            |
| 1978              | 59.57                       | 60.3                        | 60.4   | 59.8                                     | 71.3                              | 65.2                            |
| 1979              | 64.74                       | 65.5 <sup>r</sup>           | 67.7   | 65.8                                     | 77.5                              | 72.6                            |
| 1980              | 70.58                       | 71.7                        | 72.6   | 73.5                                     | 85.8                              | 82.4                            |
| 1981              | 77.76                       | 78.9                        | 82.0   | 81.1                                     | 94.6                              | 90.9                            |
| 1982              | 83.55                       | 83.8                        | 92.1   | 87.6                                     | 100.0                             | 96.5                            |
| 1983              | 87.02                       | 87.2                        | 98.4   | 91.6                                     | 102.8                             | 99.6                            |
| 1984              | 90.85                       | 91.0                        | 102.3  | 94.8                                     | 105.2                             | 103.9                           |
| 1985              | 94.32                       | 94.4                        | 103.0  | 97.3                                     | 107.5                             | 107.6                           |
| 1986              | 97.12                       | 96.9                        | 103.9  | 98.6                                     | 109.7                             | 109.6                           |
| 1987              | 100.00                      | 100.0                       | 100.0  | 100.0                                    | 111.7                             | 113.6                           |
| 1988              | 103.63                      | 103.9                       | 101.2  | 103.0                                    | 114.3                             | 118.3                           |
| 1989              | 108.23                      | 108.5                       | 103.0  | 106.6                                    | 118.8                             | 124.0                           |
| 1990              | 112.00 <sup>r</sup>         | 113.3 <sup>r</sup>          | 104.6  | 110.7 <sup>r</sup>                       | 122.9                             | 130.7                           |
| 1991              | 116.80                      | 117.7 <sup>r</sup>          | 106.9  | 114.7 <sup>r</sup>                       | 126.7                             | 136.2                           |
| 1992              | 120.30 <sup>r</sup>         | 121.1 <sup>r</sup>          | 107.9  | 120.1 <sup>r</sup>                       | 129.1                             | 140.3                           |
| 1993              | 123.50                      | 124.3                       | 110.9  | 125.1                                    | 134.4                             | 144.5                           |
| 1994 <sup>E</sup> | 126.60                      | 127.5                       | NA   | NA                                       | NA                                | 148.6                           |
| 1995 <sup>E</sup> | 130.10                      | 131.0                       | NA   | NA                                       | NA                                | 153.3                           |

Source: Bureau of Economic Analysis, "Current Business Statistics" (Monthly) and Price Measurement Branch; Council of Economic Advisers, "Economic Report of the President" (Annually); and Office of Management and Budget, "The Budget of the United States Government" (Annually).

<sup>E</sup> Estimate.

NA Not Available.

<sup>r</sup> Revised.

Key: PPI = Producer Price Index for Capital Equipment.

CPI = Consumer Price Index, All Items, All Urban Consumers for 1978 and subsequent years. Previous years, All Urban Wage Earners.

GDP= Gross Domestic Product.

## PRICE DEFLATORS FOR AEROSPACE INDUSTRY

Calendar Years 1972-1993

| Year              | Aerospace Deflators (1987 = 100) |             |             |             |                   |                   |
|-------------------|----------------------------------|-------------|-------------|-------------|-------------------|-------------------|
|                   | Composite                        | SIC<br>3721 | SIC<br>3724 | SIC<br>3728 | SIC<br>3761       | SIC<br>3764,9     |
| 1972              | 33.7                             | 39.9        | 30.1        | 36.6        | 39.7              | 34.4              |
| 1973              | 37.7                             | 41.2        | 30.9        | 38.1        | 39.4              | 35.6              |
| 1974              | 41.5                             | 44.8        | 34.9        | 44.0        | 41.6              | 40.5              |
| 1975              | 46.6                             | 48.3        | 42.3        | 51.6        | 45.2              | 49.2              |
| 1976              | 51.0                             | 52.8        | 45.9        | 56.5        | 50.4              | 53.8              |
| 1977              | 54.6                             | 56.2        | 49.1        | 58.7        | 55.6              | 58.2              |
| 1978              | 57.5                             | 59.3        | 54.6        | 55.2        | 60.7              | 63.6              |
| 1979              | 63.5                             | 65.3        | 60.9        | 58.9        | 69.7              | 70.0              |
| 1980              | 70.6                             | 72.9        | 66.3        | 65.3        | 78.9              | 78.5              |
| 1981              | 79.5                             | 80.8        | 77.0        | 74.9        | 87.1              | 89.5              |
| 1982              | 87.9                             | 89.8        | 85.2        | 84.3        | 93.4              | 97.2              |
| 1983              | 92.2                             | 94.4        | 89.5        | 87.9        | 98.6              | 101.5             |
| 1984              | 99.8                             | 105.9       | 98.1        | 93.6        | 100.7             | 102.9             |
| 1985 <sup>a</sup> | 98.7                             | 100.7       | 99.2        | 94.4        | 102.4             | 103.2             |
| 1986              | 99.8                             | 100.6       | 99.3        | 97.9        | 103.5             | 102.4             |
| 1987              | 100.0                            | 100.0       | 100.0       | 100.0       | 100.0             | 100.0             |
| 1988              | 101.9                            | 102.2       | 103.0       | 103.5       | 95.0              | 100.3             |
| 1989              | 106.1                            | 111.0       | 105.8       | 106.8       | 91.4              | 100.6             |
| 1990              | 110.5                            | 116.8       | 111.7       | 109.8       | 91.5              | 98.1              |
| 1991              | 114.6                            | 121.3       | 117.0       | 113.6       | 94.4              | 94.6              |
| 1992              | 117.4                            | 125.2       | 122.7       | 118.0       | 93.1 <sup>r</sup> | 83.5 <sup>r</sup> |
| 1993              | 120.8                            | 129.5       | 124.7       | 120.9       | 84.6              | 89.7              |

Source: Aerospace Industries Association, based on data from: Bureau of Labor Statistics, Producer Price Indices; Bureau of Economic Analysis, Implicit Price Deflators; and International Trade Administration.

<sup>a</sup> The Commerce Department has discontinued its reporting of the Aerospace Deflators with 1986. Subsequent composite deflators computed by AIA and deflators for 1985 and 1986 revised for consistency.

<sup>r</sup> Revised.

Key: SIC = Standard Industrial Classification, SIC 3721 = Aircraft; SIC 3724 = Aircraft Engines and Engine Parts; SIC 3728 = Aircraft Parts; SIC 3761 = Missiles and Space Vehicles; SIC 3764 = Space Propulsion; SIC 3769 = Space Equipment not elsewhere classified.

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## AIRCRAFT PRODUCTION

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The industry's sales of aircraft, engines, and parts, generally the largest single component of overall sales volume, fell precipitously in 1993 as both civil and military aircraft production dropped below the previous year's levels. According to Bureau of the Census data, total sales of aircraft, engines, and parts amounted to \$57.8 billion, a reduction of almost \$10 billion (15 percent) below the previous year's \$67.7 billion. Sales to the U.S. government (virtually all military aircraft) totaled \$15.3 billion,

down from \$20.1 billion in 1992. Sales in the non-U.S. government sector (largely commercial aircraft), which had been on the increase for eight consecutive years, fell to \$42.6 billion from 1992's \$47.6 billion.

The marked decline in aircraft production activity was further evident in Census' figures on orders and backlog for aircraft, engines, and parts. Net new orders totaled \$30.5 billion, the lowest figure since 1978 and a drop of almost 40 percent below the previous year's \$49.7 billion.

The decline in orders was compounded of sharp reductions in both U.S. government military and commercial orders. For 1993, the industry received orders from the U.S. government totaling \$11.6 billion, down from \$16 billion in 1992. Non-U.S. government orders came to \$18.9 billion, down from 1992's \$33.7 billion.

The backlog of orders for aircraft, engines, and parts fell by more than 16 percent to \$141.4 billion, which compares with \$168.6 billion in 1992. The



backlog was composed of \$112.7 billion in orders of non-U.S. government origin (almost 80 percent of the total) and \$26.7 billion in U.S. government orders. The comparable figures for 1992 were \$136.2 billion (non-U.S. government) and \$32.4 billion (U.S. government). A breakdown of 1993 civil aircraft production shows that commercial transport manufacture

accounted for \$24.1 billion, or more than 90 percent of the \$26.4 billion total; the latter figure compares with \$30.7 billion in 1992. The industry built 408 transports, 159 fewer than in 1992.

Sales of civil helicopters continued on the steep decline in evidence since 1988. The industry produced only 258 civil rotary-wing craft, down from 324 in 1992. In dollar value terms, helicopter shipments amounted to only \$113 million, the lowest figure in more than 20 years; it compares with \$142 million in 1992.

Production of general aviation aircraft, which had declined in each of the three preceding years, experi-



enced a slight rebound. The industry shipped 964 aircraft valued at \$2.1 billion; the figures compare with 899 planes worth \$1.8 billion in 1992.

As indicated by the sharp decline in military aircraft sales value, the number of military aircraft accepted by DoD dipped to the lowest level of any year since 1935. The total of 954 included 436 aircraft delivered to U.S. military agencies plus 92 exported under Foreign Military Sales (FMS) and 426 through direct sales by U.S. manufacturers to foreign governments. The comparable figures for 1992 were: total production, 753 aircraft; U.S. military agencies, 422; FMS, 122; direct sales, 209.



**SALES OF AIRCRAFT, ENGINES, AND PARTS**

Calendar Years 1979–1993  
(Millions of Dollars)

| Year                                | GRAND TOTAL | TOTAL      |          | Complete Aircraft & Parts |          | Aircraft Engines & Parts |          |
|-------------------------------------|-------------|------------|----------|---------------------------|----------|--------------------------|----------|
|                                     |             | U.S. Gov't | Other    | U.S. Gov't                | Other    | U.S. Gov't               | Other    |
| <b>CURRENT DOLLARS</b>              |             |            |          |                           |          |                          |          |
| 1979                                | \$24,672    | \$ 8,649   | \$16,023 | \$ 6,378                  | \$12,701 | \$2,271                  | \$ 3,322 |
| 1980                                | 29,524      | 9,427      | 20,097   | 6,724                     | 15,901   | 2,703                    | 4,196    |
| 1981                                | 33,574      | 12,047     | 21,527   | 8,197                     | 16,877   | 3,850                    | 4,650    |
| 1982                                | 31,886      | 15,120     | 16,766   | 10,903                    | 12,316   | 4,217                    | 4,450    |
| 1983                                | 35,879      | 17,074     | 18,805   | 12,898                    | 14,419   | 4,176                    | 4,386    |
| 1984                                | 37,285      | 20,216     | 17,069   | 15,136                    | 13,121   | 5,080                    | 3,948    |
| 1985                                | 43,940      | 21,899     | 22,041   | 17,783                    | 16,466   | 4,116                    | 5,575    |
| 1986                                | 47,757      | 22,755     | 25,002   | 18,788                    | 19,177   | 3,967                    | 5,825    |
| 1987                                | 49,062      | 23,769     | 25,293   | 18,131                    | 18,899   | 5,638                    | 6,394    |
| 1988                                | 50,742      | 21,316     | 29,426   | 15,278                    | 20,433   | 6,038                    | 8,993    |
| 1989                                | 53,825      | 21,371     | 32,454   | 15,340                    | 23,056   | 6,031                    | 9,398    |
| 1990                                | 66,289      | 24,614     | 41,675   | 18,970                    | 30,925   | 5,644                    | 10,750   |
| 1991                                | 68,540      | 21,724     | 46,816   | 16,049                    | 36,876   | 5,675                    | 9,940    |
| 1992 <sup>r</sup>                   | 67,669      | 20,107     | 47,562   | 15,009                    | 38,997   | 5,098                    | 8,565    |
| 1993                                | 57,849      | 15,264     | 42,585   | 11,327                    | 34,434   | 3,937                    | 8,151    |
| <b>CONSTANT DOLLARS<sup>a</sup></b> |             |            |          |                           |          |                          |          |
| 1979                                | \$38,854    | \$13,620   | \$25,233 | \$10,044                  | \$20,002 | \$3,576                  | \$ 5,231 |
| 1980                                | 41,819      | 13,353     | 28,466   | 9,524                     | 22,523   | 3,829                    | 5,943    |
| 1981                                | 42,231      | 15,153     | 27,078   | 10,311                    | 21,229   | 4,843                    | 5,849    |
| 1982                                | 36,275      | 17,201     | 19,074   | 12,404                    | 14,011   | 4,797                    | 5,063    |
| 1983                                | 38,914      | 18,518     | 20,396   | 13,989                    | 15,639   | 4,529                    | 4,757    |
| 1984                                | 37,360      | 20,257     | 17,103   | 15,166                    | 13,147   | 5,090                    | 3,956    |
| 1985                                | 44,519      | 22,187     | 22,331   | 18,017                    | 16,683   | 4,170                    | 5,648    |
| 1986                                | 47,853      | 22,801     | 25,052   | 18,826                    | 19,215   | 3,975                    | 5,837    |
| 1987                                | 49,062      | 23,769     | 25,293   | 18,131                    | 18,899   | 5,638                    | 6,394    |
| 1988                                | 49,796      | 20,919     | 28,877   | 14,993                    | 20,052   | 5,925                    | 8,825    |
| 1989                                | 50,730      | 20,142     | 30,588   | 14,458                    | 21,730   | 5,684                    | 8,858    |
| 1990                                | 59,990      | 22,275     | 37,715   | 17,167                    | 27,986   | 5,108                    | 9,729    |
| 1991                                | 59,808      | 18,956     | 40,852   | 14,004                    | 32,178   | 4,952                    | 8,674    |
| 1992 <sup>r</sup>                   | 57,640      | 17,127     | 40,513   | 12,784                    | 33,217   | 4,342                    | 7,296    |
| 1993                                | 47,888      | 12,636     | 35,252   | 9,377                     | 28,505   | 3,259                    | 6,748    |

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)" Series MA37D (Annually).

a Based on AIA's aerospace composite price deflator, 1987=100.

r Revised.

## ORDERS AND BACKLOG OF AIRCRAFT, ENGINES, AND PARTS

Calendar Years 1979–1993  
(Millions of Current Dollars)

| Year                             | GRAND<br>TOTAL | TOTAL         |           | Complete<br>Aircraft<br>& Parts |                        | Aircraft<br>Engines<br>& Parts |                       |
|----------------------------------|----------------|---------------|-----------|---------------------------------|------------------------|--------------------------------|-----------------------|
|                                  |                | U.S.<br>Gov't | Other     | U.S.<br>Gov't                   | Other                  | U.S.<br>Gov't                  | Other                 |
| <b>NET NEW ORDERS</b>            |                |               |           |                                 |                        |                                |                       |
| 1979                             | \$ 39,457      | \$ 8,762      | \$ 30,695 | \$ 8,762                        | \$ 25,084 <sup>a</sup> | \$2,348                        | \$ 5,611 <sup>a</sup> |
| 1980                             | 34,678         | 16,555        | 18,123    | 11,606                          | 14,427                 | 4,949                          | 3,696                 |
| 1981                             | 34,857         | 16,946        | 17,911    | 11,760                          | 12,621                 | 5,186                          | 5,290                 |
| 1982                             | 34,138         | 20,547        | 13,591    | 15,978                          | 10,540                 | 4,569                          | 3,051                 |
| 1983                             | 38,599         | 22,171        | 16,428    | 17,402                          | 11,688                 | 4,769                          | 4,740                 |
| 1984                             | 47,102         | 25,829        | 21,273    | 19,228                          | 18,148                 | 6,601                          | 3,125                 |
| 1985                             | 49,942         | 23,751        | 26,191    | 20,062                          | 20,153                 | 3,689                          | 6,038                 |
| 1986                             | 47,957         | 21,642        | 26,315    | 17,361                          | 20,083                 | 4,281                          | 6,232                 |
| 1987                             | 52,347         | 17,019        | 35,328    | 12,742                          | 26,411                 | 4,277                          | 8,917                 |
| 1988                             | 82,148         | 19,611        | 62,537    | 12,862                          | 46,393                 | 6,749                          | 16,144                |
| 1989                             | 96,591         | 25,421        | 71,170    | 20,172                          | 56,016                 | 5,249                          | 15,154                |
| 1990                             | 82,386         | 15,541        | 66,845    | 10,572                          | 54,565                 | 4,969                          | 12,280                |
| 1991                             | 67,490         | 22,674        | 44,816    | 18,139                          | 34,746                 | 4,535                          | 10,070                |
| 1992 <sup>r</sup>                | 49,741         | 16,012        | 33,729    | 12,772                          | 24,167                 | 3,240                          | 9,562                 |
| 1993                             | 30,485         | 11,585        | 18,900    | 7,940                           | 14,069                 | 3,645                          | 4,831                 |
| <b>BACKLOG AS OF DECEMBER 31</b> |                |               |           |                                 |                        |                                |                       |
| 1979                             | \$ 50,484      | \$17,316      | \$ 33,168 | \$13,331                        | \$ 27,955              | \$3,985                        | \$ 5,213              |
| 1980                             | 57,235         | 17,435        | 39,800    | 12,702                          | 33,258                 | 4,733                          | 6,542                 |
| 1981                             | 56,314         | 21,292        | 35,022    | 15,626                          | 27,683                 | 5,666                          | 7,339                 |
| 1982                             | 58,564         | 26,644        | 31,920    | 20,626                          | 25,980                 | 6,018                          | 5,940                 |
| 1983                             | 60,372         | 30,688        | 29,684    | 24,091                          | 23,377                 | 6,597                          | 6,307                 |
| 1984                             | 70,189         | 36,312        | 33,877    | 28,183                          | 28,404                 | 8,129                          | 5,473                 |
| 1985                             | 76,191         | 38,150        | 38,041    | 30,462                          | 32,091                 | 7,688                          | 5,950                 |
| 1986                             | 76,391         | 37,041        | 39,350    | 29,035                          | 32,997                 | 8,006                          | 6,353                 |
| 1987                             | 80,015         | 30,323        | 49,692    | 23,645                          | 40,849                 | 6,678                          | 8,843                 |
| 1988                             | 111,280        | 28,412        | 82,868    | 21,083                          | 66,782                 | 7,329                          | 16,086                |
| 1989                             | 159,150        | 36,320        | 122,830   | 29,182                          | 102,814                | 7,138                          | 20,016                |
| 1990                             | 172,940        | 26,911        | 146,029   | 20,382                          | 126,000                | 6,529                          | 20,029                |
| 1991                             | 173,676        | 31,176        | 142,500   | 24,822                          | 124,112                | 6,354                          | 18,388                |
| 1992 <sup>r</sup>                | 168,577        | 32,369        | 136,208   | 27,862                          | 119,572                | 4,507                          | 16,636                |
| 1993                             | 141,370        | 28,689        | 112,681   | 24,475                          | 99,207                 | 4,214                          | 13,474                |

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)" Series MA37D (Annually).

a AIA estimate, based on MQ37D data.

r Revised.

## U.S. AIRCRAFT PRODUCTION—CIVIL

Calendar Years 1969–1993

| Year | TOTAL  | Domestic Shipments |              |                  | Export Shipments |              |                  |
|------|--------|--------------------|--------------|------------------|------------------|--------------|------------------|
|      |        | Trans-ports        | Heli-copters | General Aviation | Trans-ports      | Heli-copters | General Aviation |
| 1969 | 13,505 | 332                | 282          | 9,996            | 182              | 252          | 2,461            |
| 1970 | 8,076  | 127                | 150          | 5,246            | 184              | 332          | 2,037            |
| 1971 | 8,158  | 50                 | 171          | 5,900            | 173              | 298          | 1,566            |
| 1972 | 10,576 | 79                 | 319          | 7,702            | 148              | 256          | 2,072            |
| 1973 | 14,709 | 143                | 342          | 10,482           | 151              | 428          | 3,163            |
| 1974 | 15,326 | 91                 | 433          | 9,903            | 241              | 395          | 4,263            |
| 1975 | 15,251 | 127                | 528          | 10,804           | 188              | 336          | 3,268            |
| 1976 | 16,429 | 64 <sup>a</sup>    | 442          | 12,232           | 158              | 315          | 3,218            |
| 1977 | 17,913 | 54                 | 527          | 13,441           | 101              | 321          | 3,469            |
| 1978 | 18,962 | 130                | 536          | 14,346           | 111              | 368          | 3,471            |
| 1979 | 18,460 | 176                | 570          | 13,177           | 200              | 459          | 3,878            |
| 1980 | 13,634 | 150                | 841          | 8,703            | 237              | 525          | 3,178            |
| 1981 | 10,916 | 132                | 619          | 6,840            | 255              | 453          | 2,617            |
| 1982 | 5,085  | 111                | 333          | 3,326            | 121              | 254          | 940              |
| 1983 | 3,356  | 133                | 187          | 2,172            | 129              | 216          | 519              |
| 1984 | 2,999  | 102                | 143          | 2,013            | 83               | 233          | 425              |
| 1985 | 2,691  | 126                | 247          | 1,545            | 152              | 137          | 484              |
| 1986 | 2,156  | 171                | 120          | 1,031            | 159              | 210          | 464              |
| 1987 | 1,800  | 187                | 116          | 598              | 170              | 242          | 487              |
| 1988 | 1,949  | 206                | 103          | 500              | 217              | 280          | 643              |
| 1989 | 2,448  | 138                | 221          | 225              | 260              | 294          | 1,310            |
| 1990 | 2,268  | 215                | 254          | 335              | 306              | 349          | 809              |
| 1991 | 2,181  | 204                | 253          | 487              | 385              | 318          | 534              |
| 1992 | 1,790  | 180                | 112          | 541              | 387              | 212          | 358              |
| 1993 | 1,630  | 130                | 83           | 631              | 278              | 175          | 333              |

Source: Aerospace Industries Association, based on company reports; General Aviation Manufacturers Association; and Department of Commerce, International Trade Administration.

a Prior to 1976, includes the C-130 military transport.

## U.S. AIRCRAFT PRODUCTION—MILITARY

Calendar Years 1969–1993

| Year              | TOTAL            | U.S. Military Agencies | Exports |                  |                     |
|-------------------|------------------|------------------------|---------|------------------|---------------------|
|                   |                  |                        | Total   | FMS <sup>a</sup> | Direct <sup>b</sup> |
| 1969              | 4,290            | 3,644                  | 646     | NA               | NA                  |
| 1970              | 3,720            | 3,085                  | 635     | NA               | NA                  |
| 1971              | 2,914            | 2,232                  | 682     | NA               | NA                  |
| 1972              | 2,530            | 1,993                  | 537     | 124              | 413                 |
| 1973              | 1,821            | 1,243                  | 578     | 129              | 449                 |
| 1974              | 1,513            | 799                    | 714     | 365              | 349                 |
| 1975              | 1,779            | 844                    | 935     | 525              | 410                 |
| 1976              | 1,318            | 625                    | 693     | 518              | 175                 |
| 1977              | 1,134            | 454                    | 680     | 408              | 272                 |
| 1978              | 996              | 467                    | 529     | 256              | 273                 |
| 1979              | 837              | 531                    | 306     | 203              | 103                 |
| 1980              | 1,047            | 625                    | 422     | 194              | 228                 |
| 1981              | 1,062            | 703                    | 359     | 215              | 144                 |
| 1982              | 1,159            | 690                    | 469     | 68               | 401                 |
| 1983              | 1,053            | 766                    | 287     | 70               | 217                 |
| 1984              | 936              | 561                    | 375     | 71               | 304                 |
| 1985              | 919              | 643                    | 276     | 134              | 142                 |
| 1986              | 1,107            | 708                    | 399     | 110              | 289                 |
| 1987              | 1,210            | 725                    | 485     | 133              | 352                 |
| 1988              | 1,305            | 687                    | 618     | 138              | 480                 |
| 1989              | 1,261            | 614                    | 647     | 92               | 555                 |
| 1990 <sup>r</sup> | 1,053            | 664                    | 387     | 99               | 290                 |
| 1991 <sup>r</sup> | 911              | 556                    | 355     | 94               | 261                 |
| 1992 <sup>r</sup> | 753              | 422                    | 331     | 122              | 209                 |
| 1993              | 954 <sup>c</sup> | 436                    | 518     | 92               | 426 <sup>c</sup>    |

Source: Aerospace Industries Association, based on USAF, USN, and USA survey responses and Department of Commerce, International Trade Administration.

a Also includes acceptances of NATO AWACS aircraft.

b Military aircraft exported via commercial contracts, directly from manufacturers to foreign governments.

c The number of small (450 kg–2000 kg), new aircraft exported doubled in 1993 to 340 worth \$18 million.

NA Not available.

r Revised.

**CIVIL AIRCRAFT SHIPMENTS**

Calendar Years 1979–1993

| Year                              | TOTAL    | Transport Aircraft <sup>a</sup> | Helicopters | General Aviation   |
|-----------------------------------|----------|---------------------------------|-------------|--------------------|
| <b>NUMBER OF AIRCRAFT SHIPPED</b> |          |                                 |             |                    |
| 1979                              | 18,460   | 376                             | 1,029       | 17,055             |
| 1980                              | 13,634   | 387                             | 1,366       | 11,881             |
| 1981                              | 10,916   | 387                             | 1,072       | 9,457              |
| 1982                              | 5,085    | 232                             | 587         | 4,266              |
| 1983                              | 3,356    | 262                             | 403         | 2,691 <sup>b</sup> |
| 1984                              | 2,999    | 185                             | 376         | 2,438              |
| 1985                              | 2,691    | 278                             | 384         | 2,029              |
| 1986                              | 2,155    | 330                             | 330         | 1,495              |
| 1987                              | 1,800    | 357                             | 358         | 1,085              |
| 1988                              | 1,949    | 423                             | 383         | 1,143              |
| 1989                              | 2,448    | 398                             | 515         | 1,535              |
| 1990                              | 2,268    | 521                             | 603         | 1,144              |
| 1991                              | 2,181    | 589                             | 571         | 1,021              |
| 1992                              | 1,790    | 567                             | 324         | 899                |
| 1993                              | 1,630    | 408                             | 258         | 964                |
| <b>VALUE—Millions of Dollars</b>  |          |                                 |             |                    |
| 1979                              | \$10,644 | \$ 8,030                        | \$403       | \$2,211            |
| 1980                              | 13,058   | 9,895                           | 656         | 2,507              |
| 1981                              | 13,223   | 9,706                           | 597         | 2,920              |
| 1982                              | 8,610    | 6,246                           | 365         | 1,999              |
| 1983                              | 9,773    | 8,000                           | 303         | 1,470 <sup>b</sup> |
| 1984                              | 7,717    | 5,689                           | 330         | 1,698              |
| 1985                              | 10,385   | 8,448                           | 506         | 1,431              |
| 1986                              | 11,858   | 10,308                          | 288         | 1,262              |
| 1987                              | 12,148   | 10,507                          | 277         | 1,364              |
| 1988                              | 15,855   | 13,603                          | 334         | 1,918              |
| 1989                              | 17,129   | 15,074                          | 251         | 1,804              |
| 1990                              | 24,477   | 22,215                          | 254         | 2,008              |
| 1991                              | 29,035   | 26,856                          | 211         | 1,968              |
| 1992                              | 30,728   | 28,750                          | 142         | 1,836              |
| 1993                              | 26,389   | 24,133                          | 113         | 2,144              |

Source: Aerospace Industries Association, based on company reports and General Aviation Manufacturers' Association.

a U.S.-manufactured fixed-wing aircraft over 33,000 pounds empty weight, including all jet transports plus the four-engine turboprop-powered Lockheed L-100.

b Includes 3 off-the-shelf Gulfstream G-III's delivered to the U.S. Air Force for C-20 VIP transports.

CIVIL TRANSPORT AIRCRAFT BACKLOG<sup>a</sup>

As of December 31, 1989-1993

| Company and Model   | 1989         | 1990         | 1991         | 1992         | 1993         |
|---|--------------|--------------|--------------|--------------|--------------|
| <b>TOTAL AIRCRAFT ON ORDER</b><br>(Domestic and Foreign Orders) | 1,989        | 2,138        | 1,829        | 1,493        | 1,358        |
| Value (Millions of Dollars) . . . .                             | \$89,069     | \$112,339    | \$108,833    | \$96,724     | \$77,735     |
| <b>Boeing—TOTAL</b> . . . . .                                   | <u>1,440</u> | <u>1,563</u> | <u>1,456</u> | <u>1,210</u> | <u>1,155</u> |
| B-737 . . . . .   | 739          | 754          | 615          | 488          | 465          |
| B-747 . . . . .   | 165          | 250          | 234          | 214          | 156          |
| B-757 . . . . .   | 344          | 333          | 333          | 241          | 246          |
| B-767 . . . . .   | 192          | 192          | 188          | 145          | 141          |
| B-777 . . . . .   | —            | 34           | 86           | 122          | 147          |
| <b>McDonnell Douglas—TOTAL</b> . . . . .                        | <u>549</u>   | <u>575</u>   | <u>373</u>   | <u>283</u>   | <u>203</u>   |
| MD-11 . . . . .   | 126          | 175          | 138          | 97           | 60           |
| MD-80 . . . . .   | 423          | 400          | 235          | 186          | 143          |
| <b>TOTAL FOREIGN ORDERS</b> . . . . .                           | 1,092        | 1,205        | 1,073        | 884          | 661          |
| Value (Millions of Dollars) . . . .                             | \$54,956     | \$ 71,213    | \$ 72,733    | \$66,795     | \$50,409     |
| <b>Boeing—TOTAL</b> . . . . .                                   | <u>750</u>   | <u>872</u>   | <u>844</u>   | <u>687</u>   | <u>511</u>   |
| B-737 . . . . .   | 359          | 412          | 329          | 228          | 152          |
| B-747 . . . . .   | 141          | 211          | 205          | 192          | 143          |
| B-757 . . . . .   | 119          | 125          | 144          | 91           | 48           |
| B-767 . . . . .   | 131          | 124          | 114          | 88           | 66           |
| B-777 . . . . .   | —            | —            | 52           | 88           | 102          |
| <b>McDonnell Douglas—TOTAL</b> . . . . .                        | <u>342</u>   | <u>333</u>   | <u>229</u>   | <u>197</u>   | <u>150</u>   |
| MD-11 . . . . .   | 96           | 131          | 101          | 76           | 56           |
| MD-80 . . . . .   | 246          | 202          | 128          | 121          | 94           |

Source: Aerospace Industries Association, based on company reports.

NOTE: Boeing's unfilled orders not reported on a firm order basis beginning with 1993.

a Unfilled firm orders excluding options for U.S.-manufactured transport aircraft over 33,000 pounds. Includes new transports contracted for lease from the manufacturer.

**SHIPMENTS OF CIVIL TRANSPORT AIRCRAFT<sup>a</sup>**  
**Calendar Years 1989–1993**

| <b>Company and Model</b>                 | <b>1989</b> | <b>1990</b> | <b>1991</b> | <b>1992</b> | <b>1993</b> |
|--|-------------|-------------|-------------|-------------|-------------|
| <b>TOTAL</b>                             |             |             |             |             |             |
| Number of Aircraft Shipped . . .         | 398         | 521         | 589         | 567         | 408         |
| Value (Millions of Dollars) . . . .      | \$15,074    | \$22,215    | \$26,856    | \$28,750    | \$24,133    |
| <b>Boeing—TOTAL</b> . . . . .            |             |             |             |             |             |
| B-737 . . . . .                          | 146         | 174         | 214         | 218         | 152         |
| B-747 . . . . .                          | 45          | 68          | 64          | 61          | 56          |
| B-757 . . . . .                          | 51          | 77          | 80          | 99          | 71          |
| B-767 . . . . .                          | 37          | 60          | 62          | 63          | 51          |
| <b>McDonnell Douglas—TOTAL</b> . . . . . |             |             |             |             |             |
| DC-10 . . . . .                          | 1           | —           | —           | —           | —           |
| MD-11 . . . . .                          | —           | 3           | 31          | 42          | 36          |
| MD-80 . . . . .                          | 118         | 139         | 138         | 84          | 42          |

Source: Aerospace Industries Association, based on company reports.  
 a U.S.-manufactured fixed-wing aircraft over 33,000 lbs.

SPECIFICATIONS OF U.S. CIVIL JET TRANSPORT AIRCRAFT<sup>a</sup>

On Order or in Production as of 1993

| Number of Engines and Crew, and Model Designation <sup>b</sup> | Initial Service | Standard Mixed Class | Operating Empty Weight (000's lbs) | Maximum Takeoff Gross Weight (000's lbs) | Range (Nautical Miles) <sup>c</sup> | Engine Manufacturer <sup>d</sup> and Model    |
|--|-----------------|----------------------|------------------------------------|--|-------------------------------------|---|
| <b>FOUR ENGINES/CREW OF 2</b>                                  |                 |                      |                                    |  |                                     |   |
| 747-400*   | 1988            | 412-509              | 399-403                            | 870                                      | 6,060<br>-7,200                     | GE CF6-80C2 or<br>RR RB211-524                |
| <b>THREE ENGINES/CREW OF 2</b>                                 |                 |                      |                                    |  |                                     |   |
| MD-11*   | 1989            | 298-410              | 288                                | 625                                      | 6,920                               | GE CF6-80C2-DF1<br>or P&W PW4360              |
| MD-11ER*   | TBD             | 298-410              | 289                                | 630                                      | 7,210                               | GE CF6-80C2-DF1<br>or P&W PW4360              |
| <b>TWO ENGINES/CREW OF 2</b>                                   |                 |                      |                                    |  |                                     |   |
| 737-300  | 1984            | 141                  | 70-71                              | 125-139                                  | 1,840<br>-2,950                     | CFMI CFM56-3-B1<br>or B2                      |
| 737-400  | 1988            | 159                  | 75-78                              | 139-150                                  | 2,250<br>-2,800                     | CFMI CFM56-3-B2<br>or CFM56-3C                |
| 737-500  | 1990            | 108-132              | 70-71                              | 116-134                                  | 2,500                               | CFMI CFM56-3-B1<br>or CFM56-3C-1              |
| 757  | 1982            | 194-231              | 126                                | 220-255                                  | 4,550                               | RR RB211-535E or<br>P&W PW2037                |
| 767-200ER*   | 1984            | 174-290              | 185-186                            | 351                                      | 5,942                               | P&W JT9D-7R4 or<br>GE CF6-80A                 |
| 767-300*   | 1986            | 218-269              | 196-199                            | 351                                      | 3,800<br>-4,035                     | P&W JT9D-7R4 or<br>GE CF6-80A                 |
| 767-300ER*   | 1988            | 218-269              | 200                                | 380-412                                  | 5,225<br>-6,165                     | P&W PW4000 or<br>GE CF6-80C2                  |
| 777*   | 1995            | 305-375              | 295-301                            | 506-535                                  | 3,960<br>-4,820                     | RR Trent-871,<br>GE GE90-B1,<br>or P&W PW4073 |
| MD-80 series:  |                 |                      |                                    |  |                                     |   |
| MD-81  | 1980            | 155                  | 80                                 | 142                                      | 1,584                               | P&W JT8D-209 or<br>P&W JT8D-217A              |
| MD-82  | 1981            | 155                  | 80                                 | 149                                      | 2,076                               | P&W JT8D-217C                                 |
| MD-83  | 1985            | 155                  | 81                                 | 160                                      | 2,534                               | P&W JT8D-219                                  |
| MD-87  | 1987            | 130                  | 76                                 | 140                                      | 2,405                               | P&W JT8D-217C                                 |
| MD-88  | 1987            | 155                  | 82                                 | 160                                      | 2,534                               | P&W JT8D-219C or<br>P&W JT8D-217C             |
| MD-90  | 1995            | 155                  | 88                                 | 156                                      | 2,296                               | IAE V2500-D5                                  |

Source: Aerospace Industries Association, based on company reports.

a All jet-powered passenger transport aircraft 33,000 pounds or more empty weight.

b The Boeing Company manufacturers models: 737, 747, 757, 767, &amp; 777 and McDonnell Douglas Corporation manufacturers models: MD-11, MD-80, and MD-90.

c Full passenger load and baggage.

d P&amp;W = Pratt &amp; Whitney; GE = General Electric; RR = Rolls-Royce; CFMI = General Electric/Snecma; IAE = International Aero Engines.

TBD To be decided

\* Wide-body aircraft.



**SPECIFICATIONS OF U.S. CIVIL HELICOPTERS**  
**In Production as of 1993**

| <b>Company</b>               | <b>Commercial Model</b> | <b>Number of Places</b> | <b>Useful Load (Lbs.)</b> | <b>Range with Useful Load (N.Miles)</b> | <b>External Cargo Payload (Lbs.)</b> |
|------------------------------|-------------------------|-------------------------|---------------------------|---|--------------------------------------|
| Bell Helicopter Textron      | 214 Series              | 20                      | 7,889                     | 457                                     | 7,900                                |
| Enstrom Helicopter           | F-28 Series             | 3                       | 1,030                     | 228                                     | 1,000                                |
|                              | 280 Series              | 3                       | 1,015                     | 260                                     | 1,000                                |
|                              | 480 Series              | 5                       | 1,175                     | 415                                     | NA                                   |
| McDonnell Douglas Helicopter | 500 Series              | 5                       | 1,559                     | 367                                     | 2,000                                |
|                              | 520 Series              | 5                       | 1,806                     | 217 <sup>r</sup>                        | 2,306                                |
|                              | 530 Series              | 5                       | 1,536                     | 239 <sup>r</sup>                        | 2,000                                |
| Robinson Helicopter          | R22                     | 2                       | 546                       | 209                                     | —                                    |
|                              | R44                     | 4                       | 1,000                     | 210                                     | —                                    |
| Schweizer Aircraft           | 300C                    | 3                       | 950                       | 201                                     | 1,050                                |
|                              | 330                     | 4                       | 1,110                     | 252                                     | 1,280                                |
| Sikorsky Aircraft            | S-76B                   | 14                      | 5,048 <sup>r</sup>        | 357                                     | 3,300                                |
|                              | S-76C                   | 14                      | 5,481                     | 430                                     | 3,300                                |

Source: Helicopter Association International, "1994 Helicopter Annual" (Annually).  
 NA Not available.  
 r Revised.

CIVIL HELICOPTER SHIPMENTS<sup>a</sup>

Calendar Years 1989–1993

| Company and Model                  | 1989       | 1990       | 1991       | 1992       | 1993       |
|------------------------------------|------------|------------|------------|------------|------------|
| <b>CIVIL SHIPMENTS</b> .....       | 515        | 603        | 571        | 324        | 258        |
| Value (Millions of Dollars) ...    | \$251      | \$254      | \$211      | \$142      | \$113      |
| <b>Bell—TOTAL</b> .....            | <u>22</u>  | <u>16</u>  | <u>4</u>   | <u>1</u>   | <u>2</u>   |
| 212 .....                          | 3          | 1          | —          | —          | —          |
| 214 series .....                   | 2          | 1          | —          | 1          | 2          |
| 412 .....                          | 17         | 14         | 4          | —          | —          |
| <b>Enstrom—TOTAL</b> .....         | <u>24</u>  | <u>27</u>  | <u>17</u>  | <u>6</u>   | <u>10</u>  |
| F-28 series .....                  | 6          | 12         | 8          | 3          | (b)        |
| 280 series .....                   | 18         | 15         | 9          | 3          | 8          |
| 480 series .....                   | —          | —          | —          | —          | 2          |
| <b>McDonnell Douglas—TOTAL</b> ... | <u>73</u>  | <u>77</u>  | <u>50</u>  | <u>51</u>  | <u>26</u>  |
| 500 series .....                   | 64         | 65         | 42         | 23         | 5          |
| 520N series .....                  | —          | —          | 3          | 17         | 21         |
| 530 series .....                   | 9          | 12         | 5          | 11         | —          |
| <b>Robinson—TOTAL</b> .....        | <u>310</u> | <u>384</u> | <u>402</u> | <u>212</u> | <u>166</u> |
| R22 .....                          | 310        | 384        | 402        | 212        | 135        |
| R44 .....                          | —          | —          | —          | —          | 31         |
| <b>Rogerson—TOTAL</b> .....        | <u>—</u>   | <u>—</u>   | <u>2</u>   | <u>3</u>   | <u>—</u>   |
| UH12E .....                        | —          | —          | 2          | 3          | —          |
| <b>Schweizer—TOTAL</b> .....       | <u>69</u>  | <u>83</u>  | <u>78</u>  | <u>39</u>  | <u>45</u>  |
| 300C .....                         | 69         | 83         | 78         | 39         | 40         |
| 330 .....                          | —          | —          | —          | —          | 5          |
| <b>Sikorsky—TOTAL</b> .....        | <u>17</u>  | <u>16</u>  | <u>18</u>  | <u>12</u>  | <u>9</u>   |
| S-76 .....                         | 17         | 16         | 18         | 12         | 9          |

Source: Aerospace Industries Association, based on company reports.

NOTE: All data exclude production by foreign licensees.

a Domestic and export helicopter shipments for non-military use. Helicopters in military configuration, exported to foreign governments and purchased under commercial contract are reported elsewhere. Models which may be shipped in either a civil or a military configuration appear in both tables.

b Reporting of F-28 and 280 series combined.

**DIRECT EXPORT SHIPMENTS OF MILITARY HELICOPTERS<sup>a</sup>**  
**Calendar Years 1989–1993**

| <b>Manufacturer and Model</b>                 | <b>1989</b> | <b>1990</b> | <b>1991</b> | <b>1992</b> | <b>1993</b> |
|---|-------------|-------------|-------------|-------------|-------------|
| <b>DIRECT MILITARY EXPORT SHIPMENTS</b> ..... | 46          | 48          | 45          | 51          | 61          |
| Value (Millions of Dollars) .....             | \$278       | \$337       | \$489       | \$460       | \$429       |
| Bell AH-1S .....                              | 26          | —           | —           | —           | —           |
| Boeing Vertol CH-47/414/352 ...               | —           | 11          | 9           | 6           | —           |
| Robinson R22 .....                            | —           | —           | —           | 10          | —           |
| Sikorsky S-70C .....                          | 17          | 35          | 36          | 24          | 60          |
| Sikorsky S-76 .....                           | —           | —           | —           | —           | 1           |
| Sikorsky S-80M .....                          | 3           | 2           | —           | 11          | —           |

Source: Aerospace Industries Association, company reports.

<sup>a</sup> Shipments of helicopters in military configuration exported directly from U.S. manufacturers to foreign governments. Military helicopters exported via Foreign Military Sales (FMS) are reported with Dept. of Defense (DoD) aircraft acceptance data elsewhere in this chapter. Some models reported on this page may be shipped in either military or civil configuration; see Civil Helicopter Shipments table for additional data.

## GENERAL AVIATION AIRCRAFT SHIPMENTS

By Selected Manufacturers  
Calendar Years 1989–1993

|  | 1989    | 1990    | 1991               | 1992               | 1993               |
|--|---------|---------|--------------------|--------------------|--------------------|
| <b>NUMBER OF AIRCRAFT SHIPPED</b>                                    | 1,535   | 1,144   | 1,021              | 899                | 964                |
| Single-Engine, Piston .....  | 1,023   | 608     | 564                | 510                | 516                |
| Multi-Engine, Piston .....   | 87      | 87      | 49                 | 41                 | 39                 |
| Turboprop .....  | 268     | 281     | 222                | 177                | 211                |
| Turbojet .....   | 157     | 168     | 186                | 171                | 198                |
| <b>VALUE OF SHIPMENTS<sup>a</sup></b><br>(Millions of Dollars) ..... | \$1,804 | \$2,008 | \$1,968            | \$1,836            | \$2,144            |
| Single-Engine, Piston .....  | \$ 104  | \$ 68   | \$ 93 <sup>b</sup> | \$ 92 <sup>b</sup> | \$ 76 <sup>b</sup> |
| Multi-Engine, Piston .....   | 24      | 24      | (b)                | (b)                | (b)                |
| Turboprop .....  | 524     | 644     | 527                | 460                | 595                |
| Turbojet .....   | 1,149   | 1,272   | 1,348              | 1,284              | 1,473              |
| <b>Number of Aircraft By<br/>Selected Manufacturer</b>               |         |         |                    |                    |                    |
| American Champion .....  | NA      | NA      | NA                 | NA                 | 38                 |
| American General .....   | NA      | 10      | 82                 | 51                 | 30                 |
| Aviat .....  | NA      | NA      | 71                 | 63                 | 56                 |
| Beech .....  | 371     | 433     | 402                | 348                | 305                |
| Bellanca .....   | 7       | 4       | 1                  | 3                  | 4                  |
| Cessna .....   | 183     | 171     | 176                | 140                | 173                |
| Christen .....   | 75      | 68      | —                  | —                  | —                  |
| Classic .....  | NA      | 8       | 8                  | 9                  | 7                  |
| Commander .....  | NA      | NA      | NA                 | 25                 | 31                 |
| Fairchild .....  | 12      | 14      | 10                 | 14                 | 20                 |
| Gulfstream .....   | 40      | 34      | 29                 | 25                 | 26                 |
| Lake .....   | 23      | 17      | 11                 | 9                  | 3                  |
| Learjet .....  | 25      | 25      | 25                 | 23                 | 38                 |
| Maule .....  | 35      | 28      | 66                 | 33                 | 70                 |
| Mooney .....   | 143     | 147     | 88                 | 69                 | 64                 |
| Piper .....  | 621     | 178     | 41                 | 85                 | 99                 |
| Taylorcraft .....  | NA      | 7       | 11                 | 2                  | —                  |

Source: General Aviation Manufacturers' Association.

a Manufacturers' net billing price.

b "Multi-Engine, Piston" combined with "Single-Engine, Piston."

NA Not available.

## MILITARY AIRCRAFT ACCEPTED BY U.S. MILITARY AGENCIES

Number and Flyaway Value  
Calendar Years 1979–1993

| Year                                     | TOTAL    | Bomber/<br>Patrol/<br>Command/<br>Control | Fighter/<br>Attack | Trans-<br>port/<br>Tanker | Trainer | Heli-<br>copter | Other |
|--|----------|---|--------------------|---------------------------|---------|-----------------|-------|
| <b>NUMBER</b>                            |          |   |                    |                           |         |                 |       |
| 1979                                     | 734      | 17  | 529                | 16                        | —       | 158             | 14    |
| 1980                                     | 819      | 16  | 551                | 15                        | 18      | 189             | 30    |
| 1981                                     | 918      | 19  | 649                | 17                        | 60      | 158             | 15    |
| 1982                                     | 758      | 26  | 478                | 14                        | 60      | 172             | 8     |
| 1983                                     | 836      | 34  | 421                | 22                        | 120     | 233             | 6     |
| 1984                                     | 632      | 34  | 298                | 18                        | 30      | 240             | 12    |
| 1985                                     | 777      | 34  | 409                | 25                        | —       | 306             | 3     |
| 1986                                     | 818      | 52  | 424                | 76                        | —       | 266             | —     |
| 1987                                     | 858      | 74  | 483                | 36                        | —       | 265             | —     |
| 1988                                     | 842      | 55  | 509                | 31                        | —       | 247             | —     |
| 1989                                     | 706      | 24  | 408                | 21                        | —       | 253             | —     |
| 1990                                     | 763      | 24  | 454                | 25                        | —       | 260             | —     |
| 1991                                     | 650      | 17  | 395                | 23                        | —       | 215             | —     |
| 1992 <sup>r</sup>                        | 544      | 10  | 312                | 30                        | 37      | 155             | —     |
| 1993                                     | 528      | 11  | 293                | 25                        | 56      | 143             | —     |
| <b>FLYAWAY VALUE—Millions of Dollars</b> |          |   |                    |                           |         |                 |       |
| 1979                                     | \$ 5,470 | \$ 442                                    | \$4,660            | \$ 136                    | \$ —    | \$ 219          | \$13  |
| 1980                                     | 6,514    | 475                                       | 5,282              | 178                       | 32      | 516             | 31    |
| 1981                                     | 8,446    | 526                                       | 6,518              | 509                       | 32      | 825             | 19    |
| 1982                                     | 8,605    | 886                                       | 6,383              | 410                       | 42      | 872             | 12    |
| 1983                                     | 9,640    | 1,259                                     | 6,708              | 575                       | 79      | 1,009           | 10    |
| 1984                                     | 9,308    | 1,270                                     | 5,774              | 627                       | 18      | 1,597           | 22    |
| 1985                                     | 14,122   | 3,640                                     | 7,923              | 838                       | —       | 1,715           | 6     |
| 1986                                     | 20,903   | 8,177                                     | 8,004              | 2,665                     | —       | 2,057           | —     |
| 1987                                     | 21,459   | 8,569                                     | 8,900              | 2,218                     | —       | 1,772           | —     |
| 1988                                     | 16,031   | 2,911                                     | 8,953              | 2,314                     | —       | 1,853           | —     |
| 1989                                     | 11,968   | 1,423                                     | 7,735              | 743                       | —       | 2,067           | —     |
| 1990                                     | 13,036   | 1,499                                     | 8,731              | 605                       | —       | 2,201           | —     |
| 1991                                     | 11,754   | 1,023                                     | 8,517              | 437                       | —       | 1,777           | —     |
| 1992 <sup>r</sup>                        | 11,482   | 613                                       | 7,673              | 1,346                     | 67      | 1,583           | —     |
| 1993                                     | 11,277   | 1,530                                     | 6,360              | 1,332                     | 565     | 1,490           | —     |

Source: Aerospace Industries Association, based on USAF, USN, and USA survey responses.

NOTE: Data represent new U.S.-manufactured aircraft, excluding gliders and targets. Values include spares, spare parts, and support equipment that are procured with the aircraft. Includes aircraft accepted for shipment to foreign governments for military assistance programs and foreign military sales.

<sup>r</sup> Revised.

MILITARY AIRCRAFT ACCEPTANCES BY UNITED STATES AIR FORCE<sup>a</sup>

Calendar Years 1992–1993  
(Costs in Millions of Dollars)

| Type and Model                        | Number           |      | Flyaway Cost <sup>b</sup> |         | Weapon System Cost <sup>c</sup> |       |
|---------------------------------------|------------------|------|---------------------------|---------|---------------------------------|-------|
|                                       | 1992             | 1993 | 1992                      | 1993    | 1992                            | 1993  |
| <b>AIR FORCE—TOTAL</b> .....          | 169 <sup>r</sup> | 186  | \$3,870 <sup>r</sup>      | \$4,925 | \$4,819                         | NA    |
| <b>Bomber—TOTAL</b> .....             | —                | 1    | \$ —                      | \$ 977  | \$ —                            | \$ NA |
| B-2 .....                             | —                | 1    | —                         | 977     | —                               | NA    |
| <b>Fighter/Attack—TOTAL</b> .....     | 101 <sup>r</sup> | 130  | 2,459 <sup>r</sup>        | 2,587   | 3,108 <sup>r</sup>              | 2,997 |
| AC-130 .....                          | 3 <sup>r</sup>   | —    | 129 <sup>r</sup>          | —       | 129 <sup>r</sup>                | —     |
| F-15 .....                            | 42 <sup>r</sup>  | 14   | 1,478 <sup>r</sup>        | 501     | 1,999 <sup>r</sup>              | 736   |
| F-16 .....                            | 56 <sup>r</sup>  | 116  | 852 <sup>r</sup>          | 2,086   | 980 <sup>r</sup>                | 2,261 |
| <b>Transports/Tankers—TOTAL</b> ..... | 25               | 20   | 1,222                     | 1,226   | 1,451                           | 1,465 |
| C-17 .....                            | 4                | 4    | 1,076                     | 1,076   | 1,276                           | 1,276 |
| C-26 .....                            | 14               | 7    | 48                        | 24      | 48                              | 24    |
| C-27A .....                           | 1                | 1    | 16                        | 17      | 16                              | 17    |
| MC-130H .....                         | 6                | 8    | 82                        | 109     | 111                             | 148   |
| <b>Trainer—TOTAL</b> .....            | 28               | 35   | 101                       | 135     | 152                             | 160   |
| T-1A .....                            | 28 <sup>r</sup>  | 35   | 101 <sup>r</sup>          | 135     | 152 <sup>r</sup>                | 160   |
| <b>Helicopters—TOTAL</b> .....        | 15               | —    | 88                        | —       | 108                             | —     |
| MH-60G .....                          | 15               | —    | 88                        | —       | 108                             | —     |

Source: Department of the Air Force.

NOTE: Costs shown are approximate. Calendar year acceptances may derive from procurement quantities funded in more than one fiscal year.

a Air Force acceptances for own use; excludes FMS/MAP shipments.

b Flyaway Cost includes airframe, engines, electronics, communications, armament, other installed equipment, and non-recurring costs associated with the manufacture of aircraft.

c Weapon system cost includes flyaway costs, peculiar ground equipment, training equipment, and technical data.

NA Not available.

r Revised.

MILITARY AIRCRAFT ACCEPTANCES BY UNITED STATES ARMY<sup>a</sup>

Calendar Years 1992–1993

| Type and Model                        | Number |      | Flyaway Cost <sup>b</sup> |       | Weapon System Cost <sup>c</sup> |       |
|---------------------------------------|--------|------|---------------------------|-------|---------------------------------|-------|
|                                       | 1992   | 1993 | 1992                      | 1993  | 1992                            | 1993  |
| <b>ARMY—TOTAL</b> .....               | 91     | 107  | \$856                     | \$871 | \$914                           | \$981 |
| <b>Helicopters—TOTAL</b> .....        | 91     | 106  | \$856                     | \$867 | \$914                           | \$977 |
| AH-64A .....                          | 61     | 46   | 678                       | 512   | 733                             | 576   |
| UH-60L .....                          | 30     | 60   | 178                       | 355   | 181                             | 401   |
| <b>Transports/Tankers—TOTAL</b> ..... | —      | 1    | —                         | 4     | —                               | 4     |
| C-26 .....                            | —      | 1    | —                         | 4     | —                               | 4     |

Source: Department of the Army.

a Army acceptances for own use; excludes FMS/MAP shipments.

b Flyaway cost includes airframes, engines, electronics, communications, armament and other installed equipment.

c Weapon System Cost includes flyaway cost, initial spares, ground equipment, training equipment and other support items.

## MILITARY AIRCRAFT ACCEPTANCES BY UNITED STATES NAVY<sup>a</sup>

Calendar Years 1992–1993  
(Costs in Millions of Dollars)

| Type and Model                     | Number            |      | Flyaway Cost <sup>b</sup> |         | Weapon System Cost <sup>c</sup> |         |
|------------------------------------|-------------------|------|---------------------------|---------|---------------------------------|---------|
|                                    | 1992 <sup>r</sup> | 1993 | 1992 <sup>r</sup>         | 1993    | 1992 <sup>r</sup>               | 1993    |
| <b>NAVY—TOTAL</b> .....            | 162               | 143  | \$4,379                   | \$3,601 | \$5,628                         | \$4,918 |
| <b>Patrol—TOTAL</b> .....          | 8                 | 6    | \$ 515                    | \$ 337  | \$ 638                          | \$ 463  |
| E-2C .....                         | 6                 | 6    | 329                       | 337     | 411                             | 463     |
| E-6 .....                          | 2                 | —    | 186                       | —       | 227                             | —       |
| <b>Fighter/Attack—TOTAL</b> .....  | 99                | 75   | 3,010                     | 2,109   | 3,766                           | 2,906   |
| F-14 .....                         | 16                | 5    | 716                       | 174     | 1,141                           | 435     |
| F/A-18 .....                       | 65                | 46   | 1,978                     | 1,466   | 2,316                           | 1,966   |
| AV-8B .....                        | 18                | 24   | 270                       | 469     | 309                             | 505     |
| A-6E .....                         | 2                 | —    | 46                        | —       | 91                              | —       |
| <b>Transports/Tankers—TOTAL</b> .. | 5                 | 4    | 124                       | 102     | 140                             | 110     |
| C-130T .....                       | 5                 | 2    | 124                       | 50      | 140                             | 56      |
| KC-130 .....                       | —                 | 2    | —                         | 52      | —                               | 54      |
| <b>Trainers—TOTAL</b> .....        | 9                 | 21   | 166                       | 430     | 302                             | 591     |
| T-45A .....                        | 9                 | 21   | 166                       | 430     | 302                             | 591     |
| <b>Helicopters—TOTAL</b> .....     | 41                | 37   | 564                       | 623     | 782                             | 848     |
| AH-1W .....                        | 10                | 7    | 76                        | 56      | 99                              | 71      |
| CH-53 .....                        | 8                 | 11   | 173                       | 241     | 204                             | 282     |
| MH-53 .....                        | —                 | 2    | —                         | 48      | —                               | 129     |
| SH-60B .....                       | 6                 | 7    | 94                        | 124     | 193                             | 168     |
| SH-60F .....                       | 17                | 10   | 221                       | 154     | 286                             | 198     |

Source: Department of the Navy.

a Navy acceptances for own use; excludes FMS shipments.

b Flyaway Cost includes airframe, engines, electronics, communications, armament, other installed equipment, non-recurring costs, and ancillary equipment.

c Weapons System Cost (Investment Cost) includes flyaway cost, initial spares, ground equipment, training equipment, and other support items.

r Revised.

**MILITARY AIRCRAFT ACCEPTANCES  
FOR REIMBURSABLE PROGRAMS<sup>a</sup>**

Calendar Years 1992–1993  
(Millions of Dollars)

| Accepting Agency,<br>Type, and Model                      | Number of<br>Aircraft Accepted |           | Flyaway<br>Cost <sup>b</sup> |              |
|---|--------------------------------|-----------|------------------------------|--------------|
|   | 1992                           | 1993      | 1992                         | 1993         |
| <b>TOTAL ACCEPTANCES FOR<br/>REIMBURSABLE PROGRAMS</b> .. | 122 <sup>r</sup>               | 92        | \$2,377 <sup>r</sup>         | \$1,880      |
| <b>AIR FORCE—TOTAL</b> .....                              | 93                             | 74        | \$1,863                      | \$1,413      |
| <b>Fighter Attack—TOTAL</b> .....                         | <u>93</u>                      | <u>74</u> | <u>1,863</u>                 | <u>1,413</u> |
| F-15 .....  | 10                             | —         | 278                          | —            |
| F-16 C/D .....  | 83                             | 74        | 1,585                        | 1,413        |
| <b>NAVY—TOTAL</b> .....                                   | 21 <sup>r</sup>                | 18        | \$ 439 <sup>r</sup>          | \$ 467       |
| <b>Patrol—TOTAL</b> .....                                 | <u>2</u>                       | <u>4</u>  | <u>98<sup>r</sup></u>        | <u>216</u>   |
| E-2 .....   | 2                              | 4         | 98 <sup>r</sup>              | 216          |
| <b>Fighter/Attack—TOTAL</b> .....                         | <u>19<sup>r</sup></u>          | <u>14</u> | <u>341<sup>r</sup></u>       | <u>251</u>   |
| F/A-18 .....  | 19 <sup>r</sup>                | 14        | 341 <sup>r</sup>             | 251          |
| <b>ARMY—TOTAL</b> .....                                   | 8                              | —         | \$ 75                        | \$ —         |
| <b>Helicopters—TOTAL</b> .....                            | <u>8</u>                       | <u>—</u>  | <u>75</u>                    | <u>—</u>     |
| UH-60 .....   | 8                              | —         | 75                           | —            |

Source: Aerospace Industries Association, based on USAF, USN, and USA survey responses.

a Foreign government aircraft purchases through the Department of Defense Foreign Military Sales program.

b Flyaway cost includes airframes, engines, electronics, communications, armament, other installed equipment, and non-recurring costs associated with the manufacture of the aircraft.

r Revised.



AEROSPACE FACTS AND FIGURES 1994/1995

**MILITARY AIRCRAFT PROGRAM PROCUREMENT**

Fiscal Years 1993, 1994, and 1995

(Millions of Dollars<sup>a</sup>)

| Agency and Model              | 1993 |          | 1994 <sup>E</sup> |          | 1995 <sup>E</sup> |          |
|-------------------------------|------|----------|-------------------|----------|-------------------|----------|
|                               | No.  | Cost     | No.               | Cost     | No.               | Cost     |
| <b>AIR FORCE</b>              |      |          |                   |          |                   |          |
| AC-130U Spectre Gunship       | —    | \$ 1.4   | —                 | \$ 24.8  | —                 | \$ 67.8  |
| B-1B                          | —    | 160.5    | —                 | 162.4    | —                 | 154.3    |
| B-2 Stealth Bomber            | 4    | 2,642.0  | —                 | 571.7    | —                 | 384.4    |
| C-17 Globemaster III          | 6    | 2,065.4  | 6                 | 2,157.8  | 6                 | 2,661.9  |
| C-130H Hercules               | 8    | 287.1    | —                 | 53.6     | —                 | 50.0     |
| Civil Air Patrol Aircraft     | 27   | 2.7      | 27                | 3.6      | 27                | 1.4      |
| E-8A JSTARS                   | 2    | 575.0    | 2                 | 560.0    | 2                 | 564.2    |
| Enhanced Flight Screener      | 42   | 12.5     | 33                | 9.9      | —                 | —        |
| F-15E Eagle                   | —    | 20.9     | —                 | 28.6     | —                 | 20.4     |
| F-16 Falcon                   | 24   | 666.8    | 12                | 470.6    | —                 | 100.5    |
| HC-130                        | —    | 99.0     | —                 | —        | —                 | —        |
| JPATS <sup>b</sup>            | —    | —        | —                 | —        | 3                 | 123.3    |
| MC-130H Combat Talon II       | —    | 53.5     | —                 | 23.6     | —                 | 29.7     |
| MH-60G Pave Hawk              | 10   | 29.8     | —                 | —        | —                 | —        |
| Non-Development Airlift       | —    | —        | —                 | 97.9     | —                 | 103.7    |
| T-1A Jayhawk                  | 36   | 156.6    | 35                | 140.8    | 35                | 155.2    |
| <b>ARMY</b>                   |      |          |                   |          |                   |          |
| AH-64 Apache                  | —    | \$ 139.6 | 10                | \$ 167.6 | —                 | \$ 123.2 |
| C-21A                         | —    | —        | 1                 | 5.5      | —                 | —        |
| New Training Helicopter       | 63   | 54.6     | 34                | 29.3     | —                 | 0.5      |
| RC-12P                        | 5    | 111.4    | 2                 | 59.3     | 1                 | 44.2     |
| UH-60 Black Hawk <sup>b</sup> | 60   | 405.2    | 63                | 427.6    | 60                | 393.1    |
| <b>NAVY</b>                   |      |          |                   |          |                   |          |
| AH-1W Sea Cobra               | 12   | \$ 122.1 | 12                | \$ 143.1 | 12                | \$ 141.7 |
| AV-8B Harrier                 | —    | 24.8     | 4                 | 144.1    | 4                 | 145.7    |
| CH/MH-53E Super Stallion      | 20   | 493.8    | 12                | 291.1    | —                 | 41.1     |
| E-2C Hawkeye                  | —    | 94.8     | —                 | 37.8     | 4                 | 327.4    |
| EA-6B Prowler                 | —    | 36.3     | —                 | —        | —                 | —        |
| F-14 Tomcat                   | —    | 135.2    | —                 | —        | —                 | —        |
| F/A-18 Hornet                 | 36   | 1,244.3  | 36                | 1,648.1  | 24                | 1,117.2  |
| HH-60H <sup>b</sup>           | 7    | 115.3    | 17                | 256.3    | —                 | 39.9     |
| SH-60B Seahawk                | 12   | 243.0    | 7                 | 188.0    | —                 | —        |
| SH-60F CV ASW                 | 9    | 163.2    | —                 | 2.0      | —                 | 7.6      |
| T-45 Goshawk                  | 12   | 262.6    | 12                | 289.6    | 12                | 245.4    |

Source: Department of Defense Budget, "Program Acquisition Costs by Weapon System" (Annually) and "Procurement Programs (P-1)" (Annually).

NOTE: See Research and Development Chapter for aircraft program RDT&E authorization data.

a Total Obligational Authority for procurement, excluding initial spares.

b Navy, and Air Force funding.

c Army, Navy, and Air Force funding.

E Estimate. Latest year reflects Administration's budget proposal.

ACTIVE U.S. MILITARY AIRCRAFT<sup>a</sup> IN CONTINENTAL U.S.

Fiscal Years 1980–1999

| Year              | Total <sup>a</sup> | Fixed-Wing Aircraft |        |           | Helicopters |        |
|-------------------|--------------------|---------------------|--------|-----------|-------------|--------|
|                   |                    | Total               | Jet    | Turboprop |             | Piston |
| 1980              | 18,969             | 11,362              | 8,794  | 1,869     | 699         | 7,607  |
| 1981              | 19,363             | 11,645              | 9,111  | 1,943     | 591         | 7,718  |
| 1982              | 21,728             | 12,063              | 9,647  | 1,900     | 516         | 9,665  |
| 1983              | 18,652             | 11,603              | 9,495  | 1,745     | 363         | 7,049  |
| 1984              | 18,833             | 11,661              | 9,551  | 1,777     | 333         | 7,172  |
| 1985              | 19,333             | 11,929              | 9,640  | 1,881     | 408         | 7,404  |
| 1986              | 20,157             | 11,919              | 9,730  | 1,803     | 386         | 8,238  |
| 1987              | 20,514             | 12,054              | 9,819  | 1,865     | 370         | 8,460  |
| 1988              | 21,010             | 12,481              | 9,954  | 2,222     | 305         | 8,529  |
| 1989              | 19,223             | 11,893              | 9,501  | 2,131     | 261         | 7,330  |
| 1990              | 20,017             | 12,817              | 10,360 | 2,199     | 258         | 7,200  |
| 1991              | 19,966             | 12,587              | 10,221 | 2,119     | 247         | 7,379  |
| 1992              | 19,210             | 11,936              | 9,672  | 2,035     | 229         | 7,274  |
| 1993 <sup>E</sup> | 17,660             | 10,524              | 8,399  | 1,917     | 208         | 7,136  |
| 1994 <sup>E</sup> | 16,093             | 9,763               | 7,685  | 1,856     | 222         | 6,330  |
| 1995 <sup>E</sup> | 15,217             | 9,262               | 7,211  | 1,792     | 259         | 5,955  |
| 1996 <sup>E</sup> | 14,873             | 9,144               | 7,118  | 1,750     | 276         | 5,729  |
| 1997 <sup>E</sup> | 14,533             | 8,928               | 6,950  | 1,707     | 271         | 5,605  |
| 1998 <sup>E</sup> | 14,395             | 8,831               | 6,884  | 1,677     | 270         | 5,564  |
| 1999 <sup>E</sup> | 14,355             | 8,826               | 6,896  | 1,661     | 269         | 5,529  |

Source: Office of the Secretary of Defense, as reported in "FAA Aviation Forecasts" (Annually).

a Includes Army, Air Force, Navy, and Marine regular service aircraft, as well as Reserve and National Guard Aircraft.

E Estimate.

AEROSPACE FACTS AND FIGURES 1994/1995

**DEPARTMENT OF DEFENSE  
OUTLAYS FOR AIRCRAFT PROCUREMENT**

**By Agency  
Fiscal Years 1962–1995  
(Millions of Dollars)**

| Year              | TOTAL<br>AIRCRAFT<br>PROCUREMENT | Air Force | Navy     | Army   |
|-------------------|----------------------------------|-----------|----------|--------|
| 1962              | \$ 6,659                         | \$ 4,387  | \$ 2,102 | \$ 170 |
| 1963              | 6,309                            | 3,747     | 2,328    | 234    |
| 1964              | 6,053                            | 3,894     | 1,859    | 300    |
| 1965              | 5,200                            | 3,115     | 1,739    | 346    |
| 1966              | 6,635                            | 4,074     | 2,021    | 540    |
| 1967              | 8,411                            | 4,842     | 2,607    | 962    |
| 1968              | 9,462                            | 5,079     | 3,244    | 1,139  |
| 1969              | 9,177                            | 5,230     | 2,821    | 1,126  |
| 1970              | 7,948                            | 4,623     | 2,488    | 837    |
| 1971              | 6,631                            | 3,960     | 2,125    | 546    |
| 1972              | 5,927                            | 3,191     | 2,347    | 389    |
| 1973              | 5,066                            | 2,396     | 2,557    | 113    |
| 1974              | 5,006                            | 2,078     | 2,806    | 122    |
| 1975              | 5,484                            | 2,211     | 3,137    | 136    |
| 1976              | 6,520                            | 3,323     | 3,061    | 136    |
| Tr.Qtr.           | 1,557                            | 859       | 672      | 26     |
| 1977              | 6,608                            | 3,586     | 2,721    | 301    |
| 1978              | 6,971                            | 3,989     | 2,602    | 380    |
| 1979              | 8,836                            | 5,138     | 3,140    | 558    |
| 1980              | 11,124                           | 6,647     | 3,689    | 787    |
| 1981              | 13,193                           | 7,941     | 4,397    | 855    |
| 1982              | 16,793                           | 9,624     | 5,872    | 1,297  |
| 1983              | 21,013                           | 11,799    | 7,490    | 1,724  |
| 1984              | 23,196                           | 12,992    | 8,040    | 2,165  |
| 1985              | 26,586                           | 15,619    | 8,263    | 2,705  |
| 1986              | 30,828                           | 18,919    | 8,922    | 2,987  |
| 1987              | 32,956                           | 20,036    | 9,614    | 3,306  |
| 1988              | 28,246                           | 15,961    | 9,407    | 2,878  |
| 1989              | 27,569                           | 14,662    | 10,073   | 2,834  |
| 1990              | 26,142                           | 14,303    | 9,031    | 2,808  |
| 1991              | 25,689                           | 13,794    | 9,057    | 2,840  |
| 1992              | 23,581                           | 13,154    | 7,907    | 2,520  |
| 1993              | 20,359                           | 11,438    | 7,246    | 1,675  |
| 1994 <sup>E</sup> | 18,328                           | 10,389    | 6,244    | 1,696  |
| 1995 <sup>E</sup> | 17,005                           | 9,995     | 5,578    | 1,431  |

Source: Office of Management and Budget, "Budget of the United States Government" (Annually).

NOTE: Detail may not add to totals because of rounding.

<sup>E</sup> Estimate. Latest year reflects Administration's budget proposal.

Tr.Qtr. See Glossary.

## SPECIFICATIONS OF U.S. MILITARY AIRCRAFT

### On Order or in Production as of 1993

| Primary Mission,<br>DoD Designation,<br>& Popular Name | Manufacturer        | U.S.<br>Military<br>Service | Crew | Empty<br>Weight<br>(000's<br>lbs) | Engines                  | Performance Typical<br>for Primary Mission | Remarks   |
|--|---------------------|-----------------------------|------|-----------------------------------|--------------------------|--|---|
| <b>ATTACK</b>  |                     |                             |      |                                   |                          |  |   |
| AV-8B Harrier II                                       | MDC/BAe             | USMC                        | 1    | 13                                | 1xRR F402                | Mach 0.91                                  | VTOL  |
| <b>BOMBERS</b>   |                     |                             |      |                                   |                          |  |   |
| B-2 Spirit   | NGC                 | USAF                        | 2    | 100-110                           | 4xGE F118                | 7,600 miles                                | Radar eluding tactical bomber                                 |
| <b>FIGHTERS</b>  |                     |                             |      |                                   |                          |  |   |
| F-14D  | NGC                 | USN                         | 2    | 42                                | 2xGE F110                | Mach 2.3 class                             | Missile, gun fleet defense                                    |
| F-15E Eagle  | MDC                 | USAF                        | 2    | 37                                | 2xP&W F100               | Mach 2.5 class                             | Dual role fighter/long range interdiction                     |
| F-16A/B Fighting Falcon                                | Lockheed            | USAF                        | 1-2  | 16                                | 1xP&W F100               | Mach 2+ class                              | Multirole fighter; fully fly-by-wire; missiles, guns          |
| F-16C/D Fighting Falcon                                | Lockheed            | USAF                        | 1-2  | 18                                | 1xP&W F100/<br>1xGE F110 | Mach 2+ class                              | Provisions for AMRAAM, LANTIRN, and new EW Nav. Comm. Systems |
| F/A-18C/D Hornet                                       | MDC/NGC             | USN/USMC                    | 1-2  | 23                                | 2xGE F404                | Mach 1.7 class                             | Missiles, guns; also export                                   |
| F-22 A/B   | Lockheed/<br>Boeing | USAF                        | 1-2  | 30                                | 2xPW F119                | Mach 2+ class                              | B version is tandem-seat version                              |
| <b>COMMAND/CONTROL AND PATROL</b>                      |                     |                             |      |                                   |                          |  |   |
| E-2C Hawkeye   | NGC                 | USN                         | 5    | 38                                | 2xAll T56                | 6 hr. mission duration                     | AEW command & control; active/passive detection               |
| <b>CARGO-TRANSPORT</b>                                 |                     |                             |      |                                   |                          |  |   |
| C/H-130H Hercules                                      | Lockheed            | USAF/USN                    | 4    | 74-78                             | 4xAll T56                | 385 mph; 5,300 mi.                         | 64-92 troops or 39-41,000 lbs.                                |
| C-17A  | MDC                 | USAF                        | 3    | 267                               | 4xP&W F117               | Mach 0.77; 3,000 n.m.                      | 102 troops or 172,000 lbs.                                    |
| C-20F/G/H  | Gulfstream          | All                         | 2    | 42-43                             | 2xRR Tay                 | Mach 0.80; 4,200 n.m.                      | Versions of Gulfstream IV                                     |
| C-26B  | Fairchild           | USAF/Army                   | 2    | 9                                 | 2xGA TPE 331             | 285 mph; 2,000 mi.                         | US version of SA227-DC Metro 23                               |
| C-27 Spartan   | Chrysler            | USAF                        | 2    | 36                                | 2xGE T64                 | 288 mph; 1,500 n.m.                        | USAF version of Alenia G-222                                  |
| C-29A  | BAe                 | USAF                        | 2-3  | 15                                | 2xGA TFE 731             | Mach 0.87; 2,870 n.m.                      | USAF version of BAe 125                                       |
| KC-130T  | Lockheed            | USN/USMC                    | 5-7  | 80                                | 4xAll T56                | Max 10,769 gals.                           | Tanker  |
| MC-130H Combat Talon II                                | Lockheed            | USAF                        | 5    | 76                                | 4xAll T56                | 374 mph; 2356 mi.                          | Support requirements of SOF                                   |
| V-22 Osprey  | Bell/Boeing         | USMC/SOF                    | 3    | 32                                | 2xAll T406               | Max 316 mph; 2,100 n.m.                    | With internal fuel tanks, engines tilt for VTOL               |
| <b>TRAINING</b>  |                     |                             |      |                                   |                          |  |   |
| T-1A Jayhawk   | Beech               | USAF                        | 3    | 10                                | 2xP&W JT-15D             | Max 538 mph                                | Tanker/Transport Trainer                                      |
| T-45A Goshawk  | MDC/BAe             | USN                         | 2    | 9                                 | 1xRR F405                | Mach 1.04 at 25,000 ft.                    | Next generation trainer                                       |
| TH-67 Creek  | Bell                | Army                        | 1    | 2                                 | 1xAll 250                | Max 135 mph; 405 mi.                       |   |
| <b>HELICOPTERS</b>                                     |                     |                             |      |                                   |                          |  |   |
| AH-1W Super Cobra                                      | Bell                | USN                         | 2    | 10                                | 2xGE T700                | Max 218 mph; 395 mi.                       | TOW, hellfire, sidewinder                                     |
| AH-64 Apache   | MDC                 | Army                        | 2    | 11                                | 2xGE T700                | Max 197 mph; 445 mi.                       | Attack helicopter   |
| CH/MH-53E  | Sikorsky            | USN                         | 3-8  | 33-36                             | 3xGE T64                 | Max 196 mph; 710 mi.                       | 55 passengers, aux. tanks/minesweeping                        |
| HH-60H   | Sikorsky            | USN                         | 4-12 | 14                                | 2xGE T700                | Max 135 mph; 500 mi.                       | Strike and rescue   |
| MH-60G Pave Hawk                                       | Sikorsky            | USAF/Army                   | 3    | 12                                | 2xGE T700                | Max 184 mph; 1,380 mi.                     | 11 troops; combat; search; rescue                             |
| OH-58D Kiowa Warrior                                   | Bell                | Army                        | 2    | 3                                 | 1xAll T703               | Max 127 mph; 220 mi.                       | Armed attack/reconnaissance                                   |
| SH-2G Super Sea-Sprite                                 | Kaman               | USN                         | 3-4  | 8                                 | 2xGE T700                | Max 159 mph; 500 mi.                       | LAMPS Mk. I helicopter  |
| SH-60B Seahawk   | Sikorsky            | USN                         | 3    | 15                                | 2xGE T700                | Max 171 mph; 640 mi.                       | ASW   |
| SH-60F   | Sikorsky            | USN                         | 4    | 14                                | 2xGE T700                | Max 177 mph; 789 mi.                       | ASW   |
| UH-60 Black Hawk                                       | Sikorsky            | Army/USAF                   | 3    | 11                                | 2xGE T700                | Max 184 mph; 373 mi.                       | UTTAS   |

Source: Aerospace Industries Association, based on company reports.

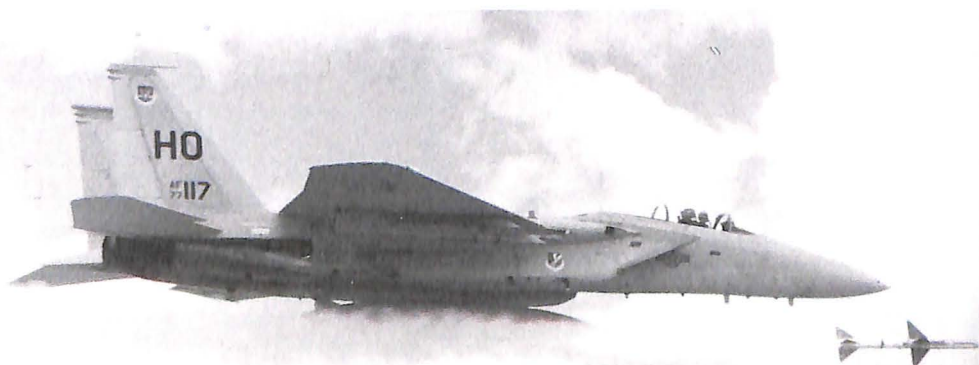
KEY: All = Allison Gas Turbine; BAe = British Aerospace; GA = Garrett Engine; GE = General Electric; MDC = McDonnell Douglas; NGC = Northrop Grumman; P&W = Pratt & Whitney; RR = Rolls Royce.

## MISSILE PROGRAMS

The downward trend in the industry's missile production activity that began in 1987 continued in 1993. Sales of missile systems, adjusted for inflation, declined to the lowest level in a decade. Similarly, the flow of new orders for missile systems dropped to the lowest level since 1979. Data compiled by the Bureau of the Census shows 1993 sales of missile systems and parts (excluding propulsion units) at \$7.4 billion, down from \$9 billion in 1992.

Census reported that net new orders for missiles and parts amounted to only \$4.7 billion in 1993, which represents a drop of almost 50 percent from 1992's \$9.2 billion. The backlog for missile systems at year-end 1993 (again excluding propulsion) was \$9.1 billion, down from \$11.8 billion in the previous year. Sales of propulsion units were

reported by Census as part of a statistical grouping that also includes engines and propulsion units for space vehicles, both civil and military. For 1993, sales in that grouping totaled \$3.1 billion, actually a slight increase over 1992. Military sales in this category were \$1.6 billion, a decline from the 1992 figure when adjusted for inflation. Sales in the non-military (civil space) category were virtually unchanged in 1992 and 1993, at \$1.5 billion. The year-end 1993 backlog for missile/space propulsion systems was \$6.9 billion, down sharply from \$8.3 billion at year-end 1992. More than 73 percent of the backlog was in non-military orders; the larger part of the decline was in the military category. The military backlog fell to \$1.8 billion from 1992's \$2.7 billion. The non-military back-



log dropped \$488 million to \$5.1 billion.

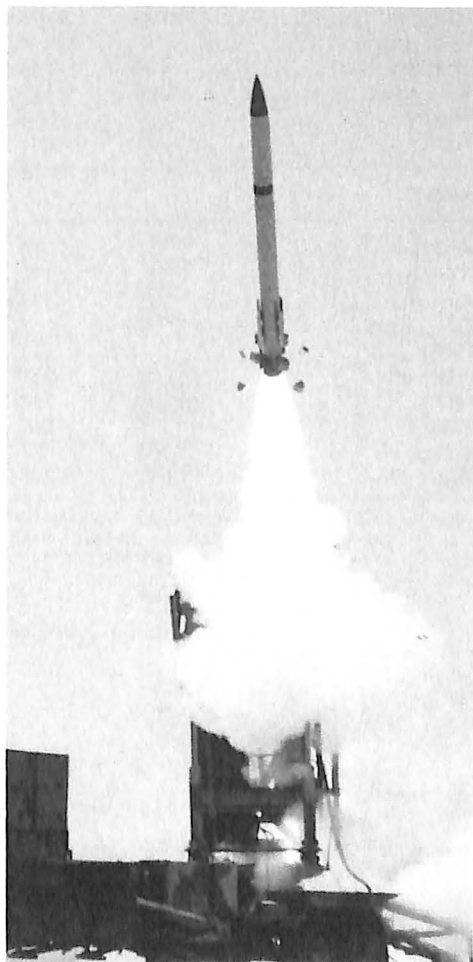
The Fiscal Year 1995 budget plan for the Department of Defense (DoD) contemplated procurement outlays totaling \$7.9 billion for missile systems, which compares with \$9.4 billion in 1994. The Air Force was, as usual, the largest missile procuring agency with an allocation of \$4.2 billion (down from \$4.7 billion). Planned Navy outlays were \$2.7 billion (down from \$3.4 billion); the Army proposed outlays of \$1 billion (down from \$1.3 billion).

Missile programs in production or in operational service in 1993/94 and planned for funding under FY 1995 appropriations included:

*Air Force:* the AMRAAM (Advanced Medium Range Air-to-Air Missile), \$394 million; the TSSAM (Tri-Service Standoff Attack Missile), \$374 million; and the AGM-130 air-to-surface weapon, \$72 million.

*Navy:* The Trident II Fleet Ballistic Missile, at \$696 million the largest of all DoD missile procurement programs; the Tomahawk cruise missile, \$302 million; the Standard air defense missile, \$258 million; the Harpoon cruise missile, \$69 million; the RAM (Rolling Airframe Missile) antiship defense system, \$64 million; and the Trident I Fleet Ballistic Missile, \$13.5 million.

*Army:* The Patriot long-range air defense missile, \$264 million; the AAWS-M (Advanced Antitank Weapon System-Medium), \$131 million; the Hellfire helicopter-launched antiarmor missile, \$122 million; the ATACMS (Army TACTical Missile System), \$116 million; the Avenger mobile antiaircraft weapon system, \$64 million.



**MISSILE PROGRAM PROCUREMENT**  
**Fiscal Years 1993, 1994, and 1995**  
(Millions of Dollars<sup>d</sup>)

| Agency<br>and<br>Model      | 1993   |         | 1994 <sup>E</sup> |          | 1995 <sup>E</sup> |         |
|-----------------------------|--------|---------|-------------------|----------|-------------------|---------|
|                             | No.    | Cost    | No.               | Cost     | No.               | Cost    |
| <b>AIR FORCE</b>            |        |         |                   |          |                   |         |
| ACM .....                   | —      | \$ 98.6 | —                 | \$ 5.3   | —                 | \$ —    |
| AGM-130 .....               | 102    | 79.9    | 102               | 70.4     | 102               | 71.8    |
| AMRAAM <sup>b</sup> .....   | 1,165  | 707.4   | 1,082             | 544.8    | 519               | 393.8   |
| HARM <sup>b</sup> .....     | 846    | 243.5   | —                 | —        | —                 | —       |
| HAVE NAP .....              | —      | 23.6    | —                 | 5.0      | —                 | —       |
| Peacekeeper .....           | —      | 27.1    | —                 | —        | —                 | —       |
| TSSAM <sup>b</sup> .....    | —      | —       | —                 | 159.6    | 48                | 373.9   |
| <b>NAVY</b>                 |        |         |                   |          |                   |         |
| Harpoon .....               | 90     | \$ 89.5 | 75                | \$ 86.3  | 58                | \$ 68.7 |
| RAM .....                   | —      | 8.2     | 180               | 51.1     | 240               | 63.5    |
| Standard .....              | 330    | 244.0   | 220               | 214.1    | 202               | 258.1   |
| Tomahawk .....              | 200    | 411.9   | 216               | 257.5    | 217               | 302.0   |
| Trident I .....             | —      | 1.1     | —                 | 7.6      | —                 | 13.5    |
| Trident II .....            | 21     | 980.3   | 24                | 1,098.6  | 18                | 696.0   |
| <b>ARMY</b>                 |        |         |                   |          |                   |         |
| AAWS-M .....                | —      | \$ 18.3 | 716               | \$ 207.3 | 376               | \$131.1 |
| ATACMS .....                | 351    | 190.6   | 255               | 152.6    | 148               | 115.9   |
| Avenger <sup>c</sup> .....  | 170    | 175.4   | 168               | 154.4    | 61                | 64.0    |
| Chapparral .....            | —      | 6.6     | —                 | —        | —                 | —       |
| Hawk .....                  | —      | 1.7     | —                 | 2.8      | —                 | 0.3     |
| Hellfire <sup>d</sup> ..... | 3,246  | 135.3   | 3,348             | 148.6    | 830               | 121.6   |
| MLRS .....                  | 24,000 | 108.6   | 1,410             | 74.7     | —                 | —       |
| Patriot <sup>f</sup> .....  | —      | 100.4   | —                 | 161.3    | —                 | 264.0   |
| Stinger .....               | 300    | 34.7    | —                 | 33.4     | —                 | —       |
| TOW 2 <sup>d</sup> .....    | 13,612 | 205.5   | —                 | 25.3     | —                 | 27.8    |

Source: Department of Defense, "Program Acquisition Costs by Weapon System" (Annually).  
NOTE: See Research and Development Chapter for missile program RDT&E authorization data.  
a Total Obligational Authority excluding initial spares and RDT&E.  
b Navy and Air Force funding.  
c Army and Marine Corps funding.  
d Army and Navy funding.  
e Estimate. Latest year reflects Administration's budget proposal.  
f Army and BMDO funding.

**DEPARTMENT OF DEFENSE  
OUTLAYS FOR MISSILE PROCUREMENT**

By Agency  
Fiscal Years 1962–1995  
(Millions of Dollars)

| Year              | TOTAL<br>MISSILE<br>PROCUREMENT | Air Force | Navy               | Army   |
|-------------------|---------------------------------|-----------|--------------------|--------|
| 1962              | \$ 3,442                        | \$2,385   | \$ 593             | \$ 464 |
| 1963              | 3,817                           | 2,676     | 718                | 423    |
| 1964              | 3,577                           | 2,100     | 981                | 496    |
| 1965              | 2,096                           | 1,320     | 522                | 254    |
| 1966              | 2,069                           | 1,313     | 512                | 244    |
| 1967              | 1,930                           | 1,278     | 432                | 220    |
| 1968              | 2,219                           | 1,388     | 436                | 395    |
| 1969              | 2,509                           | 1,382     | 534                | 593    |
| 1970              | 2,912                           | 1,467     | 702                | 743    |
| 1971              | 3,140                           | 1,497     | 791                | 852    |
| 1972              | 3,009                           | 1,334     | 831                | 844    |
| 1973              | 3,023                           | 1,454     | 628                | 941    |
| 1974              | 2,981                           | 1,537     | 541                | 903    |
| 1975              | 2,889                           | 1,602     | 615                | 672    |
| 1976              | 2,296                           | 1,549     | 584                | 163    |
| Tr. Qtr.          | 402                             | 347       | 148                | (93)   |
| 1977              | 2,781                           | 1,501     | 905                | 374    |
| 1978              | 3,096 <sup>a</sup>              | 1,376     | 1,302 <sup>a</sup> | 418    |
| 1979              | 3,786                           | 1,537     | 1,702              | 547    |
| 1980              | 4,434                           | 1,810     | 1,973              | 651    |
| 1981              | 5,809                           | 2,366     | 2,297              | 1,146  |
| 1982              | 6,782                           | 3,069     | 2,444              | 1,269  |
| 1983              | 7,795                           | 3,383     | 2,812              | 1,600  |
| 1984              | 9,527                           | 4,640     | 2,809              | 2,079  |
| 1985              | 10,749                          | 5,409     | 2,941              | 2,399  |
| 1986              | 11,731                          | 6,473     | 2,780              | 2,478  |
| 1987              | 11,473                          | 6,002     | 3,157              | 2,314  |
| 1988              | 11,676                          | 6,046     | 3,392              | 2,239  |
| 1989              | 14,503                          | 7,349     | 4,445              | 2,709  |
| 1990              | 14,851                          | 7,951     | 4,446              | 2,453  |
| 1991              | 14,400                          | 6,906     | 4,954              | 2,540  |
| 1992              | 13,504                          | 6,409     | 4,694              | 2,401  |
| 1993              | 11,404                          | 5,424     | 3,794              | 2,187  |
| 1994 <sup>E</sup> | 9,372                           | 4,658     | 3,405              | 1,309  |
| 1995 <sup>E</sup> | 7,897                           | 4,181     | 2,697              | 1,020  |

Source: Office of Management and Budget, "The Budget of the United States Government" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Beginning 1978, DoD combined Navy Missile Procurement with torpedoes and other related products into Navy Weapons Procurement. Missiles comprise approximately 80 percent of the value of this category.

E Estimate. Latest year reflects Administration's budget proposal.

Tr. Qtr. See Glossary.



**MAJOR MISSILE PROGRAMS  
RESEARCH, DEVELOPMENT, PRODUCTION, OPERATION**

| <b>Program</b>          | <b>Agency</b> | <b>Status</b> | <b>Systems Contractor</b> | <b>Propulsion Manufacturer</b> | <b>Guidance Manufacturer</b> |
|-------------------------|---------------|---------------|---------------------------|--------------------------------|------------------------------|
| <b>AIR-TO-AIR</b>       |               |               |                           |                                |                              |
| AMRAAM-120A             | USAF/USN      | D,P           | Hughes/Ray                | Hercules                       | Hughes/Ray                   |
| Phoenix-54A             | USN           | O             | Hughes/Ray                | Hercules                       | Hughes                       |
| Phoenix-54C             | USN           | P,O           | Hughes/Ray                | Hercules                       | Hughes/Ray                   |
| Sidewinder-9J           | USAF          | O             | Loral                     | Hercules/<br>Aerojet           | Loral                        |
| Sidewinder-9L           | USN/USAF      | O             | NASC                      | Bermite/TKC/<br>Hercules       | Raytheon/<br>Loral           |
| Sidewinder-9M           | USN/USAF      | O             | NASC                      | TKC/Hercules                   | Ray/Loral                    |
| Sidewinder-9N           | USAF          | O             | Loral                     | Hercules/<br>Aerojet           | Loral                        |
| Sidewinder-9P           | USAF          | P,O           | Loral/Ray                 | Hercules/<br>Aerojet           | Loral                        |
| Sidewinder-9R           | USN           | D             | Loral                     | TKC/Hercules                   | Loral                        |
| Sidewinder-9S           | USN           | P,O           | NASC                      | TKC/Hercules                   | Loral/Ray                    |
| Sparrow-7F              | USN/USAF      | O             | NASC                      | Hercules                       | Ray/Hughes                   |
| Sparrow-7M              | USN/USAF      | P             | Ray/Hughes                | Hercules                       | Ray/Hughes                   |
| Sparrow-7P              | USN           | D             | NASC                      | -                              | Raytheon                     |
| Sparrow-7R              | USN           | D             | NASC                      | -                              | Ray/Hughes                   |
| <b>AIR-TO-SURFACE</b>   |               |               |                           |                                |                              |
| ALCM-86B                | USAF          | P             | Boeing                    | WI                             | Honeywell/<br>Litton         |
| HARM-88A/B              | USN/USAF      | P             | TI                        | TKC/Hercules                   | TI                           |
| * Harpoon-84A/C/D       | USN           | P,O           | MDC                       | TCAE                           | TI/IBM/LSI/NGC               |
| GBU-15                  | USAF          | P             | RI                        | Hughes                         | -                            |
| Maverick-65A/B          | USAF          | O             | Hughes                    | TKC/Aerojet                    | Hughes                       |
| Maverick-65D            | USAF          | O             | Hughes/Ray                | TKC/Aerojet                    | Hughes/Ray                   |
| Maverick-65E            | USMC          | O             | Hughes                    | TKC/Aerojet                    | Hughes                       |
| Maverick-65F            | USN           | O             | Hughes/Ray                | TKC/Aerojet                    | Hughes/Ray                   |
| Shrike-45A/B            | USN/USAF      | O             | NWC/PMTC                  | Aerojet/<br>Hercules           | Texas<br>Instruments         |
| Sidearm 1-122A          | USMC          | O             | Motorola                  | MTI/Hercules                   | Motorola                     |
| SLAM-84E                | USN           | P             | MDC                       | TCAE                           | MDC/Hughes/RI                |
| SRAM-69A                | USAF          | O             | Boeing                    | Lockheed                       | Kearfott                     |
| Standard ARM-78D        | USN/USAF      | O             | Hughes                    | NOSIH                          | Hughes                       |
| Walleye 1-62            | USN           | O             | MM                        | -                              | MM/Hughes                    |
| Walleye 1ER-62          | USN           | R,D           | NAC                       | -                              | NAC                          |
| Walleye 2-62            | USN           | O             | NAC                       | -                              | NAC                          |
| Walleye 2<br>(ER/DL)-62 | USN           | O             | NAC                       | -                              | NAC                          |

\* Also Surface-to-Surface

(Continued on next page)

**MAJOR MISSILE PROGRAMS (Continued)**

| <b>Program</b>                  | <b>Agency</b> | <b>Status</b> | <b>Systems Contractor</b> | <b>Propulsion Manufacturer</b> | <b>Guidance Manufacturer</b> |
|---------------------------------|---------------|---------------|---------------------------|--------------------------------|------------------------------|
| <b>AIR-TO-SURFACE (Cont'd.)</b> |               |               |                           |                                |                              |
| ACM-129                         | USAF          | O             | Hughes/MDC                | WI                             | Kearfott                     |
| AGM-130A/B                      | USAF          | D             | RI                        | Hercules                       | RI                           |
| AGM-139                         | USN/USAF      | D             | NGC                       | WI                             | Honeywell                    |
| AGM-142                         | USAF          | O             | MM/Rafael                 | Rafael                         | GEC                          |
| JDAM                            | USAF          | D             | MM/MDC                    | –                              | Kearfott/<br>Honeywell       |
| JSOW                            | USN           | D             | TI                        | –                              | Kearfott                     |
| <b>ANTI-SUBMARINE</b>           |               |               |                           |                                |                              |
| VLA-44A                         | USN           | P,O           | Loral                     | TKC                            | Kearfott                     |
| <b>SURFACE-TO-AIR</b>           |               |               |                           |                                |                              |
| ADATS LOS-F-H                   | Army          | O             | MM                        | –                              | MM                           |
| Chaparral-72A                   | Army          | O             | Loral                     | Hercules/<br>Bermite           | GE/Raytheon                  |
| Chaparral-72C/E/H               | Army          | P,O           | Loral                     | AR/Hercules                    | Loral                        |
| Chaparral-72G/J                 | Army          | P,O           | Loral                     | Hercules                       | Hughes/Loral                 |
| ERINT                           | Army          | D             | Loral                     | AR                             | Loral/RI                     |
| Hawk-23B                        | Army          | P,O           | Raytheon                  | Aerojet                        | Raytheon                     |
| Patriot-104                     | Army          | P             | Raytheon                  | TKC                            | Raytheon                     |
| RAM-116A                        | USN           | D             | Hughes                    | Bermite/TKC/<br>Hercules       | Hughes                       |
| Redeye-43A                      | Army/USMC     | O             | Hughes                    | AR                             | Hughes                       |
| Roland-115                      | Army          | O             | Hughes/<br>Boeing         | Hercules                       | Hughes/<br>Boeing            |
| Sea Sparrow-7M                  | USN           | P,O           | Ray/Hughes                | Aerojet/<br>Hercules           | Ray/Hughes                   |
| Standard 1 MR                   | USN           | P,O           | Hughes                    | Aerojet/NOSIH                  | Hughes                       |
| Standard 2 MR                   | USN           | P,O           | Hughes                    | AR/Aerojet/TKC                 | Hughes                       |
| Standard 1 ER                   | USN           | O             | Hughes                    | AR/NOSIH                       | Hughes                       |
| Standard 2 ER                   | USN           | P,O           | Hughes/Ray                | AR/NOSIH/TKC                   | Hughes/Ray                   |
| Stinger-92A                     | Army/USMC     | P,O           | Hughes/Ray                | AR                             | Hughes/Ray                   |

(Continued on next page)

MAJOR MISSILE PROGRAMS (Continued)

| Program                   | Agency | Status | Systems Contractor | Propulsion Manufacturer                | Guidance Manufacturer                    |
|---------------------------|--------|--------|--------------------|--|--|
| <b>SURFACE-TO-SURFACE</b> |        |        |                    |  |  |
| *Harpoon-84A/C/D          | USN    | P,O    | MDC                | TCAE/TKC                               | TI/IBM/LSI                               |
| Minuteman 2-30F           | USAF   | O      | AFLC               | TKC/Aerojet/<br>Hercules               | Northrop<br>Rockwell                     |
| Minuteman 2-30G           | USAF   | O      | AFLC               | TKC/Aerojet                            | Autonetics<br>Rockwell                   |
| Peacekeeper<br>(MX)-118A  | USAF   | O      | BMO                | TKC/Avco/RI<br>Aerojet/MM/<br>Hercules | RI/Northrop/<br>Honeywell/<br>Litton     |
| Tomahawk (SLCM)           | USN    | P      | Hughes/MDC         | WI/AR/UTC                              | MDC/Hughes                               |
| Trident 1 (C-4)           | USN    | O      | Lockheed           | Hercules/TKC                           | MM/Draper/<br>Ray/Hughes/<br>Kearfott    |
| Trident 2 (D-5)           | USN    | P,O    | Lockheed           | Hercules/TKC/<br>UTC                   | MM/Draper/<br>Ray/Hughes/<br>Kearfott/RI |

BATTLEFIELD SUPPORT AND ANTIARMOR

|                   |           |     |         |              |                |
|-------------------|-----------|-----|---------|--------------|----------------|
| ATACMS            | Army      | P   | Loral   | AR           | -              |
| Dragon-47         | Army      | P,O | MDC     | MDC          | MDC            |
| Hellfire-114A/C/F | Army/USMC | P,O | RI/MM   | Hercules/TKC | MM             |
| Hellfire II-114K  | Army/USMC | P   | MM      | Hercules/TKC | -              |
| Longbow Hellfire  | Army/USMC | D   | MM/West | Hercules/TKC | MM/West        |
| Javelin (AAWS-M)  | Army/USMC | P   | TI/MM   | AR           | -              |
| MLRS-26,-270      | Army      | P,O | Loral   | AR           | -              |
| Shillelagh-51C    | Army      | O   | Loral   | Hercules     | Loral          |
| SMAW              | USMC      | P,O | MDC     | MDC          | -              |
| TOW-71A           | Army      | O   | Hughes  | Hercules     | Emerson El.    |
| ITOW-71C          | Army      | P,O | Hughes  | Hercules     | Emerson El.    |
| TOW2-71D          | Army      | P,O | Hughes  | Hercules/TKC | Emerson El./TI |
| TOW2A-71E         | Army      | P,O | Hughes  | Hercules/TKC | Emerson El./TI |
| TOW2B-71F         | Army      | P   | Hughes  | Hercules     | Emerson El./TI |

Source: Aerospace Industries Association, based on company reports.

Status: R-Research; D-Development; P-Production; O-Operational.

\* Also Air-to-Surface

|                                      |  |                             |
|--------------------------------------|--|-----------------------------|
| Abb: AFLC - Air Force Logistics Cmd. | NAC - Naval Avionics Center                    | RI - Rockwell International |
| AR - Atlantic Research               | NASC - Naval Air Systems Command               | TCAE - Teledyne CAE         |
| BMO - Ballistic Missile Office       | NGC - Northrop Grumman                         | TI - Texas Instruments      |
| GE - General Electric                | NOSIH - Naval Ordnance Station,<br>Indian Head | TKC - Thiokol               |
| GEC - General Electric Co PLC        | NWC - Naval Weapons Center                     | UTC - United Technologies   |
| LSI - Lear Siegler                   | PMTC - Pacific Missile Test Center             | West - Westinghouse         |
| MM - Martin Marietta                 | Ray - Raytheon                                 | WI - Williams International |
| MDC - McDonnell Douglas              |  |                             |

**ORDERS, SALES, AND BACKLOG  
MISSILE SYSTEMS AND PARTS<sup>a</sup>**

Calendar Years 1976–1993  
(Millions of Dollars)

| Year              | SALES—Current Dollars | SALES—Constant Dollars <sup>b</sup> |
|-------------------|-----------------------|-------------------------------------|
| 1976              | \$ 3,237              | \$ 6,347                            |
| 1977              | 3,118                 | 5,711                               |
| 1978              | 3,264 <sup>c</sup>    | 5,677                               |
| 1979 <sup>d</sup> | 3,706                 | 5,836                               |
| 1980              | 3,971                 | 5,625                               |
| 1981              | 4,662                 | 5,864                               |
| 1982              | 5,676                 | 6,457                               |
| 1983              | 5,991                 | 6,498                               |
| 1984              | 6,094                 | 6,106                               |
| 1985              | 7,975                 | 8,080                               |
| 1986              | 8,236                 | 8,253                               |
| 1987              | 9,671                 | 9,671                               |
| 1988              | 9,485                 | 9,308                               |
| 1989              | 9,283                 | 8,749                               |
| 1990              | 9,102                 | 8,237                               |
| 1991              | 8,989                 | 7,844                               |
| 1992 <sup>r</sup> | 9,032                 | 7,693                               |
| 1993              | 7,366                 | 6,098                               |

| Year              | NET NEW ORDERS | BACKLOG AS OF<br>DECEMBER 31 |
|-------------------|----------------|------------------------------|
| 1976              | \$ 3,036       | \$ 4,379                     |
| 1977              | 3,280          | 4,541                        |
| 1978              | 2,948          | 4,581                        |
| 1979 <sup>d</sup> | 3,724          | 4,916                        |
| 1980              | 4,961          | 5,558                        |
| 1981              | 6,030          | 6,749                        |
| 1982              | 6,034          | 7,107                        |
| 1983              | 7,231          | 8,406                        |
| 1984              | 7,731          | 10,043                       |
| 1985              | 8,122          | 10,190                       |
| 1986              | 11,023         | 12,754                       |
| 1987              | 11,482         | 14,302                       |
| 1988              | 9,437          | 14,255                       |
| 1989              | 8,998          | 14,005                       |
| 1990              | 7,917          | 12,956                       |
| 1991              | 8,072          | 12,571                       |
| 1992 <sup>r</sup> | 9,234          | 11,814                       |
| 1993              | 4,694          | 9,142                        |

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).

a Excludes engines and propulsion units where separable.

b Based on AIA's aerospace composite price deflator (1987=100).

c AIA estimate based on MQ37D.

d Prior to 1980, includes space vehicle systems and parts sold to other than U.S. Government customers.

r Revised.

**BALLISTIC MISSILE DEFENSE ORGANIZATION  
FUNDING BY PROJECT NUMBER**

Fiscal Years 1991–1995  
(Millions of Dollars)

| Project Number and Title  | 1991  | 1992  | 1993  | 1994 <sup>E</sup> | 1995 <sup>E</sup> |
|---|-------|-------|-------|-------------------|-------------------|
| 1101 Passive Sensors . . . . .  | \$ 35 | \$ 35 | \$ 21 | \$ 10             | \$ 25             |
| 1102 Microwave Radar . . . . .  | 5     | 12    | 10    | 2                 | 10                |
| 1103 Laser Radar Technology . . . . .                                       | 30    | 14    | —     | —                 | —                 |
| 1104 Signal Processing . . . . .  | 45    | 31    | 19    | 7                 | 7                 |
| 1105 Discrimination . . . . .   | 122   | 86    | 86    | 58                | 88                |
| 1106 Sensor Studies & Experiments . . . . .                                 | 159   | 168   | 285   | 116               | 77                |
| 1110 Sensor Integration . . . . .   | —     | 21    | 54    | 25                | —                 |
| 1111 Advanced Sensor Technology . . . . .                                   | —     | —     | —     | 37                | 48                |
| 1201 Interceptor Component Technology . . . . .                             | 100   | 36    | 18    | 20                | 28                |
| 1202 Interceptor Integration Technology . . . . .                           | 129   | 125   | 185   | —                 | —                 |
| 1204 Interceptor Studies & Analysis . . . . .                               | 54    | 11    | 8     | 6                 | —                 |
| 1206 Advanced TMD Weapons . . . . .   | 31    | —     | —     | —                 | —                 |
| 1209 Endoatmospheric Interceptor Technology . . . . .                       | —     | 50    | 23    | 3                 | —                 |
| 1212 D-2 HVG Projectile . . . . .   | —     | 6     | 10    | 5                 | —                 |
| 1215 Boost Phase Int/Exo . . . . .  | —     | —     | —     | 31                | 61                |
| 1216 Sea Based Theater Wide Defense . . . . .                               | —     | —     | —     | 80                | 18                |
| 1217 KKV Technology . . . . .   | —     | —     | —     | 57                | 120               |
| 1301 Free Electron Laser . . . . .  | 29    | 22    | 14    | —                 | —                 |
| 1302 Chemical Laser Technology . . . . .                                    | 91    | 99    | 12    | 54                | 78                |
| 1303 Neutral Particle Beam Technology . . . . .                             | 105   | 75    | 90    | 7                 | —                 |
| 1305 Acquisition, Tracking, Pointing & Fire<br>Control Technology . . . . . | 80    | 60    | 19    | 6                 | 13                |
| 1307 Directed Energy Demonstration . . . . .                                | —     | —     | 21    | 2                 | —                 |
| 1405 Communications Engineering . . . . .                                   | 6     | 10    | 13    | 2                 | 1                 |
| 1501 Survivability Technology . . . . .                                     | 57    | 66    | 29    | 6                 | 8                 |
| 1502 Lethality and Target Hardening . . . . .                               | 27    | 48    | 37    | 30                | 33                |
| 1503 Power & Power Conditioning . . . . .                                   | 49    | 24    | 41    | 7                 | 10                |
| 1504 Materials & Structures . . . . .                                       | 27    | 28    | 22    | 6                 | 7                 |
| 1601 Innovative Science & Technology . . . . .                              | 66    | 62    | 43    | 42                | 60                |
| 1602,3 New Concepts Development . . . . .                                   | 25    | 37    | 77    | 32                | 46                |
| 1700 Flight Test/Launch Activities . . . . .                                | 47    | 89    | 64    | 43                | —                 |

(Continued on next page)

**BALLISTIC MISSILE DEFENSE ORGANIZATION  
FUNDING BY PROJECT NUMBER (Continued)**

Fiscal Years 1991–1995  
(Millions of Dollars)

| Project Number and Title  | 1991           | 1992           | 1993           | 1994 <sup>E</sup> | 1995 <sup>E</sup> |
|---|----------------|----------------|----------------|-------------------|-------------------|
| 2102 Space & Missile Tracking System .....                        | 48             | 74             | 210            | —                 | 120               |
| 2104 Ground-Based Radar .....                                     | 86             | 184            | 194            | 259               | 181               |
| 2201 Space-Based Interceptor .....                                | 35             | —              | —              | —                 | —                 |
| 2202 Ground-Based Exoatmospheric<br>Interceptor Development ..... | 85             | 213            | 110            | —                 | —                 |
| 2203 HEDI (E2I) .....   | 103            | —              | —              | —                 | —                 |
| 2205 Brilliant Pebbles .....                                      | 392            | 384            | 246            | —                 | —                 |
| 2207 PATRIOT .....  | 45             | 160            | 170            | 244               | 542               |
| 2208 ERINT .....  | 103            | 160            | 116            | 97                | 58                |
| 2209 ACES .....   | 42             | 60             | 58             | 61                | 52                |
| 2210 THAAD .....  | —              | 100            | 273            | 435               | 496               |
| 2212 Corps SAM .....  | —              | 25             | 23             | 20                | 18                |
| 2213 Sea based area TBMD .....                                    | —              | 30             | 90             | 154               | 194               |
| 2300 Command Center .....   | 39             | 72             | 49             | 23                | 57                |
| 2308 HAWK System BM/C3 Modifications ...                          | —              | —              | —              | 30                | 31                |
| 3101 Engineering/Integration Support .....                        | 97             | 158            | 114            | 42                | 65                |
| 3107 Environment, Siting, & Facilities .....                      | 14             | 12             | 6              | 9                 | 7                 |
| 3201 Architecture and System Analyses .....                       | 7              | 3              | 6              | 38                | 50                |
| 3202 Operations Interface .....                                   | 7              | 8              | 8              | 4                 | 4                 |
| 3203 Intelligence Threat Development .....                        | 10             | 15             | 6              | 8                 | 8                 |
| 3204 Countermeasures Integration .....                            | 19             | 17             | 21             | 16                | 18                |
| 3205 Theater Missile Defense Special Studies .                    | 30             | —              | —              | —                 | —                 |
| 3206 System Threat .....  | 7              | 8              | 9              | 7                 | 7                 |
| 3207 Systems Analysis .....                                       | 20             | 25             | 12             | —                 | —                 |
| 3211 C4I Concepts .....   | —              | —              | 23             | 13                | 34                |
| 3300 Test & Evaluation Support .....                              | 268            | 403            | 623            | 316               | 302               |
| 4000 Operational Support Costs .....                              | 228            | 247            | 481            | 253               | 271               |
| Other programs <sup>a</sup> .....                                 | 56             | 85             | 55             | 22                | 6                 |
| <b>TOTAL DETAILED PROJECTS .....</b>                              | <b>\$2,978</b> | <b>\$3,623</b> | <b>\$2,878</b> | <b>\$2,735</b>    | <b>\$3,234</b>    |

Source: Ballistic Missile Defense Organization, "1994 Report to the Congress on Ballistic Missile Defense" (Annually).

a Projects with five year funding under \$20 million herein combined.

E Estimate. Represents Administration's budget request.

## SPACE PROGRAMS

Sales of space systems—including military, civil and commercial programs—declined by three percent in 1993 to \$28.9 billion, down from \$29.8 billion, according to data compiled by AIA. The Bureau of Census, whose figures do not include space vehicle engines or propulsion systems, separately reported space system sales of \$9.3 billion. That would amount to a slight increase over 1992's \$9.27 billion. The Census statistics showed a further decline in sales of military space equipment to \$5.5 billion, down from \$5.9 billion in the previous year. Non-military sales—which include sales to NASA and to commercial customers in the U.S. and abroad—came to \$3.8 billion, up from \$3.4 billion in 1992. Combined military/civil/commercial net new orders for space systems declined in 1993, according to Census data that again does not include space vehicle engines and propulsion units. A substantial increase in non-military orders was more than offset by a very sharp reduction in orders for military space systems. Non-military orders reached \$4.8 billion, up from \$3.7 billion; military orders, at \$5 billion, were down 26 percent from 1992's \$6.8 billion. At year-end 1993, the combined military/civil/commercial backlog of orders for space systems was \$13.3 billion, up from \$12.8 billion at the

end of 1992 and just slightly below the all-time high of \$13.4 billion in 1989. Here again, the changing workload mix is evident: the military backlog was \$7.1 billion, down from \$7.6 billion, while the non-military backlog increased to \$6.2 billion from the previous year's \$5.2 billion. For 1993, the military backlog was 54 percent of the total, which compares with 60 percent in 1992.

The trend in government investment in space, on the rise for almost two decades until it declined in 1992, continued downward in 1993. Total outlays for federal space activities were \$27.4 billion, down from \$27.9 billion in the previous year. The Department of Defense (DoD) once again led all government agencies in 1993 space outlays with \$13.8 billion, down from \$14.4 billion in 1992. NASA was second with outlays of \$13.1 billion, up from \$12.8 billion in 1992. DoD, with 50 percent, and NASA with 48 percent, accounted for virtually all space outlays in 1993. The Department of Commerce had outlays of \$308 million (up from \$298 million) and the Department of Energy had outlays of \$165 million (down from \$223 million); other agencies combined accounted for space outlays of \$64 million (down from \$68 million).

A DoD budget plan for FY 1995

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provides information about the major areas of defense-related space activity, most of it under Air Force cognizance. The largest USAF program in terms of funding requested is the Milstar defense communications satellite—\$648 million for research, development, test, and evaluation (RDT&E). Others include Space Boosters (\$422.7 million for procurement, \$161.1 million for RDT&E); Defense Support Program (\$364 million procurement, \$76.4 million RDT&E); Navstar Global Positioning System (\$190.2 million procurement, \$51.1 million RDT&E); Defense Satellite Communications Systems (\$134.4 million procurement, \$63.2 million RDT&E); Medium Launch Vehicle (\$149.1 million procurement, \$21 million RDT&E). The single Navy listing is the Fleet Satellite Communications program (\$125.5 million procurement, \$22 million RDT&E). The NASA plan for FY 1995 sought \$14.4 billion in budget outlays. A breakdown of the major budget categories contemplated \$6.0 billion for Science, Aeronautics, and Technology (a new budget category) plus Research and Development; \$5.6 billion for Human Space Flight (a new budget category) plus Space Flight, Control and Communications; and \$2.4 billion for Mission Support plus Research and Program Management.

A further breakdown of Human Space Flight showed \$1.9 billion for the Space Station, plus \$150 million for U.S./Russian cooperative activities; \$3.3 billion for Space Shuttle operations and upgrades. The Science, Aeronautics, and Technology category included these major allocations: Space Science, \$1.8 billion; Mission To Planet Earth, \$1.2 billion; Aeronautical Research and Technology, \$899 million; Advanced Concepts and Technology, \$608 million; Life and Microgravity Sciences & Applications, \$471 million.





**ORDERS, SALES, AND BACKLOG  
SPACE VEHICLE SYSTEMS<sup>a</sup>**

Calendar Years 1979–1993  
(Millions of Dollars)

| Year              | SALES—Current Dollars |                       |              | SALES—Constant Dollars <sup>c</sup> |                       |              |
|-------------------|-----------------------|-----------------------|--------------|-------------------------------------|-----------------------|--------------|
|                   | TOTAL                 | Military <sup>b</sup> | Non-Military | TOTAL                               | Military <sup>b</sup> | Non-Military |
| 1979              | \$ 2,539              | \$1,105               | \$1,434      | \$ 3,998                            | \$1,740               | \$2,258      |
| 1980              | 3,483                 | 1,461                 | 2,022        | 4,933                               | 2,069                 | 2,864        |
| 1981              | 3,856                 | 1,736                 | 2,120        | 4,850                               | 2,184                 | 2,667        |
| 1982              | 4,749                 | 2,606                 | 2,143        | 5,403                               | 2,965                 | 2,438        |
| 1983              | 4,940                 | 2,420                 | 2,520        | 5,358                               | 2,625                 | 2,733        |
| 1984              | 5,225                 | 3,019                 | 2,206        | 5,235                               | 3,025                 | 2,210        |
| 1985              | 6,300                 | 4,241                 | 2,059        | 6,383                               | 4,297                 | 2,086        |
| 1986              | 6,304                 | 4,579                 | 1,725        | 6,317                               | 4,588                 | 1,728        |
| 1987              | 8,051                 | 5,248                 | 2,803        | 8,051                               | 5,248                 | 2,803        |
| 1988              | 8,622                 | 6,190                 | 2,432        | 8,461                               | 6,075                 | 2,387        |
| 1989              | 9,758                 | 6,457                 | 3,301        | 9,197                               | 6,086                 | 3,111        |
| 1990              | 9,691                 | 6,556                 | 3,135        | 8,770                               | 5,933                 | 2,837        |
| 1991              | 10,515                | 6,770                 | 3,745        | 9,175                               | 5,908                 | 3,268        |
| 1992 <sup>r</sup> | 9,266                 | 5,887                 | 3,379        | 7,893                               | 5,014                 | 2,878        |
| 1993              | 9,341                 | 5,534                 | 3,807        | 7,733                               | 4,581                 | 3,151        |

| Year              | NET NEW ORDERS |                       |              | BACKLOG AS OF DECEMBER 31 |                       |              |
|-------------------|----------------|-----------------------|--------------|---------------------------|-----------------------|--------------|
|                   | TOTAL          | Military <sup>b</sup> | Non-Military | TOTAL                     | Military <sup>b</sup> | Non-Military |
| 1979              | \$ 2,698       | \$1,018               | \$1,680      | \$ 1,448                  | \$ 909                | \$ 539       |
| 1980              | 3,636          | 1,625                 | 2,011        | 2,099                     | 1,218                 | 881          |
| 1981              | 5,062          | 2,878                 | 2,184        | 3,163                     | 2,166                 | 997          |
| 1982              | 5,842          | 2,718                 | 3,124        | 4,254                     | 2,277                 | 1,977        |
| 1983              | 5,399          | 3,016                 | 2,383        | 4,865                     | 2,733                 | 2,132        |
| 1984              | 4,984          | 3,385                 | 1,599        | 4,624                     | 3,099                 | 1,525        |
| 1985              | 8,383          | 6,083                 | 2,300        | 6,707                     | 4,941                 | 1,766        |
| 1986              | 7,437          | 5,666                 | 1,771        | 8,063                     | 6,028                 | 2,035        |
| 1987              | 11,455         | 9,000                 | 2,455        | 12,393                    | 9,460                 | 2,933        |
| 1988              | 7,296          | 4,561                 | 2,735        | 10,838                    | 7,880                 | 2,958        |
| 1989              | 11,709         | 8,107                 | 3,602        | 13,756                    | 9,192                 | 4,164        |
| 1990              | 9,598          | 6,256                 | 3,342        | 12,762                    | 8,130                 | 4,332        |
| 1991              | 11,222         | 5,468                 | 5,754        | 11,664                    | 6,221                 | 5,443        |
| 1992 <sup>r</sup> | 10,491         | 6,773                 | 3,718        | 12,809                    | 7,622                 | 5,187        |
| 1993              | 9,817          | 5,041                 | 4,776        | 13,282                    | 7,129                 | 6,153        |

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)" Series MA37D (Annually).

a Excludes engines and propulsion units where separable.

b Space vehicle systems and parts sold to other than U.S. Government customers included as of 1980; previously, this product group combined with missile systems and parts.

c Based on AIA's aerospace composite price deflator, 1987=100.

r Revised.

**ORDERS, SALES, AND BACKLOG  
ENGINES AND PROPULSION UNITS FOR  
MISSILES AND SPACE VEHICLES**

Calendar Years 1979–1993  
(Millions of Dollars)

| Year | SALES—Current Dollars |                       |              | SALES—Constant Dollars <sup>a</sup> |                       |              |
|------|-----------------------|-----------------------|--------------|-------------------------------------|-----------------------|--------------|
|      | TOTAL                 | Military <sup>b</sup> | Non-Military | TOTAL                               | Military <sup>b</sup> | Non-Military |
| 1979 | \$ 952                | \$ 915                | \$ 37        | \$1,499                             | \$1,441               | \$ 58        |
| 1980 | 939                   | 661                   | 278          | 1,330                               | 936                   | 394          |
| 1981 | 1,204                 | 786                   | 418          | 1,514                               | 989                   | 526          |
| 1982 | 1,555                 | 899                   | 656          | 1,769                               | 1,023                 | 746          |
| 1983 | 1,814                 | 951                   | 863          | 1,967                               | 1,031                 | 936          |
| 1984 | 2,305                 | 1,116                 | 1,189        | 2,310                               | 1,118                 | 1,191        |
| 1985 | 2,466                 | 1,256                 | 1,210        | 2,498                               | 1,273                 | 1,226        |
| 1986 | 2,995                 | 1,796                 | 1,199        | 3,001                               | 1,800                 | 1,201        |
| 1987 | 2,993                 | 1,563                 | 1,430        | 2,993                               | 1,563                 | 1,430        |
| 1988 | 3,407                 | 1,830                 | 1,577        | 3,343                               | 1,796                 | 1,548        |
| 1989 | 3,602                 | 1,771                 | 1,831        | 3,395                               | 1,669                 | 1,726        |
| 1990 | 3,247                 | 1,911                 | 1,336        | 2,938                               | 1,729                 | 1,209        |
| 1991 | 3,807                 | 1,869                 | 1,938        | 3,322                               | 1,631                 | 1,691        |
| 1992 | 3,051                 | 1,577                 | 1,474        | 2,599                               | 1,343                 | 1,256        |
| 1993 | 3,102                 | 1,618                 | 1,484        | 2,568                               | 1,339                 | 1,228        |

| Year | NET NEW ORDERS |                       |              | BACKLOG AS OF DECEMBER 31 |                       |                    |
|------|----------------|-----------------------|--------------|---------------------------|-----------------------|--------------------|
|      | TOTAL          | Military <sup>b</sup> | Non-Military | TOTAL                     | Military <sup>b</sup> | Non-Military       |
| 1979 | \$1,187        | \$1,141               | \$ 46        | \$1,024                   | \$ 980                | \$ 44              |
| 1980 | 1,221          | 653                   | 568          | 1,284                     | 871                   | 413                |
| 1981 | 1,284          | 746                   | 538          | 1,343                     | 828                   | 515                |
| 1982 | 2,112          | 1,134                 | 978          | 1,901                     | 1,063                 | 838                |
| 1983 | 1,618          | 942                   | 676          | 1,691                     | 1,052                 | 639                |
| 1984 | 3,770          | 2,258                 | 1,512        | 3,156                     | 2,194                 | 962                |
| 1985 | 3,823          | 1,323                 | 2,500        | 4,513                     | 2,261                 | 2,252              |
| 1986 | 1,985          | 1,224                 | 761          | 3,503                     | 1,689                 | 1,814              |
| 1987 | 3,335          | 1,995                 | 1,340        | 3,849                     | 2,121                 | 1,728              |
| 1988 | 3,507          | 1,623                 | 1,884        | 3,985                     | 1,998                 | 1,987              |
| 1989 | 6,113          | 2,475                 | 3,638        | 6,410                     | 2,595                 | 3,815              |
| 1990 | 2,692          | 1,891                 | 801          | 6,230                     | 2,887                 | 3,343              |
| 1991 | 5,661          | 1,087                 | 4,574        | 8,422                     | 2,327                 | 6,095              |
| 1992 | 3,124          | 2,097                 | 1,027        | 8,310 <sup>r</sup>        | 2,729 <sup>r</sup>    | 5,581 <sup>r</sup> |
| 1993 | 1,707          | 710                   | 997          | 6,913                     | 1,820                 | 5,093              |

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).

a Based on AIA's aerospace composite price deflator, 1987=100.

b Prior to 1980 includes figures for non-military U.S. Government customers.

r Revised.

**U.S. GOVERNMENT SPACECRAFT RECORD<sup>a</sup>**  
**Calendar Years 1957–1993**

| Year | Earth Orbit <sup>b</sup> |         | Earth Escape <sup>b</sup> |                | Year              | Earth Orbit <sup>b</sup> |            | Earth Escape <sup>b</sup> |                |
|------|--------------------------|---------|---------------------------|----------------|-------------------|--------------------------|------------|---------------------------|----------------|
|      | Success                  | Failure | Success                   | Failure        |                   | Success                  | Failure    | Success                   | Failure        |
| 1957 | —                        | 1       | —                         | —              | 1976              | 33                       | —          | 1                         | —              |
| 1958 | 5                        | 8       | —                         | 4              | 1977              | 27                       | 2          | 2                         | —              |
| 1959 | 9                        | 9       | 1                         | 2              | 1978              | 34                       | 2          | 7                         | —              |
| 1960 | 16                       | 12      | 1                         | 2              | 1979              | 18                       | —          | —                         | —              |
| 1961 | 35                       | 12      | —                         | 2              | 1980              | 16                       | 4          | —                         | —              |
| 1962 | 55                       | 12      | 4                         | 1              | 1981              | 20                       | 1          | —                         | —              |
| 1963 | 62                       | 11      | —                         | —              | 1982              | 21                       | —          | —                         | —              |
| 1964 | 69                       | 8       | 4                         | —              | 1983              | 31                       | —          | —                         | —              |
| 1965 | 93                       | 7       | 4                         | 1              | 1984              | 35                       | 3          | —                         | —              |
| 1966 | 94                       | 12      | 7                         | 1 <sup>c</sup> | 1985              | 37                       | 1          | —                         | —              |
| 1967 | 78                       | 4       | 10                        | —              | 1986              | 11                       | 4          | —                         | —              |
| 1968 | 61                       | 15      | 3                         | —              | 1987              | 9                        | 1          | —                         | —              |
| 1969 | 58                       | 1       | 8                         | 1              | 1988              | 16                       | 1          | —                         | —              |
| 1970 | 36                       | 1       | 3                         | —              | 1989              | 24                       | —          | 2                         | —              |
| 1971 | 45                       | 2       | 8                         | 1              | 1990              | 40                       | —          | 1                         | —              |
| 1972 | 33                       | 2       | 8                         | —              | 1991              | 32 <sup>dr</sup>         | —          | —                         | — <sup>r</sup> |
| 1973 | 23                       | 2       | 3                         | —              | 1992              | 26 <sup>d</sup>          | —          | 1 <sup>r</sup>            | — <sup>r</sup> |
| 1974 | 27                       | 2       | 1                         | —              | 1993 <sup>f</sup> | 24 <sup>d</sup>          | —          | —                         | —              |
| 1975 | 30                       | 4       | 4                         | —              |                   |                          |            |                           |                |
|      |                          |         |                           |                | <b>TOTAL</b>      | <b>1,283</b>             | <b>144</b> | <b>83</b>                 | <b>15</b>      |

Source: NASA, "Aeronautics and Space Report of the President" (Annually).

- a Payloads, rather than launchings; some launches account for multiple spacecraft. Includes spacecraft from cooperating countries launched on U.S. launch vehicles.
- b The criterion of success is attainment of Earth orbit or Earth escape rather than judgement of mission success. "Escape" flights include all that were intended to go at least an altitude equal to the lunar distance from the Earth.
- c This Earth-escape failure did attain Earth orbit and therefore is included in the Earth-orbit success totals.
- d Excludes commercial satellites.
- f Through September 30.
- r Revised.

**WORLDWIDE SPACE LAUNCHINGS<sup>a</sup>**  
**WHICH ATTAINED EARTH ORBIT OR BEYOND**  
 Calendar Years 1957–1993

| Country                       | Total<br>1957–<br>1993 | 1989             | 1990 | 1991 <sup>r</sup> | 1992 <sup>r</sup> | 1993 <sup>b</sup> |
|-------------------------------|------------------------|------------------|------|-------------------|-------------------|-------------------|
| <b>TOTAL</b> .....            | 3,548                  | 101 <sup>r</sup> | 116  | 88                | 92                | 60                |
| U.S.S.R. ....                 | 2,411                  | 74               | 75   | 62                | 55                | 38                |
| United States .....           | 978                    | 17               | 27   | 13 <sup>c</sup>   | 25 <sup>c</sup>   | 17 <sup>c</sup>   |
| European Space Agency .....   | 53                     | 7                | 5    | 9                 | 5                 | 4                 |
| Japan .....                   | 46                     | 2                | 3    | 2                 | 2                 | 1                 |
| People's Republic of China .. | 32                     | —                | 5    | 1                 | 3                 | —                 |
| India .....                   | 6                      | —                | —    | 1                 | 2                 | —                 |
| Israel .....                  | 2                      | 1 <sup>r</sup>   | 1    | —                 | —                 | —                 |
| Other <sup>d</sup> .....      | 20                     | —                | —    | —                 | —                 | —                 |

Source: NASA, "Aeronautics and Space Report of the President" (Annually).

a Number of launchings rather than spacecraft; some launches orbited multiple spacecraft.

b Through September 30.

c Excludes commercial expendable launches.

d Includes 10 by France, 8 by Italy (5 were U.S. spacecraft), 1 by Australia, and 1 by the United Kingdom.

r Revised.

## U.S. SPACE LAUNCH VEHICLES

As of 1993

| Vehicle and<br>Initial Launch<br>& First Launch<br>of this<br>Modification | Stages                              | Thrust<br>(Kilo-<br>newtons) | Maximum Payload (Kg) <sup>a</sup>       |                                      |                                     |
|--|-------------------------------------|------------------------------|---|--------------------------------------|-------------------------------------|
|  |                                     |                              | 185-Km<br>Orbit                         | Geo-<br>synch.-<br>Transfer<br>Orbit | Circular<br>Sun-<br>Synch.<br>Orbit |
| Scout<br>(1960; 1979)  | 1. Algol IIIA*                      | 414.8                        | 255                                     | 54                                   | 155 <sup>b</sup>                    |
|  | 2. Castor IIA*                      | 267.2                        | 210 <sup>b</sup>                        |                                      |                                     |
|  | 3. Antares IIIA*                    | 80.8                         |   |                                      |                                     |
|  | 4. Altair IIIA*                     | 25.8                         |   |                                      |                                     |
| Pegasus<br>(1990)  | 1. Orion 50S*                       | 580.5                        | 380                                     | —                                    | 210                                 |
|  | 2. Orion 50*                        | 138.6                        | 280 <sup>b</sup>                        |                                      |                                     |
|  | 3. Orion 38*                        | 35.8                         |   |                                      |                                     |
| Delta II<br>6900 Series<br>(1989)  | 1. RS-270/B plus<br>9 Castor IV*    | 921.0<br>3,888.0             | 3,983<br>2,943 <sup>b</sup>             | 1,447 <sup>c</sup>                   | 2,413                               |
|  | 2. AJ10-118K                        | 42.9                         |   |                                      |                                     |
| Delta II<br>7900 Series<br>(1990)  | 1. RS-270/C plus<br>9 Hercules GEM* | 894.4<br>432.0               | 5,039<br>3,819 <sup>b</sup>             | 1,819 <sup>c</sup>                   | 3,175                               |
|  | 2. AJ10-118K                        | 42.9                         |   |                                      |                                     |
| Atlas E<br>(1958; 1968)  | 1. Atlas booster &<br>sustainer     | 1,739.5                      | 820 <sup>b</sup><br>1,860 <sup>bd</sup> | —<br>—                               | —<br>910 <sup>d</sup>               |
| Atlas I<br>(1966; 1990)  | 1. Atlas booster &<br>sustainer     | 1,954.0                      | 5,900                                   | 2,375                                | —                                   |
|  | 2. 2 Centaur I                      | 146.8                        |   |                                      |                                     |
| Atlas II<br>(1966; 1991)   | 1. Atlas booster &<br>sustainer     | 2,110.0                      | 6,580                                   | 2,610                                | 4,300                               |
|  | 2. 2 Centaur II                     | 146.8                        | 5,510 <sup>b</sup>                      |                                      |                                     |
| Atlas IIA<br>(1966; 1992)  | 1. Atlas booster &<br>sustainer     | 2,110.0                      | 7,280                                   | 2,745                                | 4,750                               |
|  | 2. 2 Centaur II                     | 185.0                        | 6,170 <sup>b</sup>                      |                                      |                                     |

(Continued on next page)

## U.S. SPACE LAUNCH VEHICLES

As of 1993 (Continued)

| Vehicle and<br>Initial Launch<br>& First Launch<br>of this<br>Modification | Stages   | Thrust<br>(Kilo-<br>newtons) | Maximum Payload (Kg) <sup>a</sup> |                           |                                     |
|--|--|------------------------------|-----------------------------------|---------------------------|-------------------------------------|
|  |  |                              | 185-Km<br>Orbit                   | 24-Hour<br>Polar<br>Orbit | Circular<br>Sun-<br>Synch.<br>Orbit |
| Titan II<br>(1964; 1988)   | 1. 2 LR-87<br>2. LR-91   | 2,090.0<br>440.0             | 1,905 <sup>b</sup>                | —                         | —                                   |
| Titan III<br>(1989)  | 0. 2 5 1/2-segment,<br>3.05-m. dia*<br>1. 2 LR-87<br>2. LR-91  | 12,420.0<br>2,429.0<br>462.8 | 14,515                            | 4,990 <sup>f</sup>        | —                                   |
| Titan IV<br>(1989)   | 0. 2 7-segment,<br>3.05-m. dia*<br>1. 2 LR-87<br>2. LR-91  | 16,000.0<br>2,429.0<br>462.8 | 17,700<br>14,110 <sup>b</sup>     | 5,900 <sup>f</sup>        | —                                   |
| Space Shuttle<br>(reusable)<br>(1981)                                      | 1. 3 main engines (SSMEs)<br>fire in parallel with solid-<br>fueled rocket boosters<br>(SRBs)<br>2. 2 SRBs mounted on<br>external tank (ET) fire in<br>parallel with SSMEs | 5,006.1<br>27,232.0          | 24,900 <sup>g</sup>               | 5,900 <sup>h</sup>        | —                                   |

Source: NASA, "Aeronautics and Space Report of the President" (Annually) and NASA Historian's office.

- \* Solid propellant; all others are liquid.
- a Due east launch except as indicated.
- b Polar launch.
- c With Star 48B.
- d With TE-M-364-4 upper stage.
- f With appropriate upper stage.
- g In full performance configuration (280-420 km orbit).
- h With IUS or TOS.

## FEDERAL SPACE ACTIVITIES OUTLAYS

Fiscal Years 1961–1993  
(Millions of Current Dollars)

| Year              | TOTAL               | NASA <sup>a</sup> | DoD    | Energy           | Commerce | Other <sup>b</sup> |
|-------------------|---------------------|-------------------|--------|------------------|----------|--------------------|
| 1961              | \$ 1,468            | \$ 694            | \$ 710 | \$ 64            | \$ —     | \$ —               |
| 1962              | 2,387               | 1,226             | 1,029  | 130              | 1        | 1                  |
| 1963              | 4,079               | 2,517             | 1,368  | 181              | 12       | 1                  |
| 1964              | 5,930               | 4,131             | 1,564  | 220              | 12       | 3                  |
| 1965              | 6,886               | 5,035             | 1,592  | 232              | 24       | 3                  |
| 1966              | 7,719               | 5,858             | 1,637  | 188              | 28       | 7                  |
| 1967              | 7,237               | 5,337             | 1,673  | 184              | 39       | 5                  |
| 1968              | 6,667               | 4,595             | 1,890  | 147              | 29       | 6                  |
| 1969              | 6,326               | 4,078             | 2,095  | 118              | 31       | 5                  |
| 1970              | 5,453               | 3,565             | 1,756  | 103              | 24       | 5                  |
| 1971              | 4,999               | 3,171             | 1,693  | 97               | 30       | 8                  |
| 1972              | 4,772               | 3,195             | 1,470  | 60               | 37       | 10                 |
| 1973              | 4,719               | 3,069             | 1,557  | 51               | 29       | 13                 |
| 1974              | 4,854               | 2,960             | 1,777  | 39               | 64       | 14                 |
| 1975              | 4,891               | 2,951             | 1,831  | 34               | 64       | 11                 |
| 1976              | 5,314               | 3,336             | 1,864  | 26               | 71       | 16                 |
| Tr. Qtr.          | 1,361               | 869               | 458    | 8                | 23       | 4                  |
| 1977              | 5,559               | 3,600             | 1,833  | 22               | 87       | 18                 |
| 1978              | 6,188               | 3,582             | 2,457  | 29               | 101      | 20                 |
| 1979              | 6,808               | 3,744             | 2,892  | 55               | 97       | 21                 |
| 1980              | 7,668               | 4,340             | 3,162  | 49               | 89       | 28                 |
| 1981              | 9,166               | 4,877             | 4,131  | 47               | 81       | 30                 |
| 1982              | 10,466              | 5,463             | 4,772  | 60               | 142      | 30                 |
| 1983              | 12,590              | 6,101             | 6,247  | 40               | 178      | 25                 |
| 1984              | 14,726              | 6,461             | 8,000  | 33               | 209      | 22                 |
| 1985              | 17,255              | 6,607             | 10,441 | 34               | 155      | 17                 |
| 1986              | 18,581              | 6,756             | 11,449 | 35               | 317      | 25                 |
| 1987              | 21,844              | 7,254             | 14,264 | 37               | 262      | 26                 |
| 1988              | 23,414              | 8,451             | 14,397 | 199              | 334      | 33                 |
| 1989              | 25,143              | 10,195            | 14,504 | 97               | 306      | 41                 |
| 1990              | 25,671              | 12,292            | 12,962 | 79               | 279      | 60                 |
| 1991              | 28,360 <sup>r</sup> | 13,351            | 14,432 | 251 <sup>r</sup> | 266      | 60 <sup>r</sup>    |
| 1992              | 27,864              | 12,838            | 14,437 | 223              | 298      | 68                 |
| 1993 <sup>E</sup> | 27,408              | 13,092            | 13,779 | 165              | 308      | 64                 |

Source: NASA, "Aeronautics and Space Report of the President" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Excludes amounts for air transportation.

b Departments of Interior and Agriculture, and the National Science Foundation. NSF funding transferred to NASA after 1982.

E Estimated.

r Revised.

Tr. Qtr. See Glossary.

**FEDERAL SPACE ACTIVITIES OUTLAYS  
IN CONSTANT DOLLARS**

Fiscal Years 1961–1993  
(Millions of Constant Dollars<sup>a</sup>)

| Year              | TOTAL               | NASA <sup>b</sup> | DoD      | Energy           | Commerce | Other <sup>c</sup> |
|-------------------|---------------------|-------------------|----------|------------------|----------|--------------------|
| 1961              | \$ 5,584            | \$ 2,640          | \$ 2,701 | \$243            | \$ —     | \$ —               |
| 1962              | 8,910               | 4,576             | 3,840    | 485              | 4        | 3                  |
| 1963              | 14,973              | 9,239             | 5,020    | 664              | 45       | 4                  |
| 1964              | 21,454              | 14,947            | 5,657    | 796              | 45       | 9                  |
| 1965              | 24,358              | 17,810            | 5,631    | 821              | 85       | 11                 |
| 1966              | 26,551              | 20,151            | 5,633    | 648              | 97       | 23                 |
| 1967              | 24,076              | 17,753            | 5,566    | 611              | 128      | 18                 |
| 1968              | 21,369              | 14,729            | 6,058    | 470              | 93       | 18                 |
| 1969              | 19,293              | 12,437            | 6,389    | 358              | 95       | 14                 |
| 1970              | 15,774              | 10,313            | 5,080    | 297              | 69       | 15                 |
| 1971              | 13,756              | 8,726             | 4,659    | 268              | 82       | 22                 |
| 1972              | 12,482              | 8,357             | 3,845    | 156              | 98       | 26                 |
| 1973              | 11,734              | 7,632             | 3,871    | 127              | 73       | 31                 |
| 1974              | 11,218              | 6,842             | 4,107    | 90               | 148      | 32                 |
| 1975              | 10,279              | 6,202             | 3,848    | 72               | 134      | 23                 |
| 1976              | 10,375              | 6,514             | 3,640    | 50               | 139      | 32                 |
| Tr.Qtr.           | 2,553               | 1,630             | 859      | 15               | 43       | 8                  |
| 1977              | 10,038              | 6,500             | 3,309    | 40               | 157      | 32                 |
| 1978              | 10,388              | 6,014             | 4,125    | 48               | 169      | 33                 |
| 1979              | 10,516              | 5,783             | 4,467    | 84               | 150      | 32                 |
| 1980              | 10,864              | 6,149             | 4,480    | 69               | 126      | 39                 |
| 1981              | 11,787              | 6,272             | 5,312    | 60               | 104      | 39                 |
| 1982              | 12,527              | 6,539             | 5,711    | 71               | 170      | 35                 |
| 1983              | 14,468              | 7,011             | 7,178    | 46               | 205      | 29                 |
| 1984              | 16,209              | 7,112             | 8,806    | 37               | 230      | 25                 |
| 1985              | 18,294              | 7,005             | 11,070   | 36               | 165      | 18                 |
| 1986              | 19,132              | 6,956             | 11,788   | 36               | 326      | 26                 |
| 1987              | 21,844              | 7,254             | 14,264   | 37               | 262      | 26                 |
| 1988              | 22,594              | 8,154             | 13,893   | 192              | 322      | 32                 |
| 1989              | 23,231              | 9,420             | 13,401   | 90               | 283      | 38                 |
| 1990 <sup>r</sup> | 22,921              | 10,975            | 11,573   | 71               | 249      | 54                 |
| 1991              | 24,281 <sup>r</sup> | 11,431            | 12,356   | 215 <sup>r</sup> | 228      | 51 <sup>r</sup>    |
| 1992              | 23,162              | 10,672            | 12,001   | 185              | 248      | 57                 |
| 1993 <sup>E</sup> | 22,193              | 10,601            | 11,157   | 134              | 249      | 52                 |

Source: AIA, derived from NASA, "Aeronautics and Space Report of the President" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Based on fiscal year GDP implicit price deflator, 1987 = 100.

b Excludes amounts for air transportation.

c Departments of Interior and Agriculture, and the National Science Foundation. NSF funding transferred to NASA after 1982.

E Estimated.

r Revised.

Tr.Qtr. See Glossary.



## FEDERAL SPACE ACTIVITIES BUDGET AUTHORITY

Fiscal Years 1961–1993

(Millions of Dollars)

| Year              | TOTAL               | NASA <sup>a</sup> | DoD    | Energy           | Commerce | Other <sup>b</sup> |
|-------------------|---------------------|-------------------|--------|------------------|----------|--------------------|
| 1961              | \$ 1,808            | \$ 926            | \$ 814 | \$ 68            | \$ —     | \$ 1               |
| 1962              | 3,295               | 1,797             | 1,298  | 148              | 51       | 1                  |
| 1963              | 5,435               | 3,626             | 1,550  | 214              | 43       | 2                  |
| 1964              | 6,831               | 5,016             | 1,599  | 210              | 3        | 3                  |
| 1965              | 6,956               | 5,138             | 1,574  | 229              | 12       | 3                  |
| 1966              | 6,970               | 5,065             | 1,689  | 187              | 27       | 3                  |
| 1967              | 6,710               | 4,830             | 1,664  | 184              | 29       | 3                  |
| 1968              | 6,529               | 4,430             | 1,922  | 145              | 28       | 4                  |
| 1969              | 5,976               | 3,822             | 2,013  | 118              | 20       | 3                  |
| 1970              | 5,341               | 3,547             | 1,678  | 103              | 8        | 4                  |
| 1971              | 4,741               | 3,101             | 1,512  | 95               | 27       | 5                  |
| 1972              | 4,575               | 3,071             | 1,407  | 55               | 31       | 10                 |
| 1973              | 4,825               | 3,093             | 1,623  | 54               | 40       | 15                 |
| 1974              | 4,640               | 2,759             | 1,766  | 42               | 60       | 14                 |
| 1975              | 4,914               | 2,915             | 1,892  | 30               | 64       | 13                 |
| 1976              | 5,320               | 3,225             | 1,983  | 23               | 72       | 16                 |
| Tr. Qtr.          | 1,341               | 849               | 460    | 5                | 22       | 4                  |
| 1977              | 5,983               | 3,440             | 2,412  | 22               | 91       | 18                 |
| 1978              | 6,518               | 3,623             | 2,738  | 34               | 103      | 20                 |
| 1979              | 7,244               | 4,030             | 3,036  | 59               | 98       | 21                 |
| 1980              | 8,689               | 4,680             | 3,848  | 40               | 93       | 28                 |
| 1981              | 9,978               | 4,992             | 4,828  | 41               | 87       | 30                 |
| 1982              | 12,441              | 5,528             | 6,679  | 61               | 145      | 29                 |
| 1983              | 15,589              | 6,328             | 9,019  | 39               | 178      | 25                 |
| 1984              | 17,136              | 6,648             | 10,195 | 34               | 236      | 22                 |
| 1985              | 20,167              | 6,925             | 12,768 | 34               | 423      | 17                 |
| 1986              | 21,659              | 7,165             | 14,126 | 35               | 309      | 25                 |
| 1987              | 26,448              | 9,809             | 16,287 | 48               | 278      | 27                 |
| 1988              | 26,607              | 8,302             | 17,679 | 241              | 352      | 33                 |
| 1989              | 28,444 <sup>r</sup> | 10,098            | 17,906 | 97               | 301      | 42                 |
| 1990              | 28,141 <sup>r</sup> | 12,142            | 15,616 | 79               | 243      | 61                 |
| 1991              | 27,779 <sup>r</sup> | 13,036            | 14,181 | 251 <sup>r</sup> | 251      | 60 <sup>r</sup>    |
| 1992              | 28,841              | 13,199            | 15,023 | 223              | 327      | 69                 |
| 1993 <sup>E</sup> | 27,736              | 13,077            | 14,106 | 165              | 324      | 64                 |

Source: NASA, "Aeronautics and Space Report of the President" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Excludes amounts for air transportation.

b Departments of Interior and Agriculture, and the National Science Foundation. NSF funding transferred to NASA after 1982.

E Estimated.

r Revised.

Tr. Qtr. See Glossary.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
BUDGET AUTHORITY**

Fiscal Years 1968–1995  
(Millions of Current Dollars)

| Year               | TOTAL    | Research and Development           | Space Flight Control and Data Communications <sup>a</sup> | Construction of Facilities | Research & Program Management <sup>b</sup> |
|--------------------|----------|------------------------------------|---|----------------------------|--|
| 1968               | \$ 4,589 | \$3,912                            | \$ —  | \$ 38                      | \$ 639                                     |
| 1969               | 3,995    | 3,314                              | —   | 33                         | 648  |
| 1970               | 3,749    | 2,993                              | —   | 53                         | 703  |
| 1971               | 3,312    | 2,556                              | —   | 26                         | 730  |
| 1972               | 3,308    | 2,523                              | —   | 53                         | 732  |
| 1973               | 3,408    | 2,599                              | —   | 79                         | 730  |
| 1974               | 3,040    | 2,194                              | —   | 101                        | 745  |
| 1975               | 3,231    | 2,323                              | —   | 143                        | 765  |
| 1976               | 3,552    | 2,678                              | —   | 82                         | 792  |
| Tr.Qtr.            | 932      | 700                                | —   | 11                         | 221  |
| 1977               | 3,819    | 2,856                              | —   | 118                        | 845  |
| 1978               | 4,064    | 3,012                              | —   | 162                        | 890  |
| 1979               | 4,559    | 3,477                              | —   | 148                        | 934  |
| 1980               | 5,243    | 4,088                              | —   | 159                        | 996  |
| 1981               | 5,522    | 4,334                              | —   | 117                        | 1,071                                      |
| 1982               | 6,020    | 4,772                              | —   | 114                        | 1,134                                      |
| 1983               | 6,875    | 5,539                              | —   | 139                        | 1,197                                      |
| 1984               | 7,316    | 2,064 <sup>a</sup>                 | 3,772   | 223                        | 1,256                                      |
| 1985               | 7,573    | 2,468                              | 3,594   | 178                        | 1,332                                      |
| 1986               | 7,807    | 2,619                              | 3,670   | 176                        | 1,342                                      |
| 1987               | 10,923   | 3,154                              | 6,100   | 217                        | 1,453                                      |
| 1988               | 9,062    | 3,280                              | 3,806   | 213                        | 1,763                                      |
| 1989               | 10,969   | 4,213                              | 4,555   | 275                        | 1,927                                      |
| 1990               | 12,324   | 5,225                              | 4,645   | 218                        | 2,023                                      |
| 1991               | 14,016   | 6,024                              | 5,271   | 498                        | 2,212                                      |
| 1992               | 14,317   | 6,848                              | 5,352   | 525                        | 1,576                                      |
| 1993               | 14,310   | 7,074                              | 5,059   | 526                        | 1,652                                      |
| 1994 <sup>E</sup>  | 14,468   | 7,441                              | 4,822   | 493                        | 1,712                                      |
| Year               | TOTAL    | Science, Aeronautics, & Technology | Human Space Flight  | Other <sup>b</sup>         | Mission Support                            |
| 1995 <sup>CE</sup> | \$14,301 | \$5,901                            | \$5,720   | \$ 17                      | \$2,663                                    |

Source: Office of Management and Budget, "Budget of the United States Government" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Separate budget category beginning in 1984; funds formerly included under Research and Development.

b Includes trust funds, Office of the Inspector General, & GSA building delegation.

c 1995 features major budget account restructuring.

E Estimate. Latest year reflects Administration's budget proposal.

Tr.Qtr. See Glossary.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
OUTLAYS**

Fiscal Years 1968–1995  
(Millions of Current Dollars)

| Year               | TOTAL               | Research and Development | Space Flight Control and Data Communications <sup>a</sup> | Construction of Facilities | Research & Program Management <sup>b</sup> |
|--------------------|---------------------|--------------------------|---|----------------------------|--|
| 1968               | \$ 4,724            | \$3,946                  | \$ —  | \$126                      | \$ 652                                     |
| 1969               | 4,252 <sup>r</sup>  | 3,530                    | —   | 65                         | 656  |
| 1970               | 3,753               | 2,992                    | —   | 54                         | 707  |
| 1971               | 3,382               | 2,630                    | —   | 44                         | 708  |
| 1972               | 3,423 <sup>r</sup>  | 2,623                    | —   | 50                         | 749  |
| 1973               | 3,315               | 2,541                    | —   | 45                         | 729  |
| 1974               | 3,256               | 2,422 <sup>r</sup>       | —   | 75                         | 760  |
| 1975               | 3,267 <sup>r</sup>  | 2,420                    | —   | 85                         | 761  |
| 1976               | 3,669               | 2,749                    | —   | 121                        | 799  |
| Tr.Qtr.            | 951 <sup>r</sup>    | 731                      | —   | 26                         | 195  |
| 1977               | 3,945               | 2,980                    | —   | 105                        | 860  |
| 1978               | 3,983               | 2,989                    | —   | 124                        | 870  |
| 1979               | 4,197 <sup>r</sup>  | 3,139                    | —   | 133                        | 925  |
| 1980               | 4,852               | 3,701 <sup>r</sup>       | —   | 140                        | 1,010                                      |
| 1981               | 5,421 <sup>r</sup>  | 4,223 <sup>r</sup>       | —   | 147                        | 1,051 <sup>r</sup>                         |
| 1982               | 6,035               | 4,796                    | —   | 109                        | 1,130                                      |
| 1983               | 6,664               | 5,316                    | —   | 108                        | 1,240                                      |
| 1984               | 7,048               | 2,792 <sup>a</sup>       | 2,915   | 109                        | 1,232                                      |
| 1985               | 7,318 <sup>r</sup>  | 2,118                    | 3,707   | 170                        | 1,323 <sup>r</sup>                         |
| 1986               | 7,404 <sup>r</sup>  | 2,615                    | 3,267   | 189                        | 1,332                                      |
| 1987               | 7,591               | 2,436                    | 3,597   | 149                        | 1,409                                      |
| 1988               | 9,092               | 2,916                    | 4,362   | 166                        | 1,648                                      |
| 1989               | 11,052 <sup>r</sup> | 3,922                    | 5,030   | 190                        | 1,909 <sup>r</sup>                         |
| 1990               | 12,429              | 5,094                    | 5,117   | 218                        | 2,000 <sup>r</sup>                         |
| 1991               | 13,878              | 5,765                    | 5,590   | 326                        | 2,196 <sup>r</sup>                         |
| 1992               | 13,961              | 6,579                    | 5,118   | 463                        | 1,802                                      |
| 1993               | 14,306              | 7,086                    | 5,025   | 557                        | 1,638                                      |
| 1994 <sup>E</sup>  | 14,183              | 7,209                    | 4,747   | 536                        | 1,691                                      |
| 1995 <sup>CE</sup> | 5,233               | 2,996                    | 1,724   | 440                        | 96   |

| Year               | TOTAL    | Science, Aeronautics, & Technology | Human Space Flight | Other <sup>b</sup> | Mission Support |
|--------------------|----------|------------------------------------|--------------------|--------------------|-----------------|
| 1995 <sup>CE</sup> | \$ 9,196 | \$3,021                            | \$3,855            | \$ 17              | \$2,302         |

Source: Office of Management and Budget, "Budget of the United States Government" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Separate budget category beginning in 1984; funds formerly included under Research and Development.

b Includes trust funds, Office of Inspector General, & GSA building delegation.

c 1995 features major budget account restructuring. Note: 1995 outlays split between old and new account structure.

E Estimate. Latest year reflects Administration's budget proposal.

r Revised.

Tr.Qtr. See Glossary.

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OUTLAYS IN CONSTANT DOLLARS

Fiscal Years 1968–1995  
(Millions of Constant Dollars<sup>a</sup>)

| Year               | TOTAL               | Research and Development           | Space Flight Control and Data Communications <sup>b</sup> | Construction of Facilities | Research & Program Management <sup>c</sup> |
|--------------------|---------------------|------------------------------------|---|----------------------------|--|
| 1968               | \$15,141            | \$12,647                           | \$ —  | \$404                      | \$2,090                                    |
| 1969               | 12,967 <sup>r</sup> | 10,765                             | —   | 198                        | 2,001                                      |
| 1970               | 10,856              | 8,655                              | —   | 156                        | 2,045                                      |
| 1971               | 9,307               | 7,237                              | —   | 121                        | 1,948                                      |
| 1972               | 8,954 <sup>r</sup>  | 6,861                              | —   | 131                        | 1,959                                      |
| 1973               | 8,242               | 6,318                              | —   | 112                        | 1,813                                      |
| 1974               | 7,525               | 5,597 <sup>r</sup>                 | —   | 173                        | 1,756                                      |
| 1975               | 6,866 <sup>r</sup>  | 5,086                              | —   | 179                        | 1,599                                      |
| 1976               | 7,163               | 5,367                              | —   | 236                        | 1,560                                      |
| Tr.Qtr.            | 1,784 <sup>r</sup>  | 1,371                              | —   | 49                         | 366  |
| 1977               | 7,124               | 5,381                              | —   | 190                        | 1,553                                      |
| 1978               | 6,686               | 5,018                              | —   | 208                        | 1,460                                      |
| 1979               | 6,483 <sup>r</sup>  | 4,849                              | —   | 205                        | 1,429                                      |
| 1980               | 6,874               | 5,244 <sup>r</sup>                 | —   | 198                        | 1,431                                      |
| 1981               | 6,971 <sup>r</sup>  | 5,431 <sup>r</sup>                 | —   | 189                        | 1,352 <sup>r</sup>                         |
| 1982               | 7,223               | 5,740                              | —   | 130                        | 1,352                                      |
| 1983               | 7,658               | 6,109                              | —   | 124                        | 1,425                                      |
| 1984               | 7,758               | 3,073 <sup>b</sup>                 | 3,209   | 120                        | 1,356                                      |
| 1985               | 7,759 <sup>r</sup>  | 2,246                              | 3,930   | 180                        | 1,403 <sup>r</sup>                         |
| 1986               | 7,624 <sup>r</sup>  | 2,693                              | 3,364   | 195                        | 1,371                                      |
| 1987               | 7,591               | 2,436                              | 3,597   | 149                        | 1,409                                      |
| 1988               | 8,774               | 2,814                              | 4,209   | 160                        | 1,590                                      |
| 1989               | 10,212 <sup>r</sup> | 3,624                              | 4,648   | 176                        | 1,764 <sup>r</sup>                         |
| 1990 <sup>r</sup>  | 11,097              | 4,548                              | 4,569   | 195                        | 1,786                                      |
| 1991               | 11,882              | 4,936                              | 4,786   | 279                        | 1,880 <sup>r</sup>                         |
| 1992               | 11,605              | 5,469                              | 4,254   | 385                        | 1,489                                      |
| 1993               | 11,584              | 5,738                              | 4,069   | 451                        | 1,326                                      |
| 1994 <sup>E</sup>  | 11,203              | 5,694                              | 3,750   | 423                        | 1,336                                      |
| 1995 <sup>dE</sup> | 4,022               | 2,303                              | 1,325   | 338                        | 74   |
| Year               | TOTAL               | Science, Aeronautics, & Technology | Human Space Flight  | Other <sup>c</sup>         | Mission Support                            |
| 1995 <sup>dE</sup> | \$ 7,068            | \$ 2,322                           | \$2,963   | \$ 13                      | \$1,769                                    |

Source: AIA, derived from Office of Management and Budget, "Budget of the United States Government" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Based on fiscal year GDP implicit price deflator, (1987=100).

b Separate budget category beginning in 1984; funds formerly included under Research and Development.

c Includes trust funds, Office of Inspector General, & GSA building delegation.

d 1995 features major budget account restructuring. Note: 1995 outlays split between old and new account structure.

E Estimate. Latest year reflects Administration's budget proposal.

r Revised.

Tr.Qtr. See Glossary.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
BUDGET AUTHORITY BY MAJOR BUDGET ACCOUNT  
FOR SELECTED PROGRAMS**

Fiscal Years 1994–1995  
(Millions of Dollars)

|  | 1994 <sup>E</sup> | 1995 <sup>E</sup> |
|--|-------------------|-------------------|
| <b>HUMAN SPACE FLIGHT</b> .....                                  | \$6,070           | \$5,720           |
| Space Station .....  | \$1,937           | \$1,890           |
| U.S.-Russian Cooperative Space Activities .....                  | 171               | 150               |
| <b>Space Shuttle—Total</b> .....                                 | <u>3,549</u>      | <u>3,324</u>      |
| Shuttle Operations .....   | 2,571             | 2,420             |
| Safety & Obsolescence Upgrades .....                             | 979               | 904               |
| <b>Payload &amp; Utilization Operations</b> .....                | 413               | 356               |
| <b>SCIENCE, AERONAUTICS, &amp; TECHNOLOGY</b> .....              | \$5,847           | \$5,901           |
| <b>Space Science—Total</b> .....                                 | <u>\$1,722</u>    | <u>\$1,766</u>    |
| Physics & Astronomy .....  | 1,068             | 1,059             |
| Planetary Exploration .....                                      | 654               | 707               |
| <b>Life &amp; Microgravity Sciences &amp; Applications</b> ..... | 515               | 471               |
| <b>Mission To Planet Earth</b> .....                             | 1,025             | 1,238             |
| <b>Advanced Concepts &amp; Technology</b> .....                  | 495               | 608               |
| <b>Aeronautical Research &amp; Technology</b> .....              | 1,102             | 899               |
| <b>Launch Services</b> .....                                     | 314               | 341               |
| <b>Mission Communication Services</b> .....                      | 589               | 481               |
| <b>Academic Programs</b> .....                                   | 86                | 97                |
| <b>MISSION SUPPORT</b> .....                                     | \$2,619           | \$2,663           |
| <b>Safety, Reliability, &amp; Quality Assurance</b> .....        | \$ 34             | \$ 39             |
| <b>Space Communication Services</b> .....                        | 214               | 269               |
| <b>Research &amp; Program Management</b> .....                   | 2,148             | 2,220             |
| <b>Construction of Facilities</b> .....                          | 222               | 135               |

Source: "NASA Budget Briefing Background Material" (Annually).

Note: Detail may not add to totals because of rounding.

E Estimate. Latest year reflects Administration's budget proposal.

**DEPARTMENT OF DEFENSE SPACE PROGRAMS  
PROCUREMENT (INCLUDING INITIAL SPARES) AND RDT&E**

Fiscal Years 1993, 1994, and 1995  
(Millions of Dollars<sup>a</sup>)

| Agency and Program        | 1993                  |         | 1994 <sup>E</sup>     |         | 1995 <sup>E</sup>     |         |
|---------------------------|-----------------------|---------|-----------------------|---------|-----------------------|---------|
|                           | Pro-<br>cure-<br>ment | RDT&E   | Pro-<br>cure-<br>ment | RDT&E   | Pro-<br>cure-<br>ment | RDT&E   |
| <b>AIR FORCE</b>          |                       |         |                       |         |                       |         |
| DMSP .....                | \$ 31.0               | \$ 21.9 | \$ 27.5               | \$ 25.7 | \$ 29.2               | \$ 28.7 |
| DSCS <sup>b</sup> .....   | 131.3                 | 44.7    | 120.9                 | 52.3    | 134.4                 | 63.2    |
| Defense Support Program . | 229.0                 | 48.6    | 356.3                 | 50.3    | 364.0                 | 76.4    |
| Medium Launch Vehicle .   | 201.0                 | 46.6    | 139.0                 | 71.2    | 149.1                 | 21.0    |
| Milstar .....             | —                     | 1,107.3 | —                     | 918.4   | —                     | 648.0   |
| NAVSTAR GPS .....         | 175.6                 | 56.2    | 166.6                 | 38.8    | 190.2                 | 51.1    |
| Space Boosters .....      | 380.0                 | 147.2   | 463.2                 | 270.1   | 422.7                 | 161.1   |
| <b>NAVY</b>               |                       |         |                       |         |                       |         |
| FSC .....                 | \$262.4               | \$ 26.2 | \$167.1               | \$ 32.5 | \$125.5               | \$ 22.0 |

Source: Department of Defense, "Program Acquisition Costs by Weapon System" (Annually).

a Total Obligational Authority.

b Army and Air Force funding.

E Estimate. Latest year reflects Administration's budget proposal.

KEY: DMSP = Defense Meteorological Satellite Program  
DSCS = Defense Satellite Communications System  
FSC = Fleet Satellite Communications  
GPS = Global Positioning System

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## AIR TRANSPORTATION

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**F**or the first time in the 1990s, the U.S. scheduled airlines recorded an operating profit in 1993. After three years in which their aggregate operating losses topped \$6 billion, the airlines showed a profit of \$1.4 billion on revenues of \$83.8 billion. This compares with a loss of \$2.4 billion on revenues of \$78.1 billion in the previous year.

Domestic revenues accounted for three-quarters of total revenues and all of the profit (in international operations, U.S. carriers incurred their fifth straight loss). Domestic operating revenues totaled \$62.8 billion, expenses were \$60.7 billion and the resultant profit was \$2.1 billion. In 1992, the scheduled airlines lost \$1.1 billion with revenues of \$57.7 billion and expenses of \$58.8 billion.

Revenues from international operations by U.S. airlines in 1993 amounted to \$21 billion, an all-time record that compares with \$20.5 billion in 1992. Expenses, though down slightly from the previous year, nonetheless outpaced revenues and produced an operating loss of \$662 million.

The airlines experienced traffic gains in both domestic and international service. In 1993, scheduled U.S. airlines flew 63 billion revenue ton-miles, compared with 61.1 billion in 1992. Passenger traffic amounted to a record 48.9 billion revenue ton-miles (up from 47.9 billion) and cargo traffic 14.1 billion (up from 13.2 billion). The total revenue load factor was 54.6 percent, compared with 54.2 percent in the previous year.

In domestic service, the scheduled

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airlines boarded almost 442 million passengers, an all-time high that compares with 432 million in 1992. Revenue passenger miles totaled 353.6 billion, up from 348 billion. The domestic passenger load factor was 62 percent, down from 62.4 percent.

U.S. carriers' international passenger service reached a record high of 45.3 million

enplanements, a solid 4.5 percent growth over 1992's 43.4 million. International revenue passenger miles amounted to 135.5 billion, up from 130.6 billion in the previous year. The international passenger service load factor was 67.7 percent, up from 67.1 percent. The world's scheduled airlines similarly broke out of the loss pattern of the three prior years with an encouraging \$2.5 billion operating profit on revenues of \$227 billion. This compares with losses (from operations) of \$1.5 billion in 1992, \$500 million in 1991, and \$1.5 billion in 1990.

The world airline fleet of turbine-engine aircraft grew by almost 1,200 units in 1993, according to



the annual survey conducted by Exxon International. As of year-end 1993, the fleet numbered 17,284 aircraft, excluding planes operated by the Russian airline Aeroflot and by air taxi operators. The number compares with 16,100 at the end of 1992. The breakdown for 1993 includes 11,345 turbojets (up from 10,504), 5,697 turboprops (up from 5,420), and 242 helicopters (up from 176).

The number of U.S.-built turbine aircraft in world service rose from 10,064 in the 1992 survey to 10,523 in 1993. The U.S.-built percentage dropped to 60.9 percent, compared with 62.5 percent a year earlier.



**OPERATING REVENUES AND EXPENSES  
OF WORLD SCHEDULED AIRLINES<sup>a</sup>**

Calendar Years 1990–1993  
(Millions of U.S. Dollars)

|                                       | 1990 <sup>r</sup> | 1991 <sup>r</sup> | 1992              | 1993 <sup>p</sup> |
|---------------------------------------|-------------------|-------------------|-------------------|-------------------|
| <b>OPERATING REVENUES:</b>            |                   |                   |                   |                   |
| Scheduled Services:                   |                   |                   |                   |                   |
| Passenger .....                       | \$153,330         | \$156,760         | \$165,870         |                   |
| Freight .....                         | 18,410            | 19,400            | 20,320            |                   |
| Mail .....                            | 2,230             | 2,310             | 2,390             |                   |
| Total Scheduled Services .....        | \$173,970         | \$178,470         | \$188,580         | NA                |
| Non-Scheduled Services .....          | 7,000             | 8,260             | 7,940             |                   |
| Incidental .....                      | 18,440            | 18,770            | 20,980            |                   |
| <b>Total Operating Revenues .....</b> | <b>\$199,500</b>  | <b>\$205,500</b>  | <b>\$217,500</b>  | <b>\$227,000</b>  |
| <b>OPERATING EXPENSES:</b>            |                   |                   |                   |                   |
| Flight Operations .....               | \$ 56,320         | \$ 56,420         | \$ 56,400         |                   |
| Maintenance & Overhaul .....          | 22,900            | 23,120            | 23,910            |                   |
| Depreciation & Amortization ....      | 13,850            | 14,310            | 15,630            |                   |
| User Charges & Station .....          |                   |                   |                   | NA                |
| Expenses .....                        | 32,460            | 34,460            | 37,720            |                   |
| Passenger Services .....              | 20,710            | 21,380            | 23,690            |                   |
| Ticketing, Sales & Promotion ....     | 32,860            | 34,340            | 35,760            |                   |
| General, Administrative & Other       | 21,900            | 21,970            | 25,890            |                   |
| <b>Total Operating Expenses .....</b> | <b>\$201,000</b>  | <b>\$206,000</b>  | <b>\$219,000</b>  | <b>\$224,500</b>  |
| <b>OPERATING RESULT .....</b>         | <b>\$ (1,500)</b> | <b>\$ (500)</b>   | <b>\$ (1,500)</b> | <b>\$ 2,500</b>   |
| Percent of Revenue .....              | -0.8%             | -0.2%             | -0.7%             | 1.1%              |
| <b>NET RESULT<sup>b</sup> .....</b>   | <b>\$ (4,500)</b> | <b>\$ (3,500)</b> | <b>\$ (7,700)</b> | <b>NA</b>         |
| Percent of Revenue .....              | -2.3%             | -1.7%             | -3.5%             | NA                |

Source: International Civil Aviation Organization, "Civil Aviation Statistics of the World" (Annually).

a Excludes domestic operations in the Commonwealth of Independent States.

b Net Result equals Operating Result minus non-operating items, including interest, income taxes, retirement of property and equipment, affiliated companies, and subsidiaries.

NA Not available.

p Preliminary.

r Revised.

() Denotes loss.

**TRAFFIC STATISTICS**  
**WORLD AIRLINE SCHEDULED SERVICE<sup>a</sup>**  
 Calendar Years 1970–1993

| Year              | Passen-<br>gers<br>Carried | Freight<br>Tons<br>Carried | Passen-<br>ger-<br>Miles<br>Per-<br>formed | Seat-<br>Miles<br>Avail-<br>able | Passen-<br>ger<br>Load<br>Factor | Ton-Miles Performed |            |  |
|-------------------|----------------------------|----------------------------|--|----------------------------------|----------------------------------|---------------------|------------|--|
|                   |                            |                            |  |                                  |                                  | Freight             | Mail       | TOTAL<br>(Passen-<br>gers &<br>Baggage,<br>Freight,<br>Mail) |
|                   |                            |                            |  |                                  |                                  | (Millions)          | (Billions) | (Percent)  |
| 1970              | 383                        | 6.7                        | 286  | 522                              | 55 %                             | 8,180               | 2,150      | 38,810   |
| 1971              | 411                        | 7.4                        | 307  | 568                              | 54                               | 9,060               | 1,990      | 41,420   |
| 1972              | 450                        | 8.0                        | 348  | 609                              | 57                               | 10,290              | 1,900      | 46,690   |
| 1973              | 489                        | 9.0                        | 384  | 667                              | 58                               | 12,010              | 1,970      | 51,910   |
| 1974              | 515                        | 9.5                        | 408  | 688                              | 59                               | 13,030              | 1,980      | 55,270   |
| 1975              | 534                        | 9.6                        | 433  | 733                              | 59                               | 13,270              | 1,990      | 58,080   |
| 1976              | 576                        | 10.3                       | 475  | 789                              | 60                               | 14,750              | 2,080      | 63,880   |
| 1977              | 610                        | 11.1                       | 508  | 837                              | 61                               | 16,190              | 2,180      | 68,790   |
| 1978              | 679                        | 11.7                       | 582  | 902                              | 65                               | 17,770              | 2,240      | 77,770   |
| 1979              | 754                        | 12.1                       | 659  | 999                              | 66                               | 19,190              | 2,350      | 86,900   |
| 1980              | 748                        | 12.2                       | 677  | 1,071                            | 63                               | 20,120              | 2,520      | 89,710   |
| 1981              | 752                        | 12.0                       | 695  | 1,091                            | 64                               | 21,150              | 2,600      | 92,800   |
| 1982              | 766                        | 12.8                       | 710  | 1,115                            | 64                               | 21,600              | 2,650      | 94,830   |
| 1983              | 798                        | 13.5                       | 739  | 1,151                            | 64                               | 24,050              | 2,740      | 100,270  |
| 1984              | 848                        | 14.8                       | 794  | 1,225                            | 65                               | 27,170              | 2,950      | 109,040  |
| 1985              | 899                        | 15.1                       | 849  | 1,293                            | 66                               | 27,290              | 3,010      | 114,860  |
| 1986              | 960                        | 16.2                       | 902  | 1,389                            | 65                               | 29,580              | 3,110      | 122,470  |
| 1987              | 1,028                      | 17.7                       | 987  | 1,471                            | 67                               | 33,100              | 3,220      | 134,570  |
| 1988              | 1,082                      | 19.0                       | 1,059                                      | 1,568                            | 68                               | 36,490              | 3,310      | 145,290  |
| 1989              | 1,119                      | 20.0                       | 1,106                                      | 1,627                            | 68                               | 39,190              | 3,470      | 153,180  |
| 1990              | 1,164                      | 20.2                       | 1,177                                      | 1,740                            | 68                               | 40,300              | 3,650      | 161,120  |
| 1991 <sup>r</sup> | 1,134                      | 19.2                       | 1,146                                      | 1,727                            | 66                               | 40,050              | 3,490      | 158,020  |
| 1992              | 1,161                      | 17.3                       | 1,198                                      | 1,819                            | 66                               | 43,030              | 3,510      | 165,900  |
| 1993 <sup>p</sup> | 1,171                      | 19.3                       | 1,225                                      | 1,866                            | 66                               | 46,340              | 3,600      | 172,070  |

Source: International Civil Aviation Organization (ICAO).

a Includes international and domestic traffic on scheduled service performed by the airlines of the 182 states which were members of ICAO in 1993.

p Preliminary.

r Revised.

## OPERATING REVENUES AND EXPENSES OF U.S. AIR CARRIERS<sup>a</sup> DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1964–1993

(Millions of Dollars)

| Year              | TOTAL OPERATIONS <sup>b</sup> |                    |                            | Domestic Operations |                    |                            | International Operations |                    |                            |
|-------------------|-------------------------------|--------------------|----------------------------|---------------------|--------------------|----------------------------|--------------------------|--------------------|----------------------------|
|                   | Operating Revenues            | Operating Expenses | Operating Profit (or Loss) | Operating Revenues  | Operating Expenses | Operating Profit (or Loss) | Operating Revenues       | Operating Expenses | Operating Profit (or Loss) |
| 1964              | \$ 4,251                      | \$ 3,781           | \$ 470                     | \$ 3,169            | \$ 2,849           | \$ 320                     | \$ 1,082                 | \$ 932             | \$ 150                     |
| 1965              | 4,958                         | 4,286              | 672                        | 3,691               | 3,239              | 452                        | 1,267                    | 1,047              | 220                        |
| 1966              | 5,745                         | 4,970              | 775                        | 4,171               | 3,670              | 502                        | 1,574                    | 1,300              | 274                        |
| 1967              | 6,865                         | 6,157              | 708                        | 4,981               | 4,560              | 421                        | 1,884                    | 1,597              | 287                        |
| 1968              | 7,753                         | 7,248              | 505                        | 5,691               | 5,397              | 295                        | 2,062                    | 1,852              | 210                        |
| 1969              | 8,791                         | 8,403              | 387                        | 6,936               | 6,613              | 322                        | 1,855                    | 1,790              | 65                         |
| 1970              | 9,290                         | 9,247              | 43                         | 7,180               | 7,181              | (1)                        | 2,109                    | 2,066              | 44                         |
| 1971              | 10,046                        | 9,717              | 328                        | 7,753               | 7,496              | 257                        | 2,292                    | 2,221              | 71                         |
| 1972              | 11,163                        | 10,578             | 584                        | 8,652               | 8,58               | 493                        | 2,512                    | 2,420              | 91                         |
| 1973              | 12,419                        | 11,834             | 585                        | 9,694               | 9,200              | 494                        | 2,725                    | 2,633              | 91                         |
| 1974              | 14,703                        | 13,978             | 725                        | 11,546              | 10,761             | 785                        | 3,157                    | 3,218              | (60)                       |
| 1975              | 15,356                        | 15,229             | 128                        | 12,020              | 11,903             | 117                        | 3,336                    | 3,326              | 11                         |
| 1976              | 17,503                        | 16,781             | 721                        | 13,899              | 13,324             | 575                        | 3,605                    | 3,457              | 147                        |
| 1977              | 19,926                        | 19,018             | 908                        | 15,822              | 15,166             | 657                        | 4,104                    | 3,852              | 252                        |
| 1978              | 22,892                        | 21,527             | 1,366                      | 18,189              | 17,172             | 1,018                      | 4,703                    | 4,355              | 348                        |
| 1979              | 27,227                        | 27,028             | 199                        | 21,652              | 21,523             | 129                        | 5,575                    | 5,505              | 69                         |
| 1980              | 33,728                        | 33,949             | (222)                      | 26,404              | 26,409             | (6)                        | 6,543                    | 6,766              | (223)                      |
| 1981              | 36,211                        | 36,612             | (401)                      | 28,788              | 29,051             | (264)                      | 6,390                    | 6,574              | (184)                      |
| 1982              | 36,066                        | 36,804             | (739)                      | 28,728              | 29,478             | (750)                      | 6,435                    | 6,452              | (17)                       |
| 1983              | 38,593                        | 38,231             | 362                        | 31,014              | 31,186             | (171)                      | 7,163                    | 6,693              | 470                        |
| 1984              | 44,060                        | 41,946             | 2,114                      | 35,394              | 33,812             | 1,582                      | 7,975                    | 7,485              | 490                        |
| 1985              | 48,580                        | 47,207             | 1,372                      | 37,629              | 36,611             | 1,018                      | 8,302                    | 7,984              | 319                        |
| 1986              | 50,086                        | 48,855             | 1,231                      | 41,001              | 39,984             | 1,060                      | 8,621                    | 8,458              | 163                        |
| 1987              | 56,787                        | 54,339             | 2,448                      | 45,658              | 43,925             | 1,733                      | 10,925                   | 10,226             | 698                        |
| 1988              | 63,679                        | 60,236             | 3,443                      | 50,187              | 47,739             | 2,448                      | 13,402                   | 12,403             | 998                        |
| 1989              | 69,225                        | 67,413             | 1,812                      | 54,314              | 52,460             | 1,855                      | 14,911                   | 14,954             | (43)                       |
| 1990              | 75,984                        | 77,898             | (1,913)                    | 57,994              | 58,983             | (989)                      | 17,990                   | 18,914             | (924)                      |
| 1991              | 75,158                        | 76,943             | (1,785)                    | 56,230              | 56,758             | (528)                      | 18,928                   | 20,185             | (1,257)                    |
| 1992              | 78,140                        | 80,585             | (2,444)                    | 57,654              | 58,801             | (1,147)                    | 20,486                   | 21,784             | (1,298)                    |
| 1993 <sup>p</sup> | 83,795                        | 82,359             | 1,436                      | 62,825              | 60,627             | 2,098                      | 20,970                   | 21,632             | (662)                      |

Source: Department of Transportation, Office of Aviation Statistics, "Air Carrier Financial Statistics Quarterly" (Quarterly).

NOTE: Detail may not add to totals because of rounding.

a Scheduled and non-scheduled service for all certificated route air carriers. Excludes supplemental air carriers, commuters, and air taxis.

b For 1980 and subsequent years, includes 'Other' operations not reported as 'Domestic' or 'International.'

p Preliminary.

**U.S. AIR CARRIERS  
TOTAL ASSETS AND INVESTMENT IN EQUIPMENT**

Calendar Years 1969–1993  
(Millions of Dollars)

| Year              | TOTAL Assets | Value of Flight Equipment | Value of Ground Property & Equipment & Other <sup>a</sup> | Less: Reserves for Depreciation & Overhaul | Equals: Net Value of Owned Operating Property & Equipment | Investment in Operating Property and Equipment as a Percent of Total Assets |
|-------------------|--------------|---------------------------|---|--|---|---|
| 1969              | \$12,069     | \$ 9,943                  | \$ 1,516  | \$ 3,560                                   | \$ 7,899  | 65.4%   |
| 1970              | 12,913       | 10,950                    | 1,951   | 4,120                                      | 8,782   | 68.0  |
| 1971              | 12,998       | 11,221                    | 2,028   | 4,649                                      | 8,600   | 66.2  |
| 1972              | 13,635       | 11,918                    | 2,225   | 5,115                                      | 9,028   | 66.2  |
| 1973              | 14,464       | 12,908                    | 2,424   | 5,693                                      | 9,639   | 66.6  |
| 1974              | 15,200       | 13,538                    | 2,539   | 6,252                                      | 9,826   | 64.6  |
| 1975              | 15,064       | 14,035                    | 2,635   | 6,823                                      | 9,847   | 65.4  |
| 1976              | 15,454       | 14,399                    | 2,792   | 7,585                                      | 9,605   | 62.2  |
| 1977              | 16,869       | 14,822                    | 2,997   | 8,141                                      | 9,679   | 57.4  |
| 1978              | 20,745       | 16,127                    | 3,367   | 8,799                                      | 10,696  | 51.6  |
| 1979              | 24,907       | 18,561                    | 3,985   | 9,746                                      | 12,800  | 51.4  |
| 1980              | 28,900       | 20,859                    | 4,682   | 10,309                                     | 15,233  | 52.7  |
| 1981              | 30,513       | 22,375                    | 5,175   | 11,028                                     | 16,521  | 54.1  |
| 1982              | 31,525       | 23,786                    | 5,424   | 11,405                                     | 17,804  | 56.5  |
| 1983              | 35,213       | 26,588                    | 6,191   | 12,910                                     | 19,868  | 56.4  |
| 1984              | 36,769       | 28,509                    | 6,061   | 14,043                                     | 20,527  | 55.8  |
| 1985              | 40,978       | 30,402                    | 6,772   | 15,467                                     | 21,707  | 53.0  |
| 1986              | 47,105       | 31,750                    | 8,468   | 14,764                                     | 25,454  | 54.0  |
| 1987              | 51,436       | 33,177                    | 9,223   | 15,580                                     | 26,820  | 52.1  |
| 1988              | 56,047       | 35,781                    | 10,248  | 17,450                                     | 28,579  | 51.0  |
| 1989              | 62,454       | 38,812                    | 11,903  | 19,018                                     | 31,697  | 50.8  |
| 1990              | 67,769       | 40,215                    | 13,523  | 20,593                                     | 33,144  | 48.9  |
| 1991              | 70,332       | 42,897                    | 14,285  | 22,009                                     | 35,173  | 50.0  |
| 1992              | 75,426       | 48,563                    | 15,219  | 24,445                                     | 39,337  | 52.2  |
| 1993 <sup>p</sup> | 82,143       | 51,414                    | 15,299  | 24,817                                     | 41,696  | 50.8  |

Source: Department of Transportation, Office of Aviation Statistics, "Air Carrier Financial Statistics Quarterly" (Quarterly).

a Includes land and construction in progress.

p Preliminary.

## SOURCES OF OPERATING REVENUES OF U.S. AIR CARRIERS<sup>a</sup> DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1979–1993  
(Millions of Dollars)

| Year                            | TOTAL<br>Operating<br>Revenues | Passenger<br>Service <sup>b</sup> | Mail <sup>c</sup> | Freight <sup>b</sup><br>& Air<br>Express | Excess<br>Baggage | Other <sup>c</sup> |
|---------------------------------|--------------------------------|-----------------------------------|-------------------|--|-------------------|--------------------|
| <b>DOMESTIC OPERATIONS</b>      |                                |                                   |                   |  |                   |                    |
| 1979                            | \$21,652                       | \$18,931                          | \$417             | \$1,485                                  | \$28              | \$ 791             |
| 1980                            | 26,404                         | 23,317                            | 446               | 1,582                                    | 32                | 1,027              |
| 1981                            | 28,788                         | 25,504                            | 497               | 1,659                                    | 36                | 1,091              |
| 1982                            | 28,728                         | 25,440                            | 524               | 1,505                                    | 42                | 1,218              |
| 1983                            | 31,014                         | 27,519                            | 516               | 1,602                                    | 52                | 1,326              |
| 1984                            | 35,393                         | 31,437                            | 552               | 1,716                                    | 70                | 1,618              |
| 1985                            | 37,629                         | 33,343                            | 733               | 1,581                                    | 78                | 1,895              |
| 1986                            | 41,001                         | 33,814                            | 679               | 4,278                                    | 85                | 2,159              |
| 1987                            | 45,658                         | 37,492                            | 704               | 4,952                                    | 67                | 2,443              |
| 1988                            | 50,187                         | 41,002                            | 789               | 5,807                                    | 72                | 2,518              |
| 1989                            | 54,314                         | 43,670                            | 767               | 5,408                                    | 70                | 4,399              |
| 1990                            | 57,994                         | 46,282                            | 747               | 4,276                                    | 76                | 6,613              |
| 1991                            | 56,230                         | 44,594                            | 734               | 4,487                                    | 78                | 6,337              |
| 1992                            | 57,654                         | 45,246                            | 937               | 4,655                                    | 87                | 6,729              |
| 1993 <sup>p</sup>               | 62,825                         | 49,298                            | 972               | 4,968                                    | 91                | 7,495              |
| <b>INTERNATIONAL OPERATIONS</b> |                                |                                   |                   |  |                   |                    |
| 1979                            | \$ 5,575                       | \$ 4,271                          | \$131             | \$ 837                                   | \$23              | \$ 313             |
| 1980                            | 6,543                          | 4,984                             | 175               | 1,011                                    | 25                | 348                |
| 1981                            | 6,390                          | 4,916                             | 165               | 984                                      | 25                | 299                |
| 1982                            | 6,435                          | 4,959                             | 177               | 990                                      | 25                | 283                |
| 1983                            | 7,163                          | 5,605                             | 152               | 999                                      | 23                | 384                |
| 1984                            | 7,975                          | 6,074                             | 158               | 1,169                                    | 27                | 546                |
| 1985                            | 8,302                          | 6,451                             | 161               | 1,130                                    | 28                | 532                |
| 1986                            | 8,621                          | 6,551                             | 154               | 1,451                                    | 28                | 437                |
| 1987                            | 10,925                         | 8,374                             | 180               | 1,783                                    | 33                | 555                |
| 1988                            | 13,402                         | 10,357                            | 183               | 2,150                                    | 39                | 672                |
| 1989                            | 14,911                         | 11,181                            | 188               | 2,417                                    | 47                | 1,078              |
| 1990                            | 17,990                         | 13,468                            | 223               | 2,602                                    | 43                | 1,654              |
| 1991                            | 18,928                         | 14,103                            | 223               | 3,134                                    | 50                | 1,419              |
| 1992                            | 20,486                         | 15,664                            | 247               | 2,980                                    | 47                | 1,547              |
| 1993 <sup>p</sup>               | 20,970                         | 15,910                            | 237               | 3,173                                    | 49                | 1,600              |

Source: Department of Transportation, Office of Aviation Statistics, "Air Carrier Financial Statistics Quarterly" (Quarterly).

NOTE: Detail may not add to totals because of rounding.

a Scheduled and non-scheduled service for all certificated route air carriers. Excludes supplemental air carriers, commuters, and air taxis.

b Scheduled and charter.

c Subsidy included with Mail through 1979, and thereafter included in Other, which also includes revenues not related to transport, plus, beginning in 1981, transport revenues not specifically broken out by category by some small carriers.

p Preliminary.

**OPERATING EXPENSES OF U.S. AIR CARRIERS<sup>a</sup>**  
**DOMESTIC AND INTERNATIONAL OPERATIONS**

Calendar Years 1979–1993  
(Millions of Dollars)

| Year                            | TOTAL<br>Operating<br>Expenses | Flying<br>Opera-<br>tions | Mainte-<br>nance | Passen-<br>ger<br>Service | Aircraft<br>& Traffic<br>Ser-<br>vicing | Promo-<br>tion<br>and<br>Sales | Depreci-<br>ation &<br>Amorti-<br>zation | Other <sup>b</sup> |
|---------------------------------|--------------------------------|---------------------------|------------------|---------------------------|---|--------------------------------|--|--------------------|
| <b>DOMESTIC OPERATIONS</b>      |                                |                           |                  |                           |   |                                |  |                    |
| 1979                            | \$21,523                       | \$ 7,998                  | \$2,457          | \$2,091                   | \$ 3,702                                | \$2,564                        | \$1,373                                  | \$1,337            |
| 1980                            | 26,409                         | 11,029                    | 2,758            | 2,329                     | 4,051                                   | 3,096                          | 1,560                                    | 1,586              |
| 1981                            | 29,051                         | 12,037                    | 2,822            | 2,522                     | 4,497                                   | 3,708                          | 1,723                                    | 1,742              |
| 1982                            | 29,478                         | 11,529                    | 2,709            | 2,668                     | 4,665                                   | 4,160                          | 1,876                                    | 1,869              |
| 1983                            | 31,186                         | 11,370                    | 2,878            | 2,983                     | 5,104                                   | 4,764                          | 2,107                                    | 1,980              |
| 1984                            | 33,812                         | 12,161                    | 3,176            | 3,192                     | 5,369                                   | 5,310                          | 2,223                                    | 2,380              |
| 1985                            | 36,611                         | 12,684                    | 3,604            | 3,464                     | 5,781                                   | 6,089                          | 2,318                                    | 2,670              |
| 1986                            | 39,934                         | 11,368                    | 4,475            | 3,793                     | 7,680                                   | 6,820                          | 2,652                                    | 3,171              |
| 1987                            | 43,925                         | 12,509                    | 4,951            | 4,169                     | 8,575                                   | 7,399                          | 2,855                                    | 3,468              |
| 1988                            | 47,739                         | 13,176                    | 5,643            | 4,444                     | 9,527                                   | 8,235                          | 2,977                                    | 3,737              |
| 1989                            | 52,460                         | 14,749                    | 6,184            | 4,775                     | 9,449                                   | 8,718                          | 3,078                                    | 5,507              |
| 1990                            | 58,983                         | 18,166                    | 6,921            | 5,220                     | 9,094                                   | 9,102                          | 3,273                                    | 7,207              |
| 1991                            | 56,758                         | 16,831                    | 6,682            | 5,068                     | 9,140                                   | 8,856                          | 3,217                                    | 6,964              |
| 1992                            | 58,801                         | 17,203                    | 6,884            | 5,327                     | 9,783                                   | 8,936                          | 3,340                                    | 7,328              |
| 1993 <sup>p</sup>               | 60,727                         | 17,533                    | 6,990            | 5,242                     | 10,033                                  | 9,362                          | 3,608                                    | 7,959              |
| <b>INTERNATIONAL OPERATIONS</b> |                                |                           |                  |                           |   |                                |  |                    |
| 1979                            | \$ 5,505                       | \$ 1,960                  | \$ 571           | \$ 538                    | \$ 922                                  | \$ 774                         | \$ 352                                   | \$ 388             |
| 1980                            | 6,766                          | 2,775                     | 616              | 600                       | 1,049                                   | 917                            | 385                                      | 423                |
| 1981                            | 6,574                          | 2,757                     | 540              | 583                       | 932                                     | 945                            | 382                                      | 435                |
| 1982                            | 6,452                          | 2,596                     | 512              | 577                       | 893                                     | 954                            | 396                                      | 525                |
| 1983                            | 6,693                          | 2,490                     | 548              | 664                       | 936                                     | 1,162                          | 389                                      | 505                |
| 1984                            | 7,485                          | 2,629                     | 677              | 749                       | 975                                     | 1,308                          | 446                                      | 701                |
| 1985                            | 7,984                          | 2,738                     | 768              | 852                       | 1,069                                   | 1,414                          | 482                                      | 662                |
| 1986                            | 8,458                          | 2,402                     | 901              | 877                       | 1,386                                   | 1,665                          | 518                                      | 711                |
| 1987                            | 10,226                         | 2,836                     | 1,096            | 1,059                     | 1,749                                   | 2,094                          | 533                                      | 860                |
| 1988                            | 12,403                         | 3,230                     | 1,332            | 1,280                     | 2,193                                   | 2,742                          | 618                                      | 1,009              |
| 1989                            | 14,954                         | 3,919                     | 1,724            | 1,454                     | 2,483                                   | 3,108                          | 746                                      | 1,520              |
| 1990                            | 18,878                         | 5,454                     | 2,051            | 1,738                     | 2,657                                   | 3,833                          | 887                                      | 2,295              |
| 1991                            | 20,185                         | 5,636                     | 2,152            | 1,861                     | 2,831                                   | 4,602                          | 892                                      | 2,210              |
| 1992                            | 21,784                         | 5,843                     | 2,148            | 2,204                     | 3,255                                   | 5,229                          | 1,033                                    | 2,073              |
| 1993 <sup>p</sup>               | 21,632                         | 5,903                     | 1,965            | 2,175                     | 3,063                                   | 5,336                          | 1,075                                    | 2,114              |

Source: Department of Transportation, Office of Aviation Statistics, "Air Carrier Financial Statistics Quarterly" (Quarterly).

NOTE: Detail may not add to totals because of rounding.

a Scheduled and non-scheduled service for all certificated route air carriers. Excludes supplemental air carriers, commuters, and air taxis.

b General and administrative and other transport-related expenses.

p Preliminary.

**TRAFFIC STATISTICS**  
**U.S. AIR CARRIER SCHEDULED SERVICE<sup>a</sup>**  
**Calendar Years 1964-1993**

| Year              | Revenue Ton-Miles<br>(Millions) |                    |        | Total<br>Available<br>Ton-Miles<br>(Millions) | Total<br>Revenue<br>Load<br>Factor | Aircraft<br>Revenue<br>Miles<br>(Millions) | Average<br>Overall<br>Flight<br>Stage<br>Length<br>(Miles) | Average<br>Available<br>Seats<br>per<br>Aircraft<br>Mile |
|-------------------|---------------------------------|--------------------|--------|---|------------------------------------|--|--|--|
|                   | Passen-<br>ger                  | Cargo <sup>b</sup> | Total  |   |                                    |  |  |  |
| 1964              | 5,630                           | 1,803              | 7,434  | 15,514  | 47.9 %                             | 1,189                                      | 301  | 93   |
| 1965              | 6,629                           | 2,356              | 8,986  | 18,408  | 48.8                               | 1,354                                      | 322  | 96   |
| 1966              | 7,736                           | 2,949              | 10,686 | 20,939  | 51.0                               | 1,482                                      | 339  | 98   |
| 1967              | 9,561                           | 3,475              | 13,036 | 26,968  | 48.3                               | 1,834                                      | 371  | 101  |
| 1968              | 11,023                          | 4,226              | 15,249 | 33,221  | 45.9                               | 2,146                                      | 401  | 107  |
| 1969              | 12,197                          | 4,701              | 16,898 | 38,664  | 43.7                               | 2,385                                      | 443  | 112  |
| 1970              | 13,171                          | 4,994              | 18,166 | 41,693  | 43.6                               | 2,426                                      | 473  | 117  |
| 1971              | 13,565                          | 5,120              | 18,685 | 44,139  | 42.3                               | 2,378                                      | 476  | 125  |
| 1972              | 15,241                          | 5,506              | 20,746 | 45,583  | 45.5                               | 2,376                                      | 471  | 129  |
| 1973              | 16,196                          | 6,046              | 22,242 | 49,019  | 45.4                               | 2,448                                      | 477  | 135  |
| 1974              | 16,292                          | 6,133              | 22,425 | 46,848  | 47.9                               | 2,258                                      | 478  | 140  |
| 1975              | 16,281                          | 5,905              | 22,186 | 47,254  | 46.9                               | 2,241                                      | 476  | 143  |
| 1976              | 17,899                          | 6,222              | 24,121 | 49,325  | 48.9                               | 2,320                                      | 480  | 146  |
| 1977              | 19,322                          | 6,587              | 25,909 | 52,284  | 49.6                               | 2,419                                      | 490  | 149  |
| 1978              | 22,678                          | 7,001              | 29,679 | 54,765  | 54.2                               | 2,520                                      | 502  | 152  |
| 1979              | 26,202                          | 7,189              | 33,390 | 60,844  | 54.9                               | 2,791                                      | 517  | 154  |
| 1980              | 25,519                          | 7,084              | 32,603 | 62,983  | 51.8                               | 2,816                                      | 526  | 158  |
| 1981              | 24,889                          | 7,060              | 31,949 | 61,186  | 52.2                               | 2,703                                      | 519  | 161  |
| 1982              | 25,964                          | 6,886              | 32,850 | 62,401  | 52.6                               | 2,699                                      | 544  | 167  |
| 1983              | 28,183                          | 7,573              | 35,756 | 65,385  | 54.7                               | 2,809                                      | 558  | 169  |
| 1984              | 30,512                          | 8,185              | 38,697 | 72,223  | 53.6                               | 3,134                                      | 575  | 168  |
| 1985              | 33,640                          | 7,689              | 41,329 | 76,059  | 54.3                               | 3,320                                      | 569  | 168  |
| 1986              | 36,655                          | 9,026              | 45,681 | 85,140  | 53.7                               | 3,725                                      | 580  | 168  |
| 1987              | 40,453                          | 10,016             | 50,469 | 92,209  | 54.7                               | 3,988                                      | 606  | 167  |
| 1988              | 42,330                          | 11,469             | 53,800 | 97,899  | 55.0                               | 4,141                                      | 618  | 169  |
| 1989              | 43,271                          | 12,187             | 55,458 | 100,082                                       | 55.4                               | 4,193                                      | 633  | 169  |
| 1990              | 45,793                          | 12,549             | 58,342 | 107,559                                       | 54.2                               | 4,491                                      | 649  | 170  |
| 1991              | 44,795                          | 12,130             | 56,925 | 105,599                                       | 53.9                               | 4,416                                      | 651  | 169  |
| 1992 <sup>r</sup> | 47,855                          | 13,199             | 61,054 | 112,749                                       | 54.2                               | 4,661                                      | 661  | 169  |
| 1993              | 48,914                          | 14,089             | 63,003 | 115,344                                       | 54.6                               | 4,840                                      | 669  | 167  |

Source: Department of Transportation, Office of Aviation Statistics, "Air Carrier Traffic Statistics Monthly" (Monthly).

NOTE: Detail may not add to totals because of rounding.

a Includes international and domestic operations.

b Includes freight, air express, U.S. and foreign mail.

r Revised.

**PASSENGER STATISTICS**  
**U.S. AIR CARRIER SCHEDULED SERVICE**  
**DOMESTIC AND INTERNATIONAL OPERATIONS**  
 Calendar Years 1979–1993

| Year                            | Revenue<br>Passenger<br>Enplanements<br>(Thousands) | Average<br>Passenger<br>Trip-Length<br>(Miles) | Revenue<br>Passenger<br>Miles<br>(Millions) | Available<br>Seat<br>Miles<br>(Millions) | Revenue<br>Passenger<br>Load Factor <sup>a</sup> |
|---------------------------------|---|--|---|--|--|
| <b>DOMESTIC OPERATIONS</b>      |   |  |   |  |  |
| 1979                            | 292,700   | 714  | 208,891                                     | 332,796                                  | 62.8   |
| 1980                            | 272,829   | 736  | 200,829                                     | 346,028                                  | 58.0   |
| 1981                            | 265,304   | 749  | 198,715                                     | 346,172                                  | 57.4   |
| 1982                            | 274,342   | 766  | 210,149                                     | 359,528                                  | 58.5   |
| 1983                            | 296,721   | 765  | 226,909                                     | 379,150                                  | 59.8   |
| 1984                            | 321,047   | 759  | 243,692                                     | 422,507                                  | 57.7   |
| 1985                            | 357,109   | 758  | 270,584                                     | 445,826                                  | 60.7   |
| 1986                            | 393,864   | 767  | 302,090                                     | 497,991                                  | 60.7   |
| 1987                            | 416,831   | 779  | 324,637                                     | 526,958                                  | 61.6   |
| 1988                            | 419,210   | 786  | 329,309                                     | 536,663                                  | 61.4   |
| 1989                            | 416,331   | 793  | 329,975                                     | 530,079                                  | 62.3   |
| 1990                            | 423,565   | 803  | 340,231                                     | 563,065                                  | 60.4   |
| 1991                            | 412,360   | 806  | 332,566                                     | 543,638                                  | 61.2   |
| 1992 <sup>r</sup>               | 431,693   | 806  | 347,931                                     | 557,989                                  | 62.4   |
| 1993                            | 441,902   | 800  | 353,630                                     | 570,680                                  | 62.0   |
| <b>INTERNATIONAL OPERATIONS</b> |   |  |   |  |  |
| 1979                            | 24,163  | 2,199  | 53,132                                      | 83,330                                   | 63.8   |
| 1980                            | 24,074  | 2,258  | 54,363                                      | 86,507                                   | 62.8   |
| 1981                            | 20,672  | 2,427  | 50,173                                      | 78,725                                   | 63.7   |
| 1982                            | 19,760  | 2,505  | 49,495                                      | 80,591                                   | 61.4   |
| 1983                            | 21,917  | 2,506  | 54,920                                      | 85,388                                   | 64.3   |
| 1984                            | 23,636  | 2,599  | 61,424                                      | 92,817                                   | 66.2   |
| 1985                            | 24,913  | 2,642  | 65,819                                      | 101,963                                  | 64.6   |
| 1986                            | 25,082  | 2,570  | 64,456                                      | 109,445                                  | 58.9   |
| 1987                            | 30,847  | 2,588  | 79,834                                      | 121,763                                  | 65.6   |
| 1988                            | 35,404  | 2,655  | 93,992                                      | 140,140                                  | 67.1   |
| 1989                            | 37,361  | 2,750  | 102,739                                     | 154,297                                  | 66.6   |
| 1990                            | 41,995  | 2,803  | 117,695                                     | 170,310                                  | 69.1   |
| 1991                            | 39,941  | 2,889  | 115,389                                     | 171,561                                  | 67.3   |
| 1992 <sup>r</sup>               | 43,415  | 3,009  | 130,622                                     | 194,784                                  | 67.1   |
| 1993                            | 45,347  | 2,988  | 135,507                                     | 200,151                                  | 67.7   |

Source: Department of Transportation, Office of Aviation Statistics, "Air Carrier Traffic Statistics Monthly" (Monthly).

a Revenue passenger miles as a percent of available seat miles.

r Revised.



## TURBINE-ENGINEED AIRCRAFT IN THE WORLD AIRLINE FLEET

(By Model, 1989-1993)

|                                  | 1989             | 1990             | 1991             | 1992             | 1993          |
|----------------------------------|------------------|------------------|------------------|------------------|---------------|
| <b>TOTAL AIRCRAFT IN SERVICE</b> | 13,514           | 14,651           | 15,181           | 16,100           | 17,284        |
| <b>Turbojets—TOTAL</b>           | <b>8,587</b>     | <b>9,426</b>     | <b>9,819</b>     | <b>10,504</b>    | <b>11,345</b> |
| Aerospatiale SE-210 Caravelle    | 56               | 49               | 38               | 34               | 29            |
| Aerospatiale SN-601 Corvette     | 12               | 7                | 2                | —                | —             |
| Airbus A300                      | 294              | 327              | 331              | 346              | 374           |
| Airbus A310                      | 147              | 180              | 193              | 207              | 222           |
| Airbus A320                      | 23               | 130              | 247              | 354              | 413           |
| Airbus A330                      | —                | —                | —                | —                | 1             |
| Airbus A340                      | —                | —                | —                | —                | 20            |
| Antonov 124                      | —                | —                | 7                | 7                | 13            |
| Avro RJ-70/85/100                | (a)              | (a)              | (a)              | (a)              | 12            |
| B.Ae./Aerospatiale Concorde      | 14               | 14               | 14               | 14               | 14            |
| B.Ae. 146                        | 102 <sup>a</sup> | 144 <sup>a</sup> | 166 <sup>a</sup> | 173 <sup>a</sup> | 185           |
| B.Ae. One-Eleven                 | 164              | 132              | 146              | 143              | 121           |
| B.Ae. Trident                    | 27               | 25               | 32               | 9                | 9             |
| B.Ae. (HS) 125                   | 17               | 16               | 17               | 19               | 23            |
| Beech 400 Beechjet               | —                | —                | 1                | 3                | 2             |
| Boeing 707/720                   | 224              | 210              | 198              | 176              | 151           |
| Boeing 727                       | 1,684            | 1,648            | 1,515            | 1,457            | 1,390         |
| Boeing 737                       | 1,585            | 1,836            | 2,019            | 2,189            | 2,363         |
| Boeing 747                       | 676              | 775              | 806              | 865              | 918           |
| Boeing 757                       | 215              | 324              | 380              | 497              | 566           |
| Boeing 767                       | 254              | 345              | 399              | 462              | 515           |
| Canadair CL-601 Challenger       | —                | —                | 2                | 2                | 4             |
| Canadair Regional Jet            | —                | —                | —                | 2                | 23            |
| Cessna 500/550/650               |                  |                  |                  |                  |               |
| Citation I/II/III                | 48               | 43               | 44               | 35               | 31            |
| Convair 880/990                  | 2                | 2                | —                | 1                | 1             |
| Dassault Falcon 10/20/50         | 44               | 39               | 43               | 41               | 46            |
| Dassault Mercure                 | 11               | 11               | 11               | 8                | 8             |
| Fokker F-28 Fellowship           | 203              | 199              | 197              | 191              | 190           |
| Fokker 100                       | 14               | 58               | 93               | 150              | 220           |
| Gulfstream II/III G-1159         | 14               | 15               | 16               | 17               | 17            |
| Ilyushin IL-62                   | 67               | 56               | 39               | 33               | 49            |
| Ilyushin IL-76                   | 58               | 60               | 61               | 64               | 83            |
| Ilyushin IL-86                   | —                | —                | —                | —                | 12            |
| Israel Aircraft 1121/1124        | 3                | 2                | 2                | 3                | 12            |
| Learjet                          | 56               | 37               | 34               | 37               | 28            |
| Lockheed L-1011 Tristar          | 229              | 228              | 227              | 214              | 213           |
| Lockheed L-1329 Jetstar          | 13               | 6                | 5                | 4                | 4             |
| MBB Hansa HFB-320                | 5                | —                | —                | —                | —             |
| McDonnell Douglas DC-8           | 276              | 253              | 257              | 261              | 264           |
| McDonnell Douglas DC-9           | 842              | 847              | 741              | 741              | 767           |
| McDonnell Douglas DC-10          | 370              | 365              | 361              | 361              | 354           |
| McDonnell Douglas MD-11          | —                | 3                | 36               | 73               | 107           |
| McDonnell Douglas MD-80          | 588              | 799              | 908              | 1,032            | 1,067         |
| Mitsubishi MU-300 Diamond        | 2                | —                | —                | —                | —             |
| Rockwell Sabreliner 60           | 3                | 3                | 3                | 2                | 1             |
| Tupolev Tu-134                   | 97               | 74               | 54               | 82               | 138           |
| Tupolev Tu-154                   | 95               | 111              | 156              | 131              | 225           |
| Yakovlev Yak-40/42               | 53               | 55               | 48               | 64               | 140           |

(Continued on next page)

## TURBINE-ENGINEED AIRCRAFT IN THE WORLD AIRLINE FLEET

(By Model, 1989–1993, continued)

|                                  | 1989       | 1990       | 1991       | 1992       | 1993       |
|----------------------------------|------------|------------|------------|------------|------------|
| <b>Turbine-Powered</b>           |            |            |            |            |            |
| <b>Helicopters—TOTAL</b> .....   | <u>240</u> | <u>176</u> | <u>188</u> | <u>176</u> | <u>242</u> |
| Aerospatiale SA-316 Alouette III | 8          | 4          | 4          | —          | —          |
| Aerospatiale SA-318 Alouette II  | 4          | 3          | 3          | 2          | 1          |
| Aerospatiale SA-319 Alouette III |            |            |            |            |            |
| Astazou .....                    | 4          | 4          | 4          | 2          | —          |
| Aerospatiale SA-341 Gazelle ..   | —          | —          | 1          | 1          | —          |
| Aerospatiale (Nurtanio)          |            |            |            |            |            |
| SA-330 Puma .....                | 22         | 16         | 18         | 18         | 28         |
| Aerospatiale AS-332 Super Puma   | 5          | 5          | 5          | 5          | 5          |
| Aerospatiale AS-350 Ecureuil/    |            |            |            |            |            |
| Astar .....                      | 7          | 10         | 10         | 7          | 3          |
| Aerospatiale AS-355 Ecureuil 2/  |            |            |            |            |            |
| Twinstar .....                   | 3          | 4          | 4          | 4          | 8          |
| Aerospatiale SA-365 Dauphin II   | 12         | 10         | 10         | 10         | 13         |
| Agusta A109 .....                | —          | —          | 3          | 3          | —          |
| Bell (Agusta/Fuji) 204 .....     | 5          | 6          | 5          | 3          | 3          |
| Bell 205 .....                   | 2          | 2          | 2          | 2          | 2          |
| Bell 206 Jetranger/Longranger .. | 39         | 26         | 33         | 33         | 36         |
| Bell 212 .....                   | 27         | 15         | 15         | 16         | 20         |
| Bell 222 UT .....                | 1          | —          | —          | —          | —          |
| Bell 412 .....                   | 2          | 3          | 4          | 6          | 17         |
| Hughes (Kawasaki) 500/369D ..    | 1          | 1          | 1          | —          | —          |
| MBB/Kawasaki BK 117 .....        | 1          | —          | —          | —          | —          |
| MBB/Nurtanio Bo.105 .....        | 34         | 33         | 33         | 33         | 41         |
| Sikorsky S-55T .....             | 5          | 5          | 5          | 5          | 5          |
| Sikorsky S-58T .....             | 5          | 5          | 4          | 4          | 4          |
| Sikorsky S-61 .....              | 32         | 10         | 10         | 10         | 33         |
| Sikorsky S-76 .....              | 18         | 11         | 11         | 12         | 23         |
| Westland 30 .....                | 3          | 3          | 3          | —          | —          |

(Continued on next page)

**TURBINE-ENGINEED AIRCRAFT IN THE WORLD AIRLINE FLEET**

(By Model, 1989–1993, continued)

|                                  | 1989         | 1990         | 1991         | 1992         | 1993         |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Turboprops—TOTAL</b> .....    | <b>4,687</b> | <b>5,049</b> | <b>5,174</b> | <b>5,420</b> | <b>5,697</b> |
| Aero Spacelines SuperGuppy ...   | 4            | —            | —            | —            | —            |
| Aerospatiale N.262/Mohawk 298    | 23           | 16           | 14           | 15           | 10           |
| Aerospatiale/Aeritalia ATR 42 .. | 122          | 178          | 210          | 227          | 242          |
| Aerospatiale/Aeritalia ATR 72 .. | —            | 17           | 48           | 76           | 103          |
| Airtech CN-235 .....             | 8            | 18           | 24           | 23           | 24           |
| Antonov An-12 .....              | 15           | 19           | 20           | 19           | 25           |
| Antonov An-22 .....              | —            | —            | —            | 2            | 2            |
| Antonov An-24/26/28/30/32 .....  | 251          | 246          | 216          | 171          | 258          |
| B.Ae. ATP .....                  | —            | 31           | 41           | 46           | 50           |
| B.Ae. Vanguard .....             | 7            | 5            | 4            | 4            | 3            |
| B.Ae. Viscount .....             | 40           | 33           | 27           | 25           | 23           |
| B.Ae. (HP-137) Jetstream 31 ...  | 201          | 277          | 205          | 309          | 296          |
| B.Ae. Jetstream 41 .....         | —            | —            | —            | 2            | 18           |
| B.Ae. (HS) Argosy .....          | 5            | —            | —            | —            | —            |
| B.Ae. HS-748 .....               | 152          | 139          | 130          | 123          | 115          |
| Beech 18 Turbo .....             | 24           | 24           | 20           | 17           | 1            |
| Beech 90 King Air .....          | 40           | 26           | 28           | 30           | 38           |
| Beech 99 .....                   | 173          | 140          | 122          | 130          | 139          |
| Beech 100 King Air .....         | 22           | 23           | 24           | 31           | 38           |
| Beech 200/300 Super King Air ..  | 83           | 78           | 76           | 87           | 94           |
| Beech 1300 .....                 | 5            | 14           | 7            | 2            | 4            |
| Beech 1900C/D .....              | 95           | 171          | 191          | 224          | 251          |
| Bristol 175 Britannia .....      | 7            | 6            | 6            | 5            | 5            |
| Canadair CL-44 .....             | 15           | 13           | 11           | 8            | 8            |
| CASA/Nurtanio C-212 Aviocar ..   | 112          | 104          | 109          | 104          | 102          |
| Cessna 208 Caravan I .....       | 229          | 287          | 312          | 307          | 312          |
| Cessna F406 Caravan II .....     | 14           | 19           | 21           | 23           | 19           |
| Cessna 425/441 Conquest I/II ... | 19           | 8            | 4            | 4            | 5            |
| Convair 580/600/640 .....        | 132          | 108          | 92           | 99           | 98           |
| DHC-2/3 Turbo Beaver/Otter ...   | 3            | 4            | 4            | 4            | 6            |
| DHC-5 Buffalo .....              | 1            | 1            | 1            | 1            | 1            |
| DHC-6 Twin Otter .....           | 465          | 432          | 428          | 437          | 419          |
| DHC-7 Dash 7 .....               | 106          | 94           | 79           | 80           | 84           |
| DHC-8 Dash 8 .....               | 120          | 214          | 254          | 307          | 341          |
| Dornier DO-228 .....             | 90           | 113          | 96           | 112          | 116          |
| Dornier DO-328 .....             | —            | —            | —            | —            | 3            |
| Douglas DC-3T Turbo Express ..   | —            | —            | 1            | —            | —            |
| Embraer EMB-110 Bandeirante ...  | 222          | 200          | 174          | 181          | 189          |
| Embraer EMB-120 Brasilia .....   | 113          | 201          | 225          | 255          | 267          |
| Fokker/Fairchild                 |              |              |              |              |              |
| F-27/FH-227 Friendship .....     | 432          | 401          | 389          | 378          | 354          |
| Fokker 50 .....                  | 45           | 101          | 121          | 134          | 152          |

(Continued on next page)

## TURBINE-ENGINEED AIRCRAFT IN THE WORLD AIRLINE FLEET

(By Model, 1989-1993, continued)

|   | 1989               | 1990               | 1991               | 1992                | 1993          |
|---|--------------------|--------------------|--------------------|---------------------|---------------|
| <b>Turboprops (continued)</b>             |                    |                    |                    |                     |               |
| GAF Nomad .....                           | 14                 | 9                  | 8                  | 12                  | 11            |
| Grumman G-21 Turbo Goose ..               | —                  | —                  | 1                  | 1                   | 1             |
| Grumman G-73 Turbo Mallard ..             | 10                 | 9                  | 4                  | 5                   | 6             |
| Grumman G-159 Gulfstream I ..             | 37                 | 34                 | 33                 | 31                  | 33            |
| Handley Page Herald .....                 | 17                 | 17                 | 17                 | 16                  | 15            |
| Harbin Y-12 II .....                      | —                  | 2                  | 5                  | 26                  | 33            |
| IAI Arava .....                           | 4                  | 3                  | 1                  | 1                   | 1             |
| Ilyushin IL-18 .....                      | 67                 | 48                 | 42                 | 31                  | 29            |
| LET L-410 .....                           | —                  | 3                  | 17                 | 19                  | 25            |
| Lockheed L-188 Electra .....              | 83                 | 74                 | 67                 | 65                  | 65            |
| Lockheed L-100/L-382 Hercules             | 58                 | 56                 | 54                 | 56                  | 53            |
| Mitsubishi MU-2B .....                    | 5                  | 5                  | 8                  | 5                   | 6             |
| Nihon AMC YS-11 .....                     | 102                | 97                 | 94                 | 92                  | 85            |
| Pilatus Britten-Norman BN-2T              |                    |                    |                    |                     |               |
| Turbo Islander .....                      | 3                  | 2                  | 3                  | 2                   | 2             |
| Piper PA-31T/42 Cheyenne ....             | 35                 | 29                 | 25                 | 19                  | 19            |
| Piper T-1040 .....                        | 15                 | 15                 | 12                 | 13                  | 11            |
| PZL (Antonov) An-28 .....                 | —                  | —                  | —                  | 3                   | 3             |
| Rockwell Turbo Commander ...              | 16                 | 14                 | 15                 | 12                  | 11            |
| Saab SF-340A/B .....                      | 136                | 206                | 265                | 312                 | 347           |
| Saunders ST-27 .....                      | 2                  | —                  | —                  | —                   | —             |
| Shorts SC-5 Belfast .....                 | 5                  | 5                  | 5                  | 5                   | 4             |
| Shorts SC-7 Skyliner/Skyvan ...           | 15                 | 16                 | 25                 | 24                  | 25            |
| Shorts 330 .....                          | 68                 | 64                 | 51                 | 55                  | 56            |
| Shorts 360 .....                          | 142                | 150                | 139                | 147                 | 148           |
| Swearingen Merlin .....                   | 46                 | 41                 | 36                 | 36                  | 49            |
| Swearingen Metro .....                    | 361                | 249                | 338                | 357                 | 377           |
| Transall C-160 .....                      | 8                  | 8                  | 8                  | 8                   | 6             |
| Xian (Antonov) Y-7 .....                  | 31                 | 31                 | 67                 | 65                  | 61            |
| <b>TOTAL AIRCRAFT IN SERVICE ..</b>       | <b>13,514</b>      | <b>14,651</b>      | <b>15,181</b>      | <b>16,100</b>       | <b>17,284</b> |
| Number Manufactured in U.S. ..            | 8,707 <sup>r</sup> | 9,333 <sup>r</sup> | 9,517 <sup>r</sup> | 10,064 <sup>r</sup> | 10,523        |
| Percent Manufactured in U.S. ..           | 64.4% <sup>r</sup> | 63.7% <sup>r</sup> | 62.7% <sup>r</sup> | 62.5% <sup>r</sup>  | 60.9%         |
| <b>Turbojet Aircraft in Service .....</b> | <b>8,587</b>       | <b>9,426</b>       | <b>9,819</b>       | <b>10,504</b>       | <b>11,345</b> |
| Number Manufactured in U.S. ..            | 7,079 <sup>r</sup> | 7,737              | 7,950              | 8,427               | 8,759         |
| Percent Manufactured in U.S. ..           | 82.4% <sup>r</sup> | 82.1%              | 81.0%              | 80.2%               | 77.2%         |
| <b>Turboprop Aircraft in Service ...</b>  | <b>4,687</b>       | <b>5,049</b>       | <b>5,174</b>       | <b>5,420</b>        | <b>5,697</b>  |
| Number Manufactured in U.S. ..            | 1,497              | 1,519              | 1,483 <sup>r</sup> | 1,549 <sup>r</sup>  | 1,624         |
| Percent Manufactured in U.S. ..           | 31.9%              | 30.1%              | 28.7% <sup>r</sup> | 28.6% <sup>r</sup>  | 28.5%         |
| <b>Turbine-Powered Helicopters</b>        |                    |                    |                    |                     |               |
| <b>In Service .....</b>                   | <b>240</b>         | <b>176</b>         | <b>188</b>         | <b>176</b>          | <b>242</b>    |
| Number Manufactured in U.S. ..            | 131 <sup>r</sup>   | 77 <sup>r</sup>    | 84 <sup>r</sup>    | 88 <sup>r</sup>     | 140           |
| Percent Manufactured in U.S. ..           | 54.6% <sup>r</sup> | 43.8% <sup>r</sup> | 44.7% <sup>r</sup> | 50.0% <sup>r</sup>  | 57.9%         |

Source: Exxon International Company, "Air World Survey," compiled by Aviation Data Service, Inc. (Annually).

NOTE: The "Air World Survey" covers the world's airlines with the exception of Aeroflot and covers aircraft in service as of December 31 and as of March 31 prior to 1991. Excludes air taxi operators.

a RJ-70 combined with B.Ae. 146.

r Revised.

## PERCENT OF CIVIL TURBOJET ENGINE MARKET BY MANUFACTURER AND AIRCRAFT MODEL

as of December 1993

| Aircraft<br>Manufacturer<br>and Model | Total<br>Installed<br>Engines | Engine Manufacturers |       |       |       |      |       |
|---------------------------------------|-------------------------------|----------------------|-------|-------|-------|------|-------|
|                                       |                               | P&W                  | GE    | RR    | CFM   | IAE  | Other |
| <b>TOTAL ENGINES</b> .....            | 34,828                        | 15,679               | 3,846 | 3,155 | 3,812 | 240  | 8,096 |
| <b>PERCENT SHARE</b> .....            | 100.0%                        | 45.0%                | 11.0% | 9.1%  | 10.9% | 0.7% | 23.2% |
| Airbus A300 <sup>a</sup> .....        | 278                           | 18%                  | 82%   | —%    | —%    | —%   | —%    |
| Airbus A300B4-200 ....                | 268                           | 11                   | 89    | —     | —     | —    | —     |
| Airbus A300B4-600R ...                | 232                           | 51                   | 49    | —     | —     | —    | —     |
| Airbus A310 <sup>a</sup> .....        | 160                           | 34                   | 66    | —     | —     | —    | —     |
| Airbus A310-300 .....                 | 286                           | 40                   | 60    | —     | —     | —    | —     |
| Airbus A320 <sup>a</sup> .....        | 36                            | —                    | —     | —     | 100   | —    | —     |
| Airbus A320-200 .....                 | 790                           | —                    | —     | —     | 70    | 30   | —     |
| Airbus A330 .....                     | 2                             | —                    | 100   | —     | —     | —    | —     |
| Airbus A340 .....                     | 72                            | —                    | —     | —     | 100   | —    | —     |
| Antonov AN-72 .....                   | 12                            | —                    | —     | —     | —     | —    | 100   |
| Antonov AN-74 .....                   | 6                             | —                    | —     | —     | —     | —    | 100   |
| Antonov AN-124 .....                  | 152                           | —                    | —     | —     | —     | —    | 100   |
| AS Corvette .....                     | 8                             | 100                  | —     | —     | —     | —    | —     |
| AS Caravelle .....                    | 68                            | 71                   | —     | 29    | —     | —    | —     |
| AS/BAe Concorde .....                 | 56                            | —                    | —     | 100   | —     | —    | —     |
| Avro Int'l RJ .....                   | 44                            | —                    | —     | —     | —     | —    | 100   |
| BAe 1-11 .....                        | 298                           | —                    | —     | 100   | —     | —    | —     |
| BAe 146 .....                         | 748                           | —                    | —     | —     | —     | —    | 100   |
| BAe HS Trident .....                  | 27                            | —                    | —     | 100   | —     | —    | —     |
| BAe HS 125 .....                      | 46                            | —                    | —     | 35    | —     | —    | 65    |
| Beech 400 Beechjet ....               | 4                             | 100                  | —     | —     | —     | —    | —     |
| Boeing B-707 <sup>a</sup> .....       | 140                           | 91                   | —     | 9     | —     | —    | —     |
| Boeing B-707-320C ....                | 560                           | 100                  | —     | —     | —     | —    | —     |
| Boeing B-720 .....                    | 36                            | 100                  | —     | —     | —     | —    | —     |
| Boeing B-727 series <sup>a</sup> ...  | 711                           | 97                   | —     | 3     | —     | —    | —     |
| Boeing B-727 <sup>b</sup> .....       | 414                           | 100                  | —     | —     | —     | —    | —     |
| Boeing B-727C .....                   | 333                           | 100                  | —     | —     | —     | —    | —     |
| Boeing B-727-200 <sup>b</sup> .....   | 693                           | 100                  | —     | —     | —     | —    | —     |
| Boeing B-727-200 ADV .                | 2,421                         | 100                  | —     | —     | —     | —    | —     |
| Boeing B-737 <sup>a</sup> .....       | 268                           | 89                   | —     | —     | 11    | —    | —     |
| Boeing B-737-200 .....                | 350                           | 100                  | —     | —     | —     | —    | —     |
| Boeing B-737-200 ADV .                | 1,412                         | 100                  | —     | —     | —     | —    | —     |
| Boeing B-737-300 .....                | 1,586                         | —                    | —     | —     | 100   | —    | —     |
| Boeing B-737-400 .....                | 680                           | —                    | —     | —     | 100   | —    | —     |
| Boeing B-737-500 .....                | 482                           | —                    | —     | —     | 100   | —    | —     |
| Boeing B-747 <sup>a</sup> .....       | 1,664                         | 51                   | 38    | 10    | —     | —    | —     |
| Boeing B-747-100 .....                | 416                           | 100                  | —     | —     | —     | —    | —     |
| Boeing B-747-200B ....                | 800                           | 69                   | 16    | 15    | —     | —    | —     |
| Boeing B-747-400 .....                | 892                           | 36                   | 34    | 30    | —     | —    | —     |
| Boeing B-757 <sup>a</sup> .....       | 102                           | 71                   | —     | 29    | —     | —    | —     |
| Boeing B-757-200 .....                | 1,042                         | 46                   | —     | 54    | —     | —    | —     |
| Boeing B-767 <sup>a</sup> .....       | 328                           | 30                   | 70    | —     | —     | —    | —     |
| Boeing B-767-200ER ...                | 248                           | 49                   | 51    | —     | —     | —    | —     |
| Boeing B-767-300ER ...                | 452                           | 43                   | 48    | 9     | —     | —    | —     |

(Continued on next page)

**PERCENT OF CIVIL TURBOJET ENGINE MARKET  
BY MANUFACTURER AND AIRCRAFT MODEL (continued)**  
as of December 1993

| Aircraft<br>Manufacturer<br>and Model | Total<br>Installed<br>Engines | Engine Manufacturers |      |     |     |     |       |
|---------------------------------------|-------------------------------|----------------------|------|-----|-----|-----|-------|
|                                       |                               | P&W                  | GE   | RR  | CFM | IAE | Other |
| Canadair CL 600/601 ...               | 6                             | —%                   | 67 % | —%  | —%  | —%  | 23 %  |
| Canadair Regional Jet ...             | 48                            | —                    | 100  | —   | —   | —   | —     |
| Cessna 500s .....                     | 104                           | 100                  | —    | —   | —   | —   | —     |
| Cessna 650 .....                      | 12                            | —                    | —    | —   | —   | —   | 100   |
| Convair CV 880/990 ...                | 8                             | —                    | 100  | —   | —   | —   | —     |
| Dassault Falcon .....                 | 122                           | —                    | 82   | —   | —   | —   | 18    |
| Dassault Mercure 100 ..               | 16                            | 100                  | —    | —   | —   | —   | —     |
| Fokker F-28 <sup>a</sup> .....        | 174                           | —                    | —    | 100 | —   | —   | —     |
| Fokker F-28-4000 .....                | 214                           | —                    | —    | 100 | —   | —   | —     |
| Fokker 100 .....                      | 422                           | —                    | —    | 100 | —   | —   | —     |
| Gulfstream II/III/IV .....            | 32                            | —                    | —    | 100 | —   | —   | —     |
| IAI 1124 .....                        | 26                            | —                    | —    | —   | —   | —   | 100   |
| Ilyushin IL-62 <sup>a</sup> .....     | 296                           | —                    | —    | —   | —   | —   | 100   |
| Ilyushin IL-62M .....                 | 608                           | —                    | —    | —   | —   | —   | 100   |
| Ilyushin IL-76 <sup>a</sup> .....     | 944                           | —                    | —    | —   | —   | —   | 100   |
| Ilyushin IL-76MD .....                | 452                           | —                    | —    | —   | —   | —   | 100   |
| Ilyushin IL-86 .....                  | 340                           | —                    | —    | —   | —   | —   | 100   |
| Ilyushin IL-96 .....                  | 20                            | —                    | —    | —   | —   | —   | 100   |
| Learjet 23/24/25 .....                | 48                            | —                    | 100  | —   | —   | —   | —     |
| Learjet 35/36/55 .....                | 56                            | —                    | —    | —   | —   | —   | 100   |
| Lockheed JetStar .....                | 24                            | 83                   | —    | —   | —   | —   | 17    |
| Lockheed L-1011 .....                 | 666                           | —                    | —    | 100 | —   | —   | —     |
| Douglas DC-8 .....                    | 1,104                         | 66                   | —    | —   | 34  | —   | —     |
| Douglas DC-9 <sup>a</sup> .....       | 592                           | 100                  | —    | —   | —   | —   | —     |
| Douglas DC-9-30 .....                 | 1,024                         | 100                  | —    | —   | —   | —   | —     |
| Douglas DC-10 <sup>a</sup> .....      | 312                           | 39                   | 61   | —   | —   | —   | —     |
| Douglas DC-10-10 .....                | 330                           | —                    | 100  | —   | —   | —   | —     |
| Douglas DC-10-30 .....                | 441                           | —                    | 100  | —   | —   | —   | —     |
| MDC MD-11 .....                       | 324                           | 43                   | 57   | —   | —   | —   | —     |
| MDC MD-80s <sup>a</sup> .....         | 144                           | 100                  | —    | —   | —   | —   | —     |
| MDC MD-81 .....                       | 236                           | 100                  | —    | —   | —   | —   | —     |
| MDC MD-82 .....                       | 1,064                         | 100                  | —    | —   | —   | —   | —     |
| MDC MD-83 .....                       | 398                           | 100                  | —    | —   | —   | —   | —     |
| MDC MD-88 .....                       | 304                           | 100                  | —    | —   | —   | —   | —     |
| Rockwell Sabreliner ....              | 2                             | 100                  | —    | —   | —   | —   | —     |
| Tupolev TU-134 <sup>a</sup> .....     | 230                           | —                    | —    | —   | —   | —   | 100   |
| Tupolev TU-134A .....                 | 846                           | —                    | —    | —   | —   | —   | 100   |
| Tupolev TU-154 <sup>a</sup> .....     | 504                           | —                    | —    | —   | —   | —   | 100   |
| Tupolev TU-154B .....                 | 327                           | —                    | —    | —   | —   | —   | 100   |
| Tupolev TU-154B2 .....                | 924                           | —                    | —    | —   | —   | —   | 100   |
| Tupolev TU-154M .....                 | 501                           | —                    | —    | —   | —   | —   | 100   |
| Yakovlev YAK-40 series <sup>a</sup> . | 9                             | —                    | —    | —   | —   | —   | 100   |
| Yakovlev YAK-40 <sup>b</sup> .....    | 705                           | —                    | —    | —   | —   | —   | 100   |
| Yakovlev YAK-42 .....                 | 276                           | —                    | —    | —   | —   | —   | 100   |

Source: Aerospace Industries Association, based on data from Aviation Data Service.

<sup>a</sup> Data for major (100 or more aircraft) series excluded and reported separately.

<sup>b</sup> Series bearing same designation as model number, but qualifies for separate reporting as a major series.

KEY: AS = Aerospatiale; BAe = British Aerospace; CFM = CFM International; GE = General Electric;  
IAE = International Aero Engines; IAI = Israel Aircraft Industries; MDC = McDonnell Douglas;  
P&W = Pratt & Whitney; RR = Rolls-Royce.

**ACTIVE<sup>a</sup> U.S. AIR CARRIER FLEET**  
**By Type of Aircraft, Number of Engines and Model**  
**Active as of December 1989–1993**

|                                     | 1989         | 1990         | 1991         | 1992               | 1993         |
|-------------------------------------|--------------|--------------|--------------|--------------------|--------------|
| <b>TOTAL</b> .....                  | 5,778        | 6,083        | 6,054        | 7,320 <sup>f</sup> | 7,306        |
| <b>Turbojets—TOTAL</b> .....        | 3,942        | 4,148        | 4,167        | 4,446              | 4,584        |
| <b>Four-Engine—TOTAL</b> .....      | <u>428</u>   | <u>432</u>   | <u>410</u>   | <u>389</u>         | <u>410</u>   |
| Boeing 707 .....                    | 27           | 25           | 27           | 20                 | 13           |
| Boeing 747 .....                    | 180          | 190          | 184          | 178                | 183          |
| B.Ae. 146 .....                     | 53           | 44           | 17           | 23                 | 20           |
| McDonnell Douglas DC-8 .....        | 168          | 173          | 182          | 168                | 194          |
| <b>Three-Engine—TOTAL</b> .....     | <u>1,459</u> | <u>1,438</u> | <u>1,376</u> | <u>1,381</u>       | <u>1,292</u> |
| Boeing 727 .....                    | 1,167        | 1,152        | 1,073        | 1,029              | 953          |
| Lockheed L-1011 .....               | 107          | 101          | 100          | 113                | 100          |
| McDonnell Douglas DC-10/MD-11 ..... | 185          | 185          | 203          | 239                | 239          |
| <b>Twin-Engine—TOTAL</b> .....      | <u>2,055</u> | <u>2,278</u> | <u>2,381</u> | <u>2,676</u>       | <u>2,882</u> |
| Airbus A-300 .....                  | 63           | 67           | 63           | 58                 | 58           |
| Airbus A-310 .....                  | 19           | 21           | 42           | 21                 | 27           |
| Airbus A-320 .....                  | 11           | 10           | 35           | 54                 | 75           |
| Boeing 737 .....                    | 756          | 812          | 835          | 915                | 1,013        |
| Boeing 757 .....                    | 146          | 199          | 234          | 328                | 375          |
| Boeing 767 .....                    | 111          | 120          | 136          | 170                | 187          |
| B.Ae. BAC-111 .....                 | —            | 3            | 1            | —                  | —            |
| Cessna C500/C501 .....              | —            | —            | —            | 2                  | 3            |
| Cessna C550 .....                   | 5            | 7            | —            | —                  | —            |
| Cessna C650 .....                   | —            | —            | —            | 1                  | —            |
| Dassault Falcon .....               | —            | —            | 2            | —                  | —            |
| Fokker F-28 .....                   | 53           | 68           | 75           | 117                | 129          |
| Grumman G-1159 .....                | —            | 1            | 3            | 1                  | —            |
| Israel Aircraft 1121 .....          | —            | —            | —            | 1                  | —            |
| Learjet LR-25 .....                 | 2            | 1            | 2            | 3                  | —            |
| Learjet LR-35 .....                 | 1            | 2            | —            | 3                  | 1            |
| McDonnell Douglas DC-9/MD-80 .....  | 888          | 967          | 953          | 1,002              | 1,009        |
| <b>Turboprops—TOTAL</b> .....       | 1,476        | 1,595        | 1,598        | 1,894              | 1,868        |
| <b>Four-Engine—TOTAL</b> .....      | <u>96</u>    | <u>88</u>    | <u>75</u>    | <u>107</u>         | <u>102</u>   |
| Canadair CL44D .....                | 5            | 5            | —            | 5                  | 1            |
| De Havilland DHC-7 .....            | 41           | —            | 33           | 40                 | 38           |
| Lockheed 188 Electra .....          | 30           | 24           | 24           | 44                 | 45           |
| Lockheed 382 .....                  | 20           | 19           | 18           | 18                 | 18           |
| <b>Twin-Engine—TOTAL</b> .....      | <u>1,380</u> | <u>1,507</u> | <u>1,523</u> | <u>1,787</u>       | <u>1,751</u> |
| Beech BE65 .....                    | —            | —            | —            | 16                 | —            |
| Beech BE90 .....                    | —            | —            | —            | 1                  | 3            |
| Beech BE99 .....                    | 53           | 54           | 32           | 39                 | 29           |
| Beech BE100 .....                   | 1            | 2            | 1            | 4                  | 1            |
| Beech BE200 .....                   | 10           | 16           | 8            | 11                 | 9            |
| Beech BE1900 .....                  | 109          | 147          | 167          | 231                | 251          |

(Continued on next page)

**ACTIVE<sup>a</sup> U.S. AIR CARRIER FLEET (Continued)**

By Type of Aircraft, Number of Engines, and Model

Active as of December 1989-1993

|  | 1989 | 1990 | 1991 | 1992             | 1993 |
|--|------|------|------|------------------|------|
| <b>Twin-Engine (continued)</b>                         |      |      |      |                  |      |
| B.Ae. ATP .....  | —    | 4    | 10   | 10               | 9    |
| B.Ae. Jetstream .....                                  | 165  | 222  | 214  | 240              | 247  |
| CASA C212 Aviocar .....                                | 16   | 16   | 13   | —                | 1    |
| Cessna C425 .....                                      | —    | —    | —    | 1                | 2    |
| Cessna C441 .....                                      | 4    | 2    | 2    | 2                | —    |
| Convair 580/600/640 .....                              | 58   | 33   | 37   | 19               | 16   |
| DeHavilland DHC-6 .....                                | 69   | 67   | 69   | 74               | 67   |
| DeHavilland DHC-8 .....                                | 64   | 74   | 81   | 115              | 120  |
| Dornier DO228 .....                                    | 34   | 32   | 31   | 13               | 13   |
| Embraer EMB110 .....                                   | 59   | 48   | 23   | 16               | 14   |
| Embraer EMB120 .....                                   | 105  | 156  | 167  | 195              | 217  |
| Fairchild/Fokker F-27/FH-227 ...                       | 53   | 58   | 50   | 53               | 50   |
| Grumman G-73 .....                                     | 5    | 7    | 4    | 5                | —    |
| Grumman G-159 .....                                    | 6    | 7    | 2    | 1                | —    |
| McKinnon G-21 .....                                    | —    | —    | —    | —                | 2    |
| Mitsubishi MU-2 .....                                  | —    | 1    | 1    | 10               | —    |
| Nihon YS-11 .....                                      | 21   | 21   | 22   | 31               | 25   |
| Nord ND-262/STC-262 .....                              | 2    | 1    | —    | 1                | —    |
| Piper PA31T .....                                      | 12   | 8    | 8    | 99               | 79   |
| Piper 42 .....   | —    | —    | 1    | 1                | —    |
| Saab-Fairchild SF340A .....                            | 85   | 109  | 153  | 195              | 209  |
| Shorts SC-7 .....                                      | —    | 2    | 2    | 6                | 6    |
| Shorts SD-3/5D-330 .....                               | 118  | 103  | 93   | 88               | 74   |
| SNAIS ATR-42 .....                                     | 62   | 77   | 101  | 108              | 108  |
| SNAIS ATR-72 .....                                     | —    | —    | —    | 14               | 27   |
| Swearingen SA-226 .....                                | 57   | 22   | 31   | 14               | 14   |
| Swearingen SA-227 .....                                | 212  | 218  | 200  | 174              | 158  |
| <b>Single-Engine—TOTAL</b> .....                       | NA   | NA   | NA   | NA               | 15   |
| <b>Piston-Engine—TOTAL</b> .....                       | 353  | 329  | 283  | 847 <sup>r</sup> | 721  |
| <b>Four-Engine—TOTAL</b> .....                         | 35   | 31   | 26   | 20               | 22   |
| Douglas DC-6 .....                                     | 34   | 30   | 25   | 19               | 21   |
| Douglas DC-7 .....                                     | 1    | 1    | 1    | 1                | 1    |
| <b>Three-Engine—TOTAL</b> .....                        | 5    | 6    | 5    | 5                | —    |
| Pilatus Britten-Norman<br>BN2A-MK-3 Turbo Islander ... | 5    | 6    | 5    | 5                | —    |
| <b>Twin-Engine—TOTAL</b> .....                         | 313  | 292  | 252  | 415              | 293  |
| <b>Single-Engine—TOTAL</b> .....                       | NA   | NA   | NA   | 407              | 406  |
| <b>Helicopters—TOTAL</b> .....                         | 7    | 11   | 6    | 133              | 124  |

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (Annually).

NOTE: Effective 1978, includes certificated route air carriers, supplemental air carriers (charters), multi-engine aircraft in passenger service of commuters, and all aircraft over 12,500 pounds operated by air taxis, commercial operators, and travel clubs.

<sup>a</sup> "Active aircraft" equals the average number of aircraft reported in operation during the last quarter of the year.

NA Not Available.

<sup>r</sup> Revised.



**JET FUEL COSTS AND CONSUMPTION BY U.S. AIR CARRIERS<sup>a</sup>**  
**Calendar Years 1977-1993**

| Year | Gallons Consumed (Millions) | Total Cost (Millions) | Cost Per Gallon (Cents) | Cost Index (1982 = 100) | Cost of Fuel as Percent of Cash Operating Expenses |
|------|-----------------------------|-----------------------|-------------------------|-------------------------|--|
| 1977 | 10,282.0                    | \$ 3,729.8            | 36.3¢                   | 37.0                    | 20.1 %   |
| 1978 | 10,627.1                    | 4,178.2               | 39.3                    | 40.1                    | 19.7   |
| 1979 | 11,278.1                    | 6,503.0               | 57.7                    | 58.8                    | 24.4   |
| 1980 | 10,874.0                    | 9,769.5               | 89.8                    | 91.6                    | 29.7   |
| 1981 | 10,087.8                    | 10,498.0              | 104.1                   | 106.1                   | 29.3   |
| 1982 | 9,942.1                     | 9,755.2               | 98.1                    | 100.0                   | 27.2   |
| 1983 | 10,214.4                    | 9,073.1               | 88.8                    | 90.5                    | 24.5   |
| 1984 | 11,050.4                    | 9,361.7               | 84.7                    | 86.3                    | 23.8   |
| 1985 | 11,675.1                    | 9,326.7               | 79.9                    | 81.4                    | 22.2   |
| 1986 | 12,643.0                    | 6,995.8               | 55.3                    | 56.4                    | 16.3   |
| 1987 | 13,629.5                    | 7,593.8               | 55.7                    | 56.8                    | 16.0   |
| 1988 | 14,204.8                    | 7,557.2               | 53.2                    | 54.2                    | 14.4   |
| 1989 | 14,103.9                    | 8,472.7               | 60.1                    | 61.2                    | 14.9   |
| 1990 | 14,841.1                    | 11,465.2              | 77.3                    | 78.7                    | 17.6   |
| 1991 | 13,798.4                    | 9,329.5               | 67.6                    | 68.9                    | 14.8   |
| 1992 | 14,172.0 <sup>r</sup>       | 8,907.9               | 62.9                    | 64.1                    | 13.5   |
| 1993 | 14,165.0                    | 8,426.5               | 59.5                    | 60.6                    | 12.7   |

Source: Air Transport Association of America, "Airline Cost Index" (Quarterly).

a Majors and Nationals excluding Air Florida, Capitol, Transamerica, and World.

r Revised.

**U.S. CIVIL AND JOINT-USE AIRCRAFT FACILITIES<sup>a</sup>**  
**BY TYPE AND STATE**  
 As of December 31, 1993

| State                | TOTAL <sup>a</sup> | Public <sup>b</sup> | Paved | Lighted | State                             | TOTAL <sup>a</sup> | Public <sup>b</sup> | Paved        | Lighted      |
|----------------------|--------------------|---------------------|-------|---------|-----------------------------------|--------------------|---------------------|--------------|--------------|
| Alabama . . . . .    | 235                | 102                 | 153   | 98      | Nevada . . . . .                  | 124                | 61                  | 60           | 34           |
| Alaska . . . . .     | 560                | 418                 | 64    | 152     | New Hampshire . .                 | 93                 | 27                  | 51           | 19           |
| Arizona . . . . .    | 280                | 76                  | 159   | 73      | New Jersey . . . . .              | 351                | 54                  | 153          | 50           |
| Arkansas . . . . .   | 252                | 100                 | 169   | 88      | New Mexico . . . . .              | 171                | 72                  | 80           | 47           |
| California . . . . . | 942                | 267                 | 683   | 247     | New York . . . . .                | 525                | 173                 | 213          | 132          |
| Colorado . . . . .   | 391                | 85                  | 174   | 85      | North Carolina . .                | 352                | 117                 | 156          | 113          |
| Connecticut . . . .  | 138                | 25                  | 87    | 27      | North Dakota . . .                | 445                | 97                  | 86           | 97           |
| Delaware . . . . .   | 37                 | 11                  | 14    | 12      | Ohio . . . . .                    | 733                | 193                 | 290          | 189          |
| Dist. of Col. . . .  | 17                 | 2                   | 16    | 4       | Oklahoma . . . . .                | 415                | 155                 | 216          | 134          |
| Florida . . . . .    | 778                | 131                 | 327   | 144     | Oregon . . . . .                  | 396                | 103                 | 162          | 77           |
| Georgia . . . . .    | 409                | 113                 | 200   | 116     | Pennsylvania . . . .              | 774                | 151                 | 315          | 137          |
| Hawaii . . . . .     | 47                 | 13                  | 39    | 14      | Rhode Island . . . .              | 26                 | 8                   | 19           | 7            |
| Idaho . . . . .      | 218                | 122                 | 79    | 48      | South Carolina . .                | 165                | 69                  | 80           | 64           |
| Illinois . . . . .   | 920                | 134                 | 289   | 167     | South Dakota . . .                | 160                | 76                  | 66           | 75           |
| Indiana . . . . .    | 597                | 115                 | 170   | 120     | Tennessee . . . . .               | 247                | 90                  | 148          | 87           |
| Iowa . . . . .       | 309                | 135                 | 169   | 142     | Texas . . . . .                   | 1,710              | 403                 | 846          | 423          |
| Kansas . . . . .     | 384                | 149                 | 139   | 131     | Utah . . . . .                    | 119                | 47                  | 84           | 45           |
| Kentucky . . . . .   | 177                | 67                  | 108   | 59      | Vermont . . . . .                 | 71                 | 16                  | 17           | 11           |
| Louisiana . . . . .  | 433                | 90                  | 251   | 77      | Virginia . . . . .                | 358                | 69                  | 158          | 84           |
| Maine . . . . .      | 159                | 77                  | 51    | 33      | Washington . . . . .              | 424                | 134                 | 205          | 133          |
| Maryland . . . . .   | 192                | 41                  | 77    | 48      | West Virginia . . .               | 104                | 40                  | 64           | 32           |
| Massachusetts . .    | 230                | 51                  | 125   | 44      | Wisconsin . . . . .               | 483                | 143                 | 178          | 141          |
| Michigan . . . . .   | 459                | 220                 | 191   | 180     | Wyoming . . . . .                 | 101                | 41                  | 51           | 37           |
| Minnesota . . . . .  | 488                | 160                 | 141   | 140     | <b>50 States—Total</b>            | <b>18,242</b>      | <b>5,497</b>        | <b>8,138</b> | <b>4,818</b> |
| Mississippi . . . .  | 219                | 86                  | 124   | 81      | Puerto Rico . . . . .             | 31                 | 11                  | 27           | 11           |
| Missouri . . . . .   | 489                | 150                 | 228   | 143     | Virgin Islands . . .              | 9                  | 2                   | 3            | 2            |
| Montana . . . . .    | 234                | 121                 | 102   | 86      | S. Pacific <sup>c</sup> . . . . . | 35                 | 28                  | 18           | 11           |
| Nebraska . . . . .   | 301                | 97                  | 111   | 91      | <b>TOTAL</b>                      | <b>18,317</b>      | <b>5,538</b>        | <b>8,186</b> | <b>4,842</b> |

**FACILITIES BY CLASS**

| Class                    | Total <sup>a</sup> | Public <sup>b</sup> | Private       |
|--------------------------|--------------------|---------------------|---------------|
| Airports . . . . .       | 13,228             | 5,228               | 8,000         |
| Heliports . . . . .      | 4,569              | 102                 | 4,467         |
| Stolports . . . . .      | 79                 | 6                   | 73            |
| Seaplane Bases . . . . . | 441                | 202                 | 239           |
| <b>Total Facilities</b>  | <b>18,317</b>      | <b>5,538</b>        | <b>12,779</b> |

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (Annually).

a Included in these data are facilities having joint civil-military use.

b "Public" refers to use, whether publicly or privately owned.

c American Samoa, Guam, and Trust Territories.

**HELIPORTS/HELIPADS<sup>a</sup> IN THE UNITED STATES**

By State  
As of 1993

| State                    | Total<br>Helipads<br>in state | Private Use              |                         | Public Use               |                         |
|--------------------------|-------------------------------|--------------------------|-------------------------|--------------------------|-------------------------|
|                          |                               | Heliports &<br>Helistops | Helipads<br>at Airports | Heliports &<br>Helistops | Helipads<br>at Airports |
| Alabama .....            | 53                            | 51                       | —                       | 1                        | 1                       |
| Alaska .....             | 27                            | 16                       | 1                       | 7                        | 3                       |
| Arizona .....            | 91                            | 88                       | —                       | —                        | 3                       |
| Arkansas .....           | 73                            | 70                       | 1                       | —                        | 2                       |
| California .....         | 390                           | 372                      | 3                       | —                        | 15                      |
| Colorado .....           | 179                           | 175                      | 1                       | —                        | 3                       |
| Connecticut .....        | 72                            | 66                       | 1                       | 3                        | 2                       |
| Delaware .....           | 12                            | 11                       | —                       | 1                        | —                       |
| District of Columbia ... | 18                            | 18                       | —                       | —                        | —                       |
| Florida .....            | 230                           | 227                      | 1                       | 1                        | 1                       |
| Georgia .....            | 97                            | 96                       | —                       | —                        | 1                       |
| Hawaii .....             | 17                            | 15                       | —                       | —                        | 2                       |
| Idaho .....              | 28                            | 26                       | 1                       | —                        | 1                       |
| Illinois .....           | 242                           | 231                      | 3                       | 8                        | —                       |
| Indiana .....            | 108                           | 102                      | 3                       | 2                        | 1                       |
| Iowa .....               | 72                            | 71                       | —                       | —                        | 1                       |
| Kansas .....             | 32                            | 28                       | —                       | —                        | 4                       |
| Kentucky .....           | 34                            | 34                       | —                       | —                        | —                       |
| Louisiana .....          | 227                           | 220                      | 2                       | 4                        | 1                       |
| Maine .....              | 16                            | 14                       | —                       | 1                        | 1                       |
| Maryland .....           | 50                            | 46                       | 1                       | 2                        | 1                       |
| Massachusetts .....      | 118                           | 113                      | —                       | 2                        | 3                       |
| Michigan .....           | 64                            | 62                       | 1                       | 1                        | —                       |
| Minnesota .....          | 40                            | 35                       | 1                       | —                        | 4                       |
| Mississippi .....        | 39                            | 39                       | —                       | —                        | —                       |
| Missouri .....           | 109                           | 101                      | 1                       | 4                        | 3                       |
| Montana .....            | 19                            | 17                       | —                       | 2                        | —                       |
| Nebraska .....           | 23                            | 22                       | 1                       | —                        | —                       |
| Nevada .....             | 22                            | 22                       | —                       | —                        | —                       |
| New Hampshire .....      | 35                            | 33                       | —                       | 1                        | 1                       |

(Continued on next page)

HELIPORTS/HELIPADS<sup>a</sup> IN THE UNITED STATES

(Continued)

By State

As of 1993

| State                   | Total<br>Helipads<br>in state | Private Use              |                         | Public Use               |                         |
|-------------------------|-------------------------------|--------------------------|-------------------------|--------------------------|-------------------------|
|                         |                               | Heliports &<br>Helistops | Helipads<br>at Airports | Heliports &<br>Helistops | Helipads<br>at Airports |
| New Jersey .....        | 219                           | 214                      | —                       | 3                        | 2                       |
| New Mexico .....        | 20                            | 17                       | 1                       | 2                        | —                       |
| New York .....          | 129                           | 118                      | —                       | 9                        | 2                       |
| North Carolina .....    | 56                            | 54                       | —                       | 2                        | —                       |
| North Dakota .....      | 7                             | 7                        | —                       | —                        | —                       |
| Ohio .....              | 196                           | 175                      | 1                       | 16                       | 4                       |
| Oklahoma .....          | 89                            | 85                       | —                       | 4                        | —                       |
| Oregon .....            | 86                            | 82                       | 2                       | 2                        | —                       |
| Pennsylvania .....      | 279                           | 270                      | 1                       | 8                        | —                       |
| Rhode Island .....      | 12                            | 11                       | —                       | 1                        | —                       |
| South Carolina .....    | 24                            | 22                       | —                       | —                        | 2                       |
| South Dakota .....      | 9                             | 9                        | —                       | —                        | —                       |
| Tennessee .....         | 67                            | 61                       | 2                       | 3                        | 1                       |
| Texas .....             | 413                           | 398                      | 2                       | 9                        | 4                       |
| Utah .....              | 37                            | 34                       | —                       | —                        | 3                       |
| Vermont .....           | 17                            | 17                       | —                       | —                        | —                       |
| Virginia .....          | 108                           | 104                      | —                       | —                        | 4                       |
| Washington .....        | 105                           | 99                       | 2                       | 1                        | 3                       |
| West Virginia .....     | 30                            | 29                       | —                       | —                        | 1                       |
| Wisconsin .....         | 65                            | 65                       | —                       | —                        | —                       |
| Wyoming .....           | 15                            | 14                       | —                       | —                        | 1                       |
| <b>Total U.S.</b> ..... | <b>4,520</b>                  | <b>4,306</b>             | <b>33</b>               | <b>100</b>               | <b>81</b>               |

Source: Helicopter Association International, "1994 Helicopter Annual" (Annually).

NOTE: 96.0 percent of all U.S. helicopter landing areas are private, while 4.0 percent are public.

a Excludes temporary heliports, offshore heliports, and infrequently used helicopter landing sites.

**ACTIVE U.S. CIVIL AIRCRAFT<sup>a</sup>**

As of December 31, 1963–1992  
(in thousands)

| Year | TOTAL | Air Carrier <sup>b</sup> | General Aviation Aircraft |                     |                    |                   |                         |                    |
|------|-------|--------------------------|---------------------------|---------------------|--------------------|-------------------|-------------------------|--------------------|
|      |       |                          | TOTAL                     | Fixed-Wing Aircraft |                    |                   | Rotorcraft <sup>c</sup> | Other <sup>d</sup> |
|      |       |                          |                           | Multi-Engine        | Single-Engine      |                   |                         |                    |
|      |       |                          |                           |                     | 4-place & over     | 3-place & less    |                         |                    |
| 1963 | 87.2  | 2.079                    | 85.1                      | 9.7                 | 42.6               | 31.0              | 1.2                     | 0.6                |
| 1964 | 90.8  | 2.057                    | 88.7                      | 10.6                | 45.8               | 30.4              | 1.3                     | 0.6                |
| 1965 | 97.6  | 2.125                    | 95.4                      | 12.0                | 49.8               | 31.4              | 1.5                     | 0.8                |
| 1966 | 107.0 | 2.272                    | 104.7                     | 13.5                | 53.0               | 35.7              | 1.6                     | 0.9                |
| 1967 | 116.6 | 2.452                    | 114.2                     | 14.7                | 56.9               | 39.7              | 1.9                     | 1.1                |
| 1968 | 126.8 | 2.586                    | 124.2                     | 16.8                | 61.0               | 42.8              | 2.4                     | 1.3                |
| 1969 | 133.5 | 2.690                    | 130.8                     | 18.1                | 63.7               | 45.0              | 2.6                     | 1.4                |
| 1970 | 134.4 | 2.679                    | 131.7                     | 18.3                | 64.8               | 44.9              | 2.3                     | 1.6                |
| 1971 | 133.8 | 2.642                    | 131.1                     | 17.9                | 64.5               | 44.8              | 2.4                     | 1.7                |
| 1972 | 147.6 | 2.583                    | 145.0                     | 19.8                | 71.0               | 49.4              | 2.8                     | 1.9                |
| 1973 | 156.1 | 2.599                    | 153.5                     | 21.9                | 74.8               | 51.4              | 3.1                     | 2.3                |
| 1974 | 164.0 | 2.472                    | 161.5                     | 23.4                | 78.9               | 53.0              | 3.6                     | 2.5                |
| 1975 | 171.0 | 2.495                    | 168.5                     | 24.6                | 82.6               | 54.4              | 4.1                     | 2.8                |
| 1976 | 180.8 | 2.492                    | 178.3                     | 25.7                | 88.2               | 56.7              | 4.5                     | 3.2                |
| 1977 | 186.8 | 2.473                    | 184.3                     | 26.7                | 92.0               | 57.3              | 4.7                     | 3.6                |
| 1978 | 201.3 | 2.545                    | 198.8                     | 28.8                | 101.5              | 59.2              | 5.3                     | 4.0                |
| 1979 | 213.9 | 3.609                    | 210.3                     | 31.3                | 106.0              | 62.4              | 5.9                     | 4.8                |
| 1980 | 214.9 | 3.808                    | 211.0                     | 31.7                | 107.9              | 60.5              | 6.0                     | 4.9                |
| 1981 | 217.2 | 3.973                    | 213.2                     | 33.3                | 108.0              | 59.9              | 7.0                     | 5.0                |
| 1982 | 213.9 | 4.027                    | 209.8                     | 34.2                | 106.5              | 57.7              | 6.2                     | 6.2                |
| 1983 | 217.5 | 4.203                    | 213.3                     | 34.6 <sup>r</sup>   | 107.1 <sup>r</sup> | 59.1 <sup>r</sup> | 6.5                     | 5.9 <sup>r</sup>   |
| 1984 | 225.3 | 4.370                    | 220.9                     | 35.6                | 109.9              | 62.0              | 7.1                     | 6.3                |
| 1985 | 201.2 | 4.678                    | 196.5                     | 31.3                | 98.5               | 54.9              | 6.0                     | 5.8                |
| 1986 | 210.2 | 4.909                    | 205.3                     | 32.0                | 102.0              | 58.3              | 6.5                     | 6.5                |
| 1987 | 208.0 | 5.253                    | 202.7                     | 30.8                | 100.4              | 59.3              | 5.9                     | 6.3                |
| 1988 | 201.9 | 5.660                    | 196.2                     | 30.1                | 98.1               | 55.6              | 6.0                     | 6.4                |
| 1989 | 210.8 | 5.778                    | 205.0                     | 31.9                | 100.5              | 58.4              | 7.0                     | 7.2                |
| 1990 | 204.1 | 6.083                    | 198.0                     | 30.5                | 97.6               | 56.4              | 6.9                     | 6.6                |
| 1991 | 204.6 | 6.054                    | 198.5                     | 30.5                | 97.5               | 55.7              | 6.3                     | 7.6                |
| 1992 | 191.7 | 7.320                    | 184.4                     | 27.3                | 91.0               | 52.5              | 5.8                     | 7.8                |

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (Annually).

- a "Active aircraft" must have a current U.S. registration and have flown during the calendar year. Prior to 1971, only a current U.S. registration was necessary.
- b Effective 1978, includes certificated route air carriers, supplemental air carriers (charters), multi-engine aircraft in commuter passenger service, and all aircraft over 12,500 pounds operated by air taxis, commercial operators, and travel clubs.
- c Includes autogiros; excludes air carrier helicopters.
- d Includes gliders, dirigibles, and balloons.
- r Revised.

**ACTIVE U.S. CIVIL AIRCRAFT  
BY PRIMARY USE AND TYPE OF AIRCRAFT**

As of December 31, 1992

| Primary Use <sup>a</sup>        | TOTAL          | Fixed-Wing   |              |                | Rotor-<br>craft <sup>b</sup> | Other <sup>c</sup> |
|---------------------------------|----------------|--------------|--------------|----------------|------------------------------|--------------------|
|                                 |                | Turbojet     | Turboprop    | Piston         |                              |                    |
| <b>TOTAL—ALL AIRCRAFT ...</b>   | 191,754        | 8,468        | 6,598        | 162,964        | 5,886                        | 7,837              |
| <b>Air Carrier—TOTAL .....</b>  | <u>7,320</u>   | <u>4,446</u> | <u>1,894</u> | <u>847</u>     | <u>133</u>                   | —                  |
| Large .....                     | 6,037          | 4,439        | 1,257        | 255            | 86                           | —                  |
| Small .....                     | 1,283          | 7            | 637          | 592            | 47                           | —                  |
| <b>General Aviation—TOTAL .</b> | <u>184,434</u> | <u>4,022</u> | <u>4,704</u> | <u>162,117</u> | <u>5,753</u>                 | <u>7,837</u>       |
| Executive .....                 | 9,400          | 2,907        | 2,470        | 3,293          | 532                          | 199                |
| Business .....                  | 28,942         | 400          | 607          | 27,512         | 347                          | 76                 |
| Commuter <sup>d</sup> .....     | 813            | 43           | 228          | 524            | 17                           | 2                  |
| Air Taxi <sup>d</sup> .....     | 4,648          | 332          | 525          | 2,904          | 863                          | 24                 |
| Instructional .....             | 15,990         | 19           | 105          | 14,787         | 535                          | 543                |
| Personal .....                  | 108,749        | 83           | 215          | 101,680        | 819                          | 5,952              |
| Aerial Application .....        | 5,067          | 12           | 269          | 3,987          | 786                          | 13                 |
| Aerial Observation .....        | 5,593          | 13           | 54           | 4,078          | 1,220                        | 228                |
| Other Work .....                | 1,689          | —            | 55           | 986            | 259                          | 388                |
| Other .....                     | 3,542          | 213          | 176          | 2,365          | 376                          | 412                |

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (Annually) and General Aviation Manufacturers Association, "General Aviation Statistical Databook" (Annually).

NOTE: Detail may not add to totals because of estimating procedures.

a Definitions of "primary use" categories available in Glossary of "FAA Statistical Handbook."

b Includes helicopters and autogiros.

c Includes gliders, dirigibles, and balloons.

d Limited to single-engine commuters or Air taxis under 12,500 pounds. Otherwise, aircraft included in "Air Carrier."

**U.S. GENERAL AVIATION  
TYPE OF AIRCRAFT AND HOURS FLOWN**  
Calendar Years 1988-1992

|   | 1988               | 1989               | 1990               | 1991               | 1992   |
|---|--------------------|--------------------|--------------------|--------------------|--------|
| <b>Number of Active Aircraft by Type (in thousands)</b> |                    |                    |                    |                    |        |
| <b>All Aircraft—TOTAL</b> .....                         | 196.2              | 205.0              | 198.0              | 198.5              | 184.4  |
| Fixed-Wing: .....                                       | 183.8              | 190.8              | 184.5              | 184.6              | 170.8  |
| Piston: .....   | 175.0              | 180.8              | 175.2              | 175.3              | 162.1  |
| Single-Engine .....                                     | 153.7              | 158.9              | 154.0              | 154.1              | 143.6  |
| Twin-Engine .....                                       | 21.2               | 21.8               | 21.1               | 21.1               | 18.5   |
| Other .....   | 0.1                | 0.1                | 0.1                | 0.1                | 0.1    |
| Turboprop: .....  | 4.9                | 5.9                | 5.3                | 4.9                | 4.7    |
| Twin-Engine .....                                       | 4.7                | 5.7                | 4.9                | 4.4                | 4.1    |
| Other .....   | 0.2                | 0.2                | 0.4                | 0.5                | 0.6    |
| Turbojet: .....   | 3.9                | 4.1                | 4.1                | 4.4                | 4.0    |
| Twin-Engine .....                                       | 3.6                | 3.7                | 3.7                | 4.1                | 3.8    |
| Other .....   | 0.3                | 0.4                | 0.4                | 0.3                | 0.2    |
| Rotorcraft: .....                                       | 6.0                | 7.0                | 6.9                | 6.3                | 5.8    |
| Piston .....  | 2.4                | 3.0                | 3.2                | 2.5                | 2.2    |
| Turbine .....   | 3.6                | 4.0                | 3.7                | 3.8                | 3.5    |
| Balloons, Dirigibles, and Gliders ..                    | 6.4                | 7.2                | 6.6                | 6.7                | 7.8    |
| <b>Hours Flown by Type of Aircraft (in thousands)</b>   |                    |                    |                    |                    |        |
| <b>All Aircraft—TOTAL</b> .....                         | 31,114             | 32,332             | 32,096             | 30,067             | 26,493 |
| Fixed-Wing: Piston .....                                | 24,291             | 24,907             | 25,832             | 24,102             | 21,251 |
| Turboprop .....   | 2,195              | 2,892              | 2,319              | 1,513              | 1,478  |
| Turbojet .....  | 1,554              | 1,527              | 1,396              | 1,236              | 1,072  |
| Rotorcraft: Piston .....                                | 533                | 692                | 716                | 585                | 416    |
| Turbine .....   | 1,974              | 1,918              | 1,493              | 2,172              | 1,866  |
| Balloons, Dirigibles, and Gliders ..                    | 568                | 396                | 341                | 459                | 410    |
| <b>Average Hours Flown Annually by Type</b>             |                    |                    |                    |                    |        |
| <b>All Aircraft—TOTAL</b> .....                         | 158.6              | 157.7              | 162.1              | 149.1 <sup>r</sup> | 140.4  |
| Fixed-Wing: Piston .....                                | 138.8              | 17.8               | 147.4              | 137.5              | 130.4  |
| Turboprop .....   | 448.0              | 490.2              | 437.5              | 307.7 <sup>r</sup> | 314.1  |
| Turbojet .....  | 398.5              | 372.5 <sup>r</sup> | 340.6 <sup>r</sup> | 289.7 <sup>r</sup> | 270.7  |
| Rotorcraft: Piston .....                                | 222.3 <sup>r</sup> | 230.6 <sup>r</sup> | 223.7 <sup>r</sup> | 233.7 <sup>r</sup> | 184.6  |
| Turbine .....   | 548.3              | 479.5              | 403.6 <sup>r</sup> | 592.2 <sup>r</sup> | 491.3  |
| Balloons, Dirigibles, and Gliders ..                    | 88.7 <sup>r</sup>  | 55.0               | 51.6 <sup>r</sup>  | 61.4 <sup>r</sup>  | 50.9   |

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (Annually) and the Federal Aviation Administration, Office of Management Systems.

NOTE: Detail may not add to totals because of rounding and/or estimating procedures.

<sup>r</sup> Revised.

**U.S. GENERAL AVIATION  
ACTIVE AIRCRAFT AND HOURS FLOWN  
BY PRIMARY USE  
Calendar Years 1988–1992**

| Primary Use <sup>a</sup>                                | 1988          | 1989          | 1990          | 1991          | 1992          |
|---|---------------|---------------|---------------|---------------|---------------|
| <b>ACTIVE AIRCRAFT AS OF DECEMBER 31 (in thousands)</b> |               |               |               |               |               |
| <b>TOTAL</b> .....                                      | <u>196.2</u>  | <u>205.0</u>  | <u>198.0</u>  | <u>198.5</u>  | <u>184.4</u>  |
| Executive .....   | 10.2          | 11.5          | 10.1          | 10.0          | 9.4           |
| Business .....  | 32.6          | 35.0          | 33.1          | 31.6          | 28.9          |
| Commuter <sup>b</sup> .....                             | 0.9           | 1.3           | 1.2           | 0.7           | 0.8           |
| Air Taxi <sup>b</sup> .....                             | 6.0           | 6.6           | 5.8           | 5.5           | 4.7           |
| Instructional .....                                     | 15.6          | 16.6          | 18.6          | 17.9          | 16.0          |
| Personal .....  | 114.4         | 116.4         | 112.6         | 115.1         | 108.7         |
| Aerial Application .....                                | 6.6           | 6.6           | 6.2           | 7.0           | 5.1           |
| Aerial Observation .....                                | 4.4           | 5.4           | 4.9           | 5.1           | 5.6           |
| Other Work .....  | 1.7           | 2.0           | 1.4           | 1.7           | 1.7           |
| Other .....   | 3.8           | 3.6           | 4.1           | 3.9           | 3.5           |
| <b>HOURS FLOWN (in thousands)</b>                       |               |               |               |               |               |
| <b>TOTAL</b> .....                                      | <u>31,114</u> | <u>32,332</u> | <u>32,096</u> | <u>30,067</u> | <u>26,493</u> |
| Executive .....   | 3,472         | 3,453         | 2,913         | 2,617         | 2,262         |
| Business .....  | 4,594         | 4,330         | 4,417         | 4,154         | 3,537         |
| Commuter <sup>b</sup> .....                             | 1,036         | 1,392         | 1,333         | 570           | 693           |
| Air Taxi <sup>b</sup> .....                             | 2,632         | 3,020         | 2,249         | 2,241         | 2,009         |
| Instructional .....                                     | 4,917         | 5,993         | 7,244         | 6,141         | 5,340         |
| Personal .....  | 10,015        | 9,537         | 9,276         | 9,685         | 8,592         |
| Aerial Application .....                                | 1,842         | 1,868         | 1,872         | 1,911         | 1,296         |
| Aerial Observation .....                                | 1,308         | 1,719         | 1,745         | 1,797         | 1,730         |
| Other Work .....  | 525           | 517           | 572           | 471           | 343           |
| Other .....   | 774           | 507           | 475           | 473           | 358           |

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (Annually).

NOTE: Detail may not add to totals because of rounding and estimating procedures.

a Definitions of "primary use" categories available in Glossary of "FAA Statistical Handbook."

b Limited to single-engine commuters or air taxis under 12,500 pounds.



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## RESEARCH AND DEVELOPMENT

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**F**ederal government outlays for research and development (R&D) in Fiscal Year (FY) 1994 amounted to \$68.1 billion, down from \$68.4 billion in the previous year, according to estimates by the Office of Management and Budget (OMB). For FY 1995, OMB estimated a new record high of \$69.7 billion; in inflation-adjusted constant dollar terms, however, the figure represents a slight decline from FY 1994.

The Department of Defense (DoD) will account for the bulk of federal R&D outlays in FY 1995 with \$36.8 billion, or more than 52 percent of the total. NASA outlays are estimated at \$8.3 billion, up from \$8.2 billion; planned Department of Energy outlays are \$6 billion, up from \$5.9 billion. All other government agencies combined will have outlays of \$18.6 billion, up from \$17.7 billion.

In calendar year 1992, the latest year for which the National Science Foundation's survey figures are available, company funding accounted for 80 percent of all U.S. expenditures for industrial research and development. The total of all R&D performed by all

U.S. industries came to \$121.3 billion; \$96.7 billion of it was financed by company funding. The total represented a moderate increase over 1991's \$117 billion of all industrial R&D. Company funding accounted for all of the gain; federal funding for industrial R&D dropped in 1992 to \$24.7 billion, down from \$26.4 billion in 1991. The aerospace industry performed industrial R&D worth \$16.1 billion in 1992; the figure represents 13.3 percent of the dollar value of work performed by all U.S. industries. Federal funding accounted for \$9.9 billion, or more than 60 percent, of the aerospace total; company funding, however, reached an all-time high of \$6.2 billion.

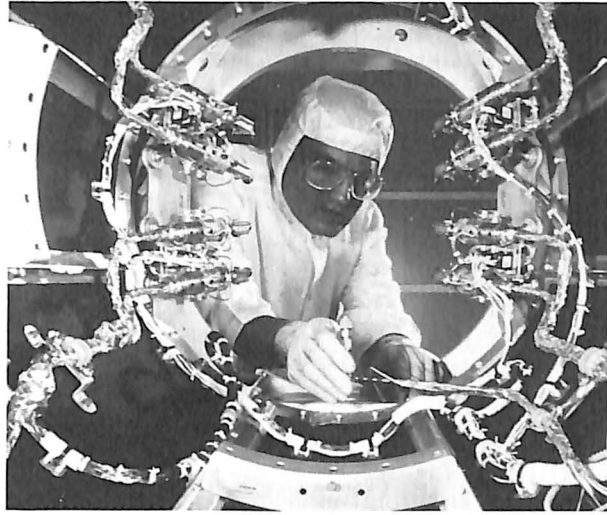
With respect to R&D funding as a percentage of net sales, the aerospace industry recorded significantly



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higher percentages than the all-industry average. Aerospace federal and company R&D investment amounted to 11.8 percent of net sales in 1992; the percentage compares with 12.1 percent in 1991. Company funding as a percentage of net sales came to 4.6 percent, which compares with 4 percent in 1991. In 1993, the aerospace industry employed 95,000 scientists and engineers engaged in R&D; this was 12.1 percent of the all-industry total (787,100).

Contract awards for DoD research, development, test, and evaluation (RDT&E) in FY 1995 in the aircraft category totalled \$5.1 billion. The most heavily-funded program is the Air Force F-22 advanced technology fighter at \$2.5 billion. Other major Air Force aircraft RDT&E programs are: the B-2 bomber (\$408 million); the C-17 Globemaster III transport (\$221 million); and the E-8A JSTARS (\$190 million). The largest Navy programs are the F/A-18 fighter (\$1.4 billion) and the V-22 Osprey tilt-rotor transport (\$497 million). The Army's principal RDT&E program is the RAH-66 Comanche helicopter (\$525 million). The Joint Advanced Strike Technology fighter for Navy, Marine Corps, and Air Force use is funded for \$201 million.



In a geographical breakdown of DoD prime contract awards in FY 1993, the Pacific region, perennial leader, continued to receive the greatest share. Pacific firms and other institutions accounted for awards totaling \$5.2 billion, 24.1 percent of the total. In second place was the South Atlantic region (\$4.8 billion of awards, 22.4 percent of the total). Awards to other areas, in order, were: the Middle Atlantic region (\$2.4 billion, 11.3 percent); Mountain (\$2.3 billion, 10.9 percent); New England (\$2.2 billion, 10.1 percent); West South Central (\$1.7 billion, 7.7 percent); West North Central (\$1.1 billion, 5.0 percent); East North Central (\$1.1 billion, 5.0 percent); East South Central (\$789 million, 3.7 percent).

## TOTAL U.S. FUNDS FOR RESEARCH AND DEVELOPMENT BY SOURCE AND PERFORMER<sup>a</sup>

Calendar Years 1991–1994  
(Millions of Dollars)

| Source of Funds                | TOTAL,<br>All Performers | Performer          |                  |                         |   |                         |
|--------------------------------|--------------------------|--------------------|------------------|-------------------------|---|-------------------------|
|                                |                          | Federal Government | Industry         | Colleges & Universities | Federally-Funded Research & Development Centers | Non-Profit Institutions |
| <b>1991<sup>r</sup></b>        |                          |                    |                  |                         |   |                         |
| <b>All Sources—TOTAL</b> . . . | <u>\$160,157</u>         | <u>\$15,238</u>    | <u>\$116,952</u> | <u>\$17,638</u>         | <u>\$5,079</u>                                  | <u>\$5,250</u>          |
| Federal Government . . .       | 60,215                   | 15,238             | 26,372           | 10,226                  | 5,079   | 3,300                   |
| Industry . . . . .             | 92,490                   | —                  | 90,580           | 1,210                   | —   | 700                     |
| Colleges & Universities . .    | 4,889                    | —                  | —                | 4,889                   | —   | —                       |
| Nonprofit Institutions . . .   | 2,563                    | —                  | —                | 1,313                   | —   | 1,250                   |
| <b>1992</b>                    |                          |                    |                  |                         |   |                         |
| <b>All Sources—TOTAL</b> . . . | <u>\$166,783</u>         | <u>\$16,690</u>    | <u>\$121,314</u> | <u>\$18,880</u>         | <u>\$5,249</u>                                  | <u>\$5,650</u>          |
| Federal Government . . .       | 60,236                   | 16,690             | 24,660           | 11,087                  | 5,249   | 3,550                   |
| Industry . . . . .             | 98,706                   | —                  | 96,654           | 1,302                   | —   | 750                     |
| Colleges & Universities . .    | 5,082                    | —                  | —                | 5,082                   | —   | —                       |
| Nonprofit Institutions . . .   | 2,759                    | —                  | —                | 1,409                   | —   | 1,350                   |
| <b>1993<sup>p</sup></b>        |                          |                    |                  |                         |   |                         |
| <b>All Sources—TOTAL</b> . . . | <u>\$174,350</u>         | <u>\$17,200</u>    | <u>\$125,900</u> | <u>\$19,700</u>         | <u>\$5,150</u>                                  | <u>\$6,400</u>          |
| Federal Government . . .       | 64,450                   | 17,200             | 26,400           | 11,500                  | 5,150   | 4,200                   |
| Industry . . . . .             | 101,700                  | —                  | 99,500           | 1,400                   | —   | 800                     |
| Colleges & Universities . .    | 5,350                    | —                  | —                | 5,350                   | —   | —                       |
| Nonprofit Institutions . . .   | 2,850                    | —                  | —                | 1,450                   | —   | 1,400                   |
| <b>1994<sup>E</sup></b>        |                          |                    |                  |                         |   |                         |
| <b>All Sources—TOTAL</b> . . . | <u>\$176,500</u>         | <u>\$17,500</u>    | <u>\$126,800</u> | <u>\$20,800</u>         | <u>\$4,950</u>                                  | <u>\$6,450</u>          |
| Federal Government . . .       | 63,950                   | 17,500             | 25,500           | 11,900                  | 4,950   | 4,100                   |
| Industry . . . . .             | 103,700                  | —                  | 101,300          | 1,550                   | —   | 850                     |
| Colleges & Universities . .    | 5,800                    | —                  | —                | 5,800                   | —   | —                       |
| Nonprofit Institutions . . .   | 3,050                    | —                  | —                | 1,550                   | —   | 1,550                   |

Source: National Science Foundation, "Annual Survey of Industrial Research and Development" (Annually).

a Source/performer detail not available by industry.

E Estimate.

p Preliminary.

r Revised.

**FEDERAL OUTLAYS FOR CONDUCT OF  
RESEARCH AND DEVELOPMENT**

Fiscal Years 1981–1995  
(Millions of Dollars)

| Year                                | TOTAL    | DoD      | NASA    | Energy <sup>a</sup> | Other <sup>b</sup> |
|-------------------------------------|----------|----------|---------|---------------------|--------------------|
| <b>CURRENT DOLLARS</b>              |          |          |         |                     |                    |
| 1981                                | \$34,168 | \$15,739 | \$5,279 | \$4,381             | \$ 8,769           |
| 1982                                | 34,660   | 18,363   | 3,220   | 5,178               | 7,899              |
| 1983                                | 35,900   | 20,566   | 2,538   | 4,924               | 7,872              |
| 1984                                | 40,986   | 23,850   | 3,539   | 5,182               | 8,415              |
| 1985                                | 47,216   | 28,165   | 2,970   | 6,954               | 9,127              |
| 1986                                | 52,141   | 33,396   | 3,432   | 5,392               | 9,921              |
| 1987                                | 53,256   | 34,732   | 3,250   | 5,262               | 10,012             |
| 1988                                | 56,100   | 35,605   | 3,832   | 5,332               | 11,331             |
| 1989                                | 60,760   | 37,819   | 4,975   | 5,681               | 12,285             |
| 1990                                | 63,810   | 38,247   | 6,325   | 5,957               | 13,281             |
| 1991                                | 65,965   | 35,330   | 7,072   | 9,674               | 13,889             |
| 1992                                | 64,728   | 35,504   | 7,617   | 6,043               | 15,565             |
| 1993                                | 68,378   | 37,666   | 8,088   | 6,036               | 16,588             |
| 1994 <sup>E</sup>                   | 68,063   | 36,219   | 8,205   | 5,891               | 17,748             |
| 1995 <sup>E</sup>                   | 69,690   | 36,773   | 8,298   | 6,016               | 18,603             |
| <b>CONSTANT DOLLARS<sup>c</sup></b> |          |          |         |                     |                    |
| 1981                                | \$43,940 | \$20,240 | \$6,789 | \$5,634             | \$11,277           |
| 1982                                | 41,484   | 21,978   | 3,854   | 6,197               | 9,454              |
| 1983                                | 41,255   | 23,634   | 2,917   | 5,658 <sup>r</sup>  | 9,046              |
| 1984                                | 45,114   | 26,252   | 3,895   | 5,704 <sup>r</sup>  | 9,263              |
| 1985                                | 50,059   | 29,861   | 3,149   | 7,373 <sup>r</sup>  | 9,677              |
| 1986                                | 53,687   | 34,386   | 3,534   | 5,552 <sup>r</sup>  | 10,215             |
| 1987                                | 53,256   | 34,732   | 3,250   | 5,262 <sup>r</sup>  | 10,012             |
| 1988                                | 54,135   | 34,358   | 3,698   | 5,145               | 10,934             |
| 1989                                | 56,140   | 34,943   | 4,597   | 5,249               | 11,351             |
| 1990 <sup>r</sup>                   | 56,973   | 34,149   | 5,647   | 5,319               | 11,858             |
| 1991                                | 56,477   | 30,248   | 6,055   | 8,283               | 11,891             |
| 1992 <sup>r</sup>                   | 53,805   | 29,513   | 6,332   | 5,023               | 12,938             |
| 1993                                | 55,367   | 30,499   | 6,549   | 4,887               | 13,432             |
| 1994 <sup>E</sup>                   | 53,762   | 28,609   | 6,481   | 4,653               | 14,019             |
| 1995 <sup>E</sup>                   | 53,566   | 28,265   | 6,378   | 4,624               | 14,299             |

Source: Office of Management and Budget, "The Budget of the United States Government" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Includes defense and nondefense-related atomic energy R&D with nondefense energy R&D.

b Includes but not limited to NSF, NIH, DoT, & Agriculture.

c Based on Fiscal Year GDP implicit price deflator, (1987=100).

E Estimate. Latest year reflects Administration's budget proposal.

r Revised.

## FUNDS FOR INDUSTRIAL RESEARCH AND DEVELOPMENT ALL INDUSTRIES AND THE AEROSPACE INDUSTRY

By Funding Source  
Calendar Years 1978-1992  
(Millions of Dollars)

| Year                                | All Industries <sup>a</sup> |               |                            | Aerospace Industry <sup>b</sup> |               |                            |
|-------------------------------------|-----------------------------|---------------|----------------------------|---------------------------------|---------------|----------------------------|
|                                     | Total                       | Federal Funds | Company Funds <sup>c</sup> | Total                           | Federal Funds | Company Funds <sup>c</sup> |
| <b>CURRENT DOLLARS</b>              |                             |               |                            |                                 |               |                            |
| 1978                                | \$ 33,304                   | \$11,189      | \$22,115                   | \$ 7,536                        | \$ 5,713      | \$1,823                    |
| 1979                                | 38,226                      | 12,518        | 25,708                     | 8,041                           | 5,840         | 2,201                      |
| 1980                                | 44,505                      | 14,029        | 30,476                     | 9,198                           | 6,628         | 2,570                      |
| 1981                                | 51,810                      | 16,382        | 35,428                     | 11,968                          | 8,528         | 3,440                      |
| 1982                                | 58,650                      | 18,545        | 40,105                     | 14,451                          | 10,265        | 4,186                      |
| 1983                                | 65,268                      | 20,680        | 44,588                     | 15,406                          | 11,396        | 4,010                      |
| 1984                                | 74,800                      | 23,396        | 51,404                     | 18,858                          | 14,094        | 4,764                      |
| 1985                                | 84,239                      | 27,196        | 57,043                     | 22,231                          | 16,582        | 5,649                      |
| 1986                                | 87,823                      | 27,891        | 59,932                     | 21,050                          | 14,984        | 6,066                      |
| 1987                                | 92,155                      | 30,752        | 61,403                     | 24,458                          | 18,519        | 5,939                      |
| 1988                                | 97,889                      | 32,117        | 65,772                     | 25,900                          | 19,877        | 6,023                      |
| 1989                                | 101,854                     | 31,292        | 70,562                     | 25,638                          | 19,633        | 6,005                      |
| 1990                                | 104,606                     | 30,626        | 73,980                     | 25,356                          | 19,216        | 6,140                      |
| 1991 <sup>r</sup>                   | 116,952                     | 26,372        | 90,580                     | 16,629                          | 11,096        | 5,533                      |
| 1992                                | 121,314                     | 24,660        | 96,654                     | 16,119                          | 9,872         | 6,248                      |
| <b>CONSTANT DOLLARS<sup>d</sup></b> |                             |               |                            |                                 |               |                            |
| 1978                                | \$ 55,240                   | \$18,556      | \$36,675                   | \$12,500                        | \$ 9,476      | \$3,023                    |
| 1979                                | 58,316                      | 19,097        | 39,219                     | 12,267                          | 8,909         | 3,358                      |
| 1980                                | 62,062                      | 19,564        | 42,499                     | 12,827                          | 9,243         | 3,584                      |
| 1981                                | 65,699                      | 20,774        | 44,925                     | 15,176                          | 10,814        | 4,362                      |
| 1982                                | 70,021                      | 22,141        | 47,881                     | 17,253                          | 12,255        | 4,998                      |
| 1983                                | 74,883                      | 23,726        | 51,156                     | 17,676                          | 13,075        | 4,601                      |
| 1984                                | 82,153                      | 25,696        | 56,457                     | 20,712                          | 15,479        | 5,232                      |
| 1985                                | 89,265                      | 28,818        | 60,446                     | 23,557                          | 17,571        | 5,986                      |
| 1986                                | 90,614                      | 28,777        | 61,837                     | 21,719                          | 15,460        | 6,259                      |
| 1987                                | 92,155                      | 30,752        | 61,403                     | 24,458                          | 18,519        | 5,939                      |
| 1988                                | 94,260                      | 30,926        | 63,334                     | 24,940                          | 19,140        | 5,800                      |
| 1989 <sup>r</sup>                   | 93,875                      | 28,841        | 65,034                     | 23,629                          | 18,095        | 5,535                      |
| 1990 <sup>r</sup>                   | 92,327                      | 27,031        | 65,296                     | 22,380                          | 16,960        | 5,419                      |
| 1991 <sup>r</sup>                   | 99,364                      | 22,406        | 76,958                     | 14,128                          | 9,427         | 4,701                      |
| 1992                                | 100,177                     | 20,363        | 79,813                     | 13,310                          | 8,152         | 5,159                      |

Source: National Science Foundation, "Annual Survey of Industrial Research and Development" (Annually).

NOTE: Detail may not add to totals because of rounding.

- a Includes all manufacturing industries, plus those non-manufacturing industries known to conduct or finance research and development.
- b Companies classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, and parts.
- c Company funds include all funds for industrial R&D work performed within company facilities except funds provided by the Federal Government. Excluded are company-financed research and development contracted to outside organizations such as research institutions, universities and colleges, or other non-profit organizations.
- d Based on GDP implicit price deflator, (1987=100).
- r Revised.

**RESEARCH AND DEVELOPMENT FUNDS AS PERCENT OF NET SALES  
ALL MANUFACTURING INDUSTRIES AND THE AEROSPACE INDUSTRY**  
Calendar Years 1978–1992

| Year              | All Manufacturing Industries <sup>a</sup> |               | Aerospace Industry <sup>b</sup> |               |
|-------------------|---|---------------|---------------------------------|---------------|
|                   | Total Funds                               | Company Funds | Total Funds                     | Company Funds |
| 1978              | 2.9%                                      | 2.0%          | 13.3%                           | 3.2%          |
| 1979              | 2.6                                       | 1.9           | 12.9                            | 3.5           |
| 1980              | 3.0                                       | 2.1           | 13.7                            | 3.8           |
| 1981              | 3.1                                       | 2.2           | 16.0                            | 4.6           |
| 1982              | 3.8                                       | 2.6           | 17.1                            | 5.1           |
| 1983              | 3.9                                       | 2.6           | 15.2                            | 4.1           |
| 1984              | 3.9                                       | 2.6           | 15.4                            | 4.0           |
| 1985              | 4.4                                       | 3.0           | 14.9                            | 3.9           |
| 1986              | 4.7                                       | 3.2           | 13.4                            | 4.0           |
| 1987              | 4.6                                       | 3.1           | 14.7                            | 3.6           |
| 1988              | 4.7                                       | 3.1           | 15.6                            | 3.6           |
| 1989              | 4.6                                       | 3.2           | 15.3                            | 3.6           |
| 1990              | 4.7                                       | 3.3           | 14.3                            | 3.5           |
| 1991 <sup>r</sup> | 4.2                                       | 3.2           | 12.1                            | 4.0           |
| 1992              | 4.2                                       | 3.3           | 11.8                            | 4.6           |

Source: National Science Foundation, "Annual Survey of Industrial Research and Development" (Annually).

a Includes all manufacturing industries known to conduct or finance research and development.

b Companies classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, and parts.

r Revised.

**FUNDS FOR INDUSTRIAL RESEARCH AND DEVELOPMENT  
IN THE AEROSPACE INDUSTRY**

**By Type of Research and Funding Source  
Calendar Years 1964-1992  
(Millions of Dollars)**

| Year              | TOTAL<br>AERO-<br>SPACE | Basic Research |                  |                       | Applied Research |                  |                       | Development |                    |                       |
|-------------------|-------------------------|----------------|------------------|-----------------------|------------------|------------------|-----------------------|-------------|--------------------|-----------------------|
|                   |                         | Total          | Federal<br>Funds | Com-<br>pany<br>Funds | Total            | Federal<br>Funds | Com-<br>pany<br>Funds | Total       | Federal<br>Funds   | Com-<br>pany<br>Funds |
| 1964              | \$ 5,078                | \$ 67          | \$ 34            | \$ 28                 | \$ 766           | \$ 607           | \$ 159                | \$ 4,244    | \$ 3,948           | \$ 296                |
| 1965              | 5,148                   | 71             | 41               | 30                    | 735              | 563              | 172                   | 4,342       | 3,921              | 421                   |
| 1966              | 5,526                   | 69             | 36               | 33                    | 773              | 563              | 210                   | 4,685       | 4,162              | 523                   |
| 1967              | 5,669                   | 71             | 33               | 38                    | 726              | 490              | 236                   | 4,871       | 4,071              | 800                   |
| 1968              | 5,765                   | 68             | 26               | 42                    | 677              | 426              | 251                   | 5,021       | 4,145              | 876                   |
| 1969              | 5,882                   | 65             | 24               | 41                    | 597              | 347              | 250                   | 5,220       | 4,216              | 1,004                 |
| 1970              | 5,219                   | 63             | 20               | 43                    | 565              | 352              | 213                   | 4,591       | 3,718              | 873                   |
| 1971              | 4,881                   | 54             | 37               | 17                    | 461              | 279              | 182                   | 4,365       | 3,583              | 782                   |
| 1972              | 4,950                   | 60             | 44               | 16                    | 451              | 267              | 184                   | 4,438       | 3,722              | 716                   |
| 1973              | 5,052                   | 50             | 21               | 29                    | 512              | 308              | 204                   | 4,491       | 3,633              | 858                   |
| 1974              | 5,278                   | 51             | 19               | 32                    | 609              | 360              | 249                   | 4,617       | 3,735              | 882                   |
| 1975              | 5,713                   | 54             | 17               | 37                    | 614              | 381              | 233                   | 5,044       | 4,119              | 925                   |
| 1976              | 6,339                   | 54             | 21               | 33                    | 666              | 365              | 301                   | 5,619       | 4,521              | 1,098                 |
| 1977              | 7,033                   | 56             | 25               | 31                    | 753              | 419              | 334                   | 6,223       | 5,017              | 1,206                 |
| 1979 <sup>a</sup> | 8,041                   | 86             | 44               | 42                    | 880              | 499              | 381                   | 7,076       | 5,314              | 1,762                 |
| 1981 <sup>a</sup> | 11,968                  | 131            | 60               | 71                    | 1,484            | 897              | 587                   | 10,353      | 7,738              | 2,615                 |
| 1983              | 13,853                  | 146            | NA               | NA                    | 3,466            | NA               | NA                    | 10,241      | 7,668              | 2,573                 |
| 1984              | 16,033                  | 247            | NA               | NA                    | 3,067            | NA               | NA                    | 12,718      | 9,870              | 2,848                 |
| 1985              | 17,619                  | 304            | 162              | 142                   | 3,785            | 2,776            | 1,009                 | 13,530      | 10,483             | 3,047                 |
| 1986              | 21,050                  | 311            | 208              | 103                   | 3,198            | 1,571            | 1,627                 | 17,541      | 13,205             | 4,336                 |
| 1987              | 24,488                  | 425            | 335              | 90                    | 2,949            | 1,709            | 1,239                 | 21,115      | 16,475             | 4,640                 |
| 1988              | 25,900                  | 366            | 263              | 104                   | 2,997            | 1,915            | 1,082                 | 22,537      | 17,700             | 4,838                 |
| 1989              | 25,638                  | 668            | 553              | 116                   | 3,081            | 2,113            | 968                   | 21,889      | 16,967             | 4,921                 |
| 1990              | 25,356                  | 658            | 519              | 139                   | 3,340            | 1,931            | 1,409                 | 21,358      | 16,766             | 4,592                 |
| 1991 <sup>r</sup> | 16,983                  | 568            | 479              | 89                    | 2,214            | 1,054            | 1,160                 | 14,107      | 9,883 <sup>b</sup> | 4,224                 |
| 1992              | 16,119                  | 448            | 390              | 58                    | 1,818            | 962              | 856                   | 13,854      | 8,520              | 5,334                 |

Source: National Science Foundation, "Annual Survey of Industrial Research and Development" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Break-outs by Research Type and Funding Source available only for odd-numbered years between 1977 and 1983.

b Computed by AIA as difference between total and company funds. Figure withheld by NSF because of imputation of more than 50 percent.

NA Not available.

r Revised.

**EMPLOYMENT AND COST OF R&D SCIENTISTS AND ENGINEERS  
ALL INDUSTRIES AND AEROSPACE INDUSTRY**

Calendar Years 1979–1993

| Year              | Employment <sup>a</sup>                    |                                       |  | Cost Per<br>R&D Scientist and Engineer <sup>d</sup> |                        |
|-------------------|--|---------------------------------------|--|---|------------------------|
|                   | All Industries <sup>b</sup><br>(Thousands) | Aerospace <sup>c</sup><br>(Thousands) | Aerospace as<br>a Percent of<br>All Industries | All Industries <sup>b</sup>                         | Aerospace <sup>c</sup> |
| 1979              | 423.9                                      | 86.5                                  | 20.4 %   | \$ 87,400   | \$ 93,300              |
| 1980              | 450.6                                      | 85.9                                  | 19.1   | 94,900  | 101,600                |
| 1981              | 487.8                                      | 95.2                                  | 19.5   | 103,900   | 128,400 <sup>r</sup>   |
| 1982              | 509.8                                      | 91.1                                  | 17.9   | 111,600   | 148,800                |
| 1983              | 540.9                                      | 103.1                                 | 19.1   | 116,000   | 143,600                |
| 1984              | 584.1                                      | 111.5                                 | 19.1   | 124,000   | 156,000                |
| 1985              | 622.5                                      | 130.2                                 | 20.9   | 130,200   | 161,700                |
| 1986              | 671.0                                      | 144.8                                 | 21.6   | 128,500   | 149,800                |
| 1987              | 695.8                                      | 136.3                                 | 19.6   | 131,200   | 179,400                |
| 1988              | 708.6                                      | 136.4                                 | 19.2   | 137,000   | 185,900                |
| 1989              | 720.2                                      | 142.3                                 | 19.8   | 140,600 <sup>r</sup>                                | 189,400                |
| 1990              | 730.9                                      | 128.5                                 | 17.6   | 145,800   | 205,900                |
| 1991              | 704.1                                      | 117.9                                 | 16.7   | 148,600 <sup>r</sup>                                | 177,000 <sup>r</sup>   |
| 1992 <sup>r</sup> | 779.3                                      | 92.9                                  | 11.9   | 154,900   | 171,600                |
| 1993              | 787.1                                      | 95.0                                  | 12.1   | NA  | NA                     |

Source: National Science Foundation.

a Employment as of January. Scientists and engineers working less than full time have been included in terms of their full time equivalent number.

b All manufacturing industries and those non-manufacturing industries known to conduct or finance research and development.

c Standard Industrial Classification codes 372 and 376.

d The arithmetic mean of the numbers of R&D scientists and engineers reported for January in two consecutive years, divided into the total R&D expenditures of each industry during the earlier year.

NA Not available.

r Revised.



**FEDERAL AERONAUTICS RESEARCH AND DEVELOPMENT**  
**Fiscal Years 1976–1993**  
(Millions of Dollars)

| Year                    | TOTAL    | NASA <sup>a</sup> | DoD <sup>b</sup> | DoT <sup>c</sup> |
|-------------------------|----------|-------------------|------------------|------------------|
| <b>BUDGET AUTHORITY</b> |          |                   |                  |                  |
| 1976                    | \$ 2,351 | \$ 325            | \$1,941          | \$ 85            |
| Tr.Qtr.                 | 584      | 83                | 480              | 22               |
| 1977                    | 2,727    | 378               | 2,256            | 93               |
| 1978                    | 3,338    | 437               | 2,807            | 94               |
| 1979                    | 2,850    | 519               | 2,240            | 91               |
| 1980                    | 2,991    | 560               | 2,336            | 95               |
| 1981                    | 3,286    | 526               | 2,653            | 106              |
| 1982                    | 3,581    | 516               | 2,984            | 81               |
| 1983                    | 3,871    | 547               | 3,221            | 103              |
| 1984                    | 4,087    | 600               | 3,224            | 263              |
| 1985                    | 4,355    | 648               | 3,422            | 265              |
| 1986                    | 6,660    | 601               | 4,927            | 1,132            |
| 1987                    | 5,824    | 698               | 4,179            | 946              |
| 1988                    | 6,974    | 723               | 4,989            | 1,262            |
| 1989                    | 10,656   | 872               | 8,240            | 1,544            |
| 1990                    | 10,690   | 932               | 7,867            | 1,891            |
| 1991                    | 9,417    | 968               | 6,149            | 2,300            |
| 1992                    | 11,164   | 1,117             | 7,366            | 2,681            |
| 1993 <sup>E</sup>       | 11,379   | 1,246             | 7,601            | 2,532            |
| <b>OUTLAYS</b>          |          |                   |                  |                  |
| 1982 <sup>d</sup>       | \$ 3,309 | \$ 563            | \$2,657          | \$ 89            |
| 1983                    | 3,554    | 563               | 2,920            | 71               |
| 1984                    | 3,727    | 586               | 2,995            | 146              |
| 1985                    | 4,010    | 643               | 3,101            | 266              |
| 1986                    | 6,071    | 648               | 4,373            | 1,050            |
| 1987                    | 5,866    | 622               | 4,182            | 1,062            |
| 1988                    | 6,340    | 679               | 4,448            | 1,213            |
| 1989                    | 8,491    | 855               | 6,420            | 1,216            |
| 1990                    | 10,009   | 889               | 7,649            | 1,471            |
| 1991                    | 9,501    | 1,017             | 6,793            | 1,691            |
| 1992                    | 10,011   | 1,122             | 6,790            | 2,099            |
| 1993 <sup>E</sup>       | 10,755   | 1,212             | 7,165            | 2,378            |

Source: NASA, "Aeronautics and Space Report of the President" (Annually).

a Research and Development, Construction of Facilities, Research and Program Management.

b Research, Development, Test, and Evaluation of aircraft and related equipment.

c Federal Aviation Administration: Research, Engineering, and Development; and Facilities, Engineering, and Development.

d First year outlays data available.

e Estimate.

Tr.Qtr. See Glossary.

**FEDERAL AERONAUTICS RESEARCH AND DEVELOPMENT  
IN CONSTANT DOLLARS**

Fiscal Years 1976–1993  
(Millions of Constant Dollars<sup>a</sup>)

| Year                    | TOTAL   | NASA <sup>b</sup> | DoD <sup>c</sup> | DoT <sup>d</sup> |
|-------------------------|---------|-------------------|------------------|------------------|
| <b>BUDGET AUTHORITY</b> |         |                   |                  |                  |
| 1976                    | \$4,590 | \$ 635            | \$3,790          | \$ 166           |
| Tr.Qtr.                 | 1,083   | 154               | 891              | 41               |
| 1977                    | 4,924   | 683               | 4,074            | 168              |
| 1978                    | 5,603   | 734               | 4,712            | 158              |
| 1979                    | 4,402   | 802               | 3,460            | 141              |
| 1980                    | 4,238   | 793               | 3,310            | 135              |
| 1981                    | 4,226   | 676               | 3,412            | 136              |
| 1982                    | 4,286   | 618               | 3,572            | 97               |
| 1983                    | 4,448   | 629               | 3,701            | 118              |
| 1984                    | 4,499   | 660               | 3,549            | 289              |
| 1985                    | 4,617   | 687               | 3,628            | 281              |
| 1986                    | 6,857   | 619               | 5,073            | 1,166            |
| 1987                    | 5,824   | 698               | 4,179            | 946              |
| 1988                    | 6,730   | 698               | 4,814            | 1,218            |
| 1989                    | 9,846   | 806               | 7,613            | 1,427            |
| 1990 <sup>r</sup>       | 9,545   | 832               | 7,024            | 1,688            |
| 1991                    | 8,063   | 829               | 5,265            | 1,969            |
| 1992 <sup>r</sup>       | 9,280   | 929               | 6,123            | 2,229            |
| 1993 <sup>E</sup>       | 9,214   | 1,009             | 6,155            | 2,050            |
| <b>OUTLAYS</b>          |         |                   |                  |                  |
| 1982 <sup>f</sup>       | \$3,961 | \$ 674            | \$3,180          | \$ 107           |
| 1983                    | 4,084   | 647               | 3,356            | 82               |
| 1984                    | 4,102   | 645               | 3,297            | 161              |
| 1985                    | 4,251   | 682               | 3,288            | 282              |
| 1986                    | 6,251   | 667               | 4,503            | 1,081            |
| 1987                    | 5,866   | 622               | 4,182            | 1,062            |
| 1988                    | 6,118   | 655               | 4,292            | 1,171            |
| 1989                    | 7,845   | 790               | 5,932            | 1,124            |
| 1990 <sup>r</sup>       | 8,937   | 794               | 6,829            | 1,313            |
| 1991                    | 8,134   | 871               | 5,816            | 1,448            |
| 1992 <sup>r</sup>       | 8,322   | 933               | 5,644            | 1,745            |
| 1993 <sup>E</sup>       | 8,709   | 981               | 5,802            | 1,926            |

Source: AIA, derived from NASA, "Aeronautics and Space Report of the President" (Annually).

a Based on Fiscal Year GDP implicit price deflator, 1987=100.

b Research and Development, Construction of Facilities, Research and Program Management.

c Research, Development, Test, and Evaluation of aircraft and related equipment.

d Federal Aviation Administration: Research, Engineering, and Development; and Facilities, Engineering, and Development.

E Estimate.

f First year outlays data available.

r Revised.

Tr.Qtr. See Glossary.

**DEPARTMENT OF DEFENSE  
APPROPRIATIONS FOR  
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION**

Fiscal Years 1993–1995  
(Millions of Dollars)

|   | 1993     | 1994 <sup>E</sup> | 1995 <sup>E</sup> |
|---|----------|-------------------|-------------------|
| <b>TOTAL—APPROPRIATIONS FOR RDT&amp;E</b> . . . . . | \$37,828 | \$34,935          | \$36,225          |
| <b>BY APPROPRIATION</b>                             |          |                   |                   |
| Army . . . . .                                      | \$ 6,057 | \$ 5,421          | \$ 5,260          |
| Navy . . . . .                                      | 8,867    | 8,301             | 8,935             |
| Air Force . . . . .                                 | 12,867   | 12,259            | 12,349            |
| Defense Agencies . . . . .                          | 9,765    | 8,710             | 9,417             |
| Director of Test & Evaluation, Defense . . . . .    | 259      | 232               | 251               |
| Director of Operational Test & Evaluation . . . . . | 12       | 11                | 13                |
| <b>RECAP OF BUDGET ACTIVITIES</b>                   |          |                   |                   |
| Research . . . . .                                  | \$ 1,314 | \$ 1,205          | \$ 1,225          |
| Exploratory Development . . . . .                   | 3,549    | 2,743             | 2,984             |
| Advanced Development . . . . .                      | 6,282    | 6,155             | 5,117             |
| Demonstration and Validation . . . . .              | 4,212    | 2,698             | 3,771             |
| Engineering & Manufacturing Development . . . . .   | 8,487    | 7,441             | 8,916             |
| RDT&E Management Support . . . . .                  | 3,398    | 3,218             | 3,343             |
| Operational Systems Development . . . . .           | 10,586   | 11,474            | 10,869            |
| <b>RECAP OF FYDP PROGRAMS</b>                       |          |                   |                   |
| Strategic Forces . . . . .                          | \$ 359   | \$ 289            | \$ 320            |
| General Purpose Forces . . . . .                    | 2,689    | 3,723             | 3,975             |
| Intelligence and Communications . . . . .           | 7,035    | 6,820             | 6,141             |
| Airlift/Sealift . . . . .                           | 12       | 22                | 5                 |
| Research and Development (FYDP Program 6) . . . . . | 27,211   | 23,458            | 25,507            |
| Central Supply and Maintenance . . . . .            | 266      | 331               | 51                |
| Training Medical and Other . . . . .                | 100      | 2                 | 2                 |
| Administration and Associated Activities . . . . .  | 16       | 6                 | 6                 |
| Support of Other Nations . . . . .                  | 4        | 2                 | 3                 |
| Special Operations Forces . . . . .                 | 235      | 281               | 216               |

Source: Department of Defense Budget, "RDT&E Programs (R-1)" annually.

NOTE: Detail may not add to totals because of rounding.

E Estimate. Latest year reflects Administration's budget proposal.

**DEPARTMENT OF DEFENSE**  
**OUTLAYS FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION**  
 Fiscal Years 1972–1995  
 (Millions of Dollars)

| Year              | TOTAL, All<br>RDT&E<br>Functions | Air Force | Navy    | Army    | Other  |
|-------------------|----------------------------------|-----------|---------|---------|--------|
| 1972              | \$ 7,881                         | \$ 3,205  | \$2,427 | \$1,779 | \$ 470 |
| 1973              | 8,157                            | 3,362     | 2,404   | 1,912   | 479    |
| 1974              | 8,582                            | 3,240     | 2,623   | 2,190   | 529    |
| 1975              | 8,866                            | 3,308     | 3,021   | 1,964   | 573    |
| 1976              | 8,923                            | 3,338     | 3,215   | 1,842   | 528    |
| Tr. Qtr.          | 2,203                            | 830       | 778     | 437     | 161    |
| 1977              | 9,795                            | 3,618     | 3,481   | 2,069   | 627    |
| 1978              | 10,508                           | 3,626     | 3,825   | 2,342   | 715    |
| 1979              | 11,152                           | 4,080     | 3,826   | 2,409   | 837    |
| 1980              | 13,127                           | 5,017     | 4,382   | 2,707   | 1,021  |
| 1981              | 15,278                           | 6,341     | 4,783   | 2,958   | 1,196  |
| 1982              | 17,729                           | 7,794     | 5,240   | 3,230   | 1,465  |
| 1983              | 20,554                           | 9,182     | 5,854   | 3,658   | 1,861  |
| 1984              | 23,117                           | 10,353    | 6,662   | 3,812   | 2,289  |
| 1985              | 27,103                           | 11,573    | 8,054   | 3,950   | 3,527  |
| 1986              | 32,283                           | 13,417    | 9,667   | 3,984   | 5,215  |
| 1987              | 33,596                           | 13,347    | 9,176   | 4,721   | 6,352  |
| 1988              | 34,792                           | 14,302    | 8,828   | 4,624   | 7,038  |
| 1989              | 37,002                           | 14,912    | 9,291   | 4,966   | 7,833  |
| 1990              | 37,458                           | 14,443    | 9,160   | 5,513   | 8,342  |
| 1991              | 34,589                           | 13,050    | 7,586   | 5,559   | 8,371  |
| 1992              | 34,632                           | 11,998    | 7,826   | 5,978   | 8,830  |
| 1993              | 36,967                           | 12,338    | 8,944   | 6,218   | 9,467  |
| 1994 <sup>E</sup> | 35,693                           | 12,201    | 8,606   | 5,454   | 9,432  |
| 1995 <sup>E</sup> | 36,141                           | 12,472    | 8,826   | 5,252   | 9,591  |

Source: Office of Management and Budget, "The Budget of the United States Government" (Annually).

<sup>E</sup> Estimate. Latest year reflects Administration's budget proposal.

Tr. Qtr. See Glossary.

**DEPARTMENT OF DEFENSE  
PRIME CONTRACT AWARDS  
FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION**

Fiscal Years 1989-1993  
(Millions of Dollars)

| Program Categories  | 1989            | 1990            | 1991            | 1992            | 1993            |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>TOTAL—RDT&amp;E</b> .....                                      | <u>\$23,206</u> | <u>\$22,319</u> | <u>\$20,898</u> | <u>\$21,730</u> | <u>\$22,292</u> |
| Research .....  | 1,429           | 994             | 1,063           | 1,195           | 1,377           |
| Exploratory Development .....                                     | 1,581           | 1,813           | 2,288           | 2,159           | 2,203           |
| Other Development .....   | 18,966          | 18,697          | 16,424          | 16,975          | 17,251          |
| Management & Support .....  | 1,230           | 815             | 1,124           | 1,401           | 1,461           |
| <b>Aircraft—TOTAL</b> .....                                       | <u>\$ 4,689</u> | <u>\$ 4,364</u> | <u>\$ 3,143</u> | <u>\$ 4,022</u> | <u>\$ 5,114</u> |
| Research .....  | 11              | (191)           | 13              | 18              | 13              |
| Exploratory Development .....                                     | 85              | 82              | 83              | 74              | 86              |
| Other Development .....   | 4,563           | 4,431           | 3,002           | 3,873           | 4,942           |
| Management & Support .....  | 30              | 42              | 45              | 58              | 73              |
| <b>Missile and Space Systems—TOTAL</b> ..                         | <u>6,962</u>    | <u>6,865</u>    | <u>6,649</u>    | <u>5,730</u>    | <u>5,871</u>    |
| Research .....  | 260             | 175             | 95              | 98              | 339             |
| Exploratory Development .....                                     | 331             | 308             | 710             | 489             | 456             |
| Other Development .....   | 6,277           | 6,291           | 5,759           | 5,084           | 5,011           |
| Management & Support .....  | 95              | 91              | 86              | 59              | 65              |
| <b>Electronics &amp; Communications<br/>Equipment—TOTAL</b> ..... | <u>3,744</u>    | <u>3,925</u>    | <u>3,814</u>    | <u>4,265</u>    | <u>3,914</u>    |
| Research .....  | 182             | 188             | 127             | 147             | 158             |
| Exploratory Development .....                                     | 289             | 327             | 299             | 369             | 337             |
| Other Development .....   | 3,190           | 3,337           | 3,323           | 3,723           | 3,374           |
| Management & Support .....  | 83              | 73              | 64              | 27              | 46              |
| <b>All Other—TOTAL<sup>a</sup></b> .....                          | <u>7,811</u>    | <u>7,165</u>    | <u>7,292</u>    | <u>7,713</u>    | <u>7,392</u>    |
| Research .....  | 976             | 822             | 827             | 933             | 867             |
| Exploratory Development .....                                     | 876             | 1,097           | 1,196           | 1,228           | 1,324           |
| Other Development .....   | 4,936           | 4,637           | 4,341           | 4,295           | 3,924           |
| Management & Support .....  | 1,022           | 609             | 928             | 1,258           | 1,277           |

Source: Department of Defense, "Prime Contract Awards by Service Category and Federal Supply Classification" (Annually).  
 NOTE: Detail may not add to totals because of rounding.  
 a "All Other" includes ships, tank-automotive, weapons, ammunition, services, and other.  
 ( ) Reflects net cancellations.

**DEPARTMENT OF DEFENSE  
NET VALUE OF PRIME CONTRACT AWARDS OVER \$25,000  
FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION**

**By Region and Type of Contractor  
Fiscal Year 1993**

| REGION                           | TOTAL    | Type of Contractor       |  |                |
|----------------------------------|----------|--------------------------|--|----------------|
|                                  |          | Educational Institutions | Other Non-Profit Institutions <sup>a</sup> | Business Firms |
| <b>TOTAL—Millions of Dollars</b> | \$21,575 | \$568                    | \$1,558                                    | \$19,449       |
| New England                      | \$ 2,184 | \$202                    | \$ 470                                     | \$ 1,513       |
| Middle Atlantic                  | 2,429    | 77                       | 174  | 2,178          |
| East North Central               | 1,071    | 52                       | 67   | 952            |
| West North Central               | 1,073    | 2                        | 7  | 1,063          |
| South Atlantic                   | 4,828    | 76                       | 356  | 4,396          |
| East South Central               | 789      | 18                       | 3  | 768            |
| West South Central               | 1,650    | 21                       | 65   | 1,565          |
| Mountain                         | 2,348    | 57                       | 7  | 2,284          |
| Pacific <sup>b</sup>             | 5,203    | 62                       | 409  | 4,731          |
| <b>PERCENT OF TOTAL</b>          | 100.0%   | 100.0%                   | 100.0%                                     | 100.0%         |
| New England                      | 10.1%    | 35.5%                    | 30.1%                                      | 7.8%           |
| Middle Atlantic                  | 11.3     | 13.6                     | 11.1                                       | 11.2           |
| East North Central               | 5.0      | 9.2                      | 4.3  | 4.9            |
| West North Central               | 5.0      | 0.4                      | 0.5  | 5.5            |
| South Atlantic                   | 22.4     | 13.3                     | 22.9                                       | 22.6           |
| East South Central               | 3.7      | 3.1                      | 0.2  | 3.9            |
| West South Central               | 7.7      | 3.6                      | 4.2  | 8.0            |
| Mountain                         | 10.9     | 10.0                     | 0.4  | 11.7           |
| Pacific <sup>b</sup>             | 24.1     | 11.2                     | 26.2                                       | 24.3           |

Source: Department of Defense, "Prime Contract Awards by Region and State" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Includes contracts with other government agencies.

b Includes Alaska and Hawaii.

**MISSILE PROGRAMS  
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION**

By Agency and Model  
Fiscal Years 1993, 1994, and 1995  
(Millions of Dollars<sup>a</sup>)

| Agency and Model          | 1993    | 1994 <sup>E</sup> | 1995 <sup>E</sup> |
|---------------------------|---------|-------------------|-------------------|
| <b>AIR FORCE</b>          |         |                   |                   |
| AGM-130 .....             | \$ 8.5  | \$ 1.9            | \$ 1.0            |
| AMRAAM <sup>b</sup> ..... | 41.5    | 67.1              | 98.6              |
| JSOW <sup>b</sup> .....   | 68.8    | 106.3             | 160.1             |
| TSSAM <sup>b</sup> .....  | —       | 383.2             | 230.3             |
| <b>NAVY</b>               |         |                   |                   |
| Harpoon .....             | \$ —    | \$ 18.9           | \$ 62.3           |
| RAM .....                 | 9.5     | 9.0               | 18.7              |
| Standard .....            | 50.1    | 62.3              | 11.8              |
| Tomahawk .....            | 27.0    | 41.0              | 81.9              |
| Trident II .....          | 46.5    | 24.9              | 45.6              |
| <b>ARMY</b>               |         |                   |                   |
| AAWS-M .....              | \$ 96.0 | \$ 46.7           | \$ 31.3           |
| ATACMS .....              | —       | 25.4              | 47.9              |
| Avenger .....             | 11.8    | 7.4               | —                 |
| *BAT .....                | 114.5   | 119.7             | 93.5              |
| Laser Hellfire .....      | 4.5     | 5.1               | —                 |
| Longbow Hellfire .....    | —       | 107.1             | 35.5              |
| MLRS .....                | 23.6    | 40.3              | 55.7              |

Source: Department of Defense Budget, "Program Acquisition Costs by Weapon System" (Annually).

NOTE: See Missile Programs Chapter for missile program procurement authorization data.

a Total Obligational Authority.

b Navy and Air Force funding.

E Estimate. Latest year reflects Administration's budget proposal.

\* Programs in R&D only.

**Missile Program Acronyms:**

|        |  |        |   |
|--------|--|--------|---|
| AAWS-M | —Advanced Anti-Tank Weapon System-Medium | AMRAAM | —Advanced Medium Range Air-to-Air Missile |
| ATACMS | —Army TACTical Missile System            | BAT    | —Brilliant Anti-Tank submunition          |
| JSOW   | —Joint Standoff Weapon                   | MLRS   | —Multiple Launch Rocket System            |
| RAM    | —Rolling Airframe Missile                | TSSAM  | —Tri-Service Standoff Attack Missile      |

**MILITARY AIRCRAFT PROGRAMS**  
**RESEARCH, DEVELOPMENT, TEST, AND EVALUATION**

By Agency and Model  
 Fiscal Years 1993, 1994, and 1995  
 (Millions of Dollars<sup>a</sup>)

| Agency and Model           | 1993     | 1994 <sup>E</sup> | 1995 <sup>E</sup> |
|----------------------------|----------|-------------------|-------------------|
| <b>AIR FORCE</b>           |          |                   |                   |
| AC-130U Spectre .....      | \$ 23.8  | \$ 32.8           | \$ 5.2            |
| B-2 Spirit .....           | 1,189.3  | 785.8             | 408.5             |
| C-17 Globemaster III ..... | 168.6    | 232.5             | 221.4             |
| E-8A JSTARS .....          | 313.4    | 283.1             | 190.4             |
| F-15E Eagle .....          | 49.4     | 65.8              | 116.6             |
| F-16 Falcon .....          | 109.4    | 60.9              | 93.2              |
| *F-22 Lightning .....      | 1,925.2  | 2,082.9           | 2,461.1           |
| *JAST <sup>b</sup> .....   | —        | 29.7              | 201.4             |
| JPATS <sup>b</sup> .....   | 2.1      | 3.2               | 39.3              |
| T-1A Jayhawk .....         | 2.3      | 2.2               | 2.2               |
| <b>NAVY</b>                |          |                   |                   |
| AH-1W Sea Cobra .....      | \$ 9.5   | \$ 5.5            | \$ 16.0           |
| AV-8B Harrier .....        | 11.7     | 18.2              | 10.2              |
| E-2C Hawkeye .....         | 6.4      | 18.1              | 58.8              |
| F-14D Tomcat .....         | 120.1    | 70.9              | 171.7             |
| F/A-18 Hornet .....        | 895.4    | 1,454.0           | 1,411.9           |
| T-45 Goshawk .....         | 49.2     | 28.6              | 0.3               |
| V-22 Osprey .....          | 714.6    | 5.2               | 496.9             |
| <b>ARMY</b>                |          |                   |                   |
| LONGBOW .....              | \$ 290.9 | \$ 170.6          | \$ 155.8          |
| OH-58D AHIP .....          | 10.0     | —                 | —                 |
| *RAH-66 Comanche .....     | 394.2    | 366.7             | 525.2             |

Source: Department of Defense Budget, "Program Acquisition Costs by Weapon System" (Annually).

NOTE: See Aircraft Production Chapter for aircraft program procurement authorization data.

a Total Obligational Authority.

b Air Force and Navy funding.

E Estimate. Latest year reflects Administration's budget proposal.

\* Programs in R&D only.



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## FOREIGN TRADE

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In 1993, exports of aerospace products declined sharply, breaking a rising trend of eight consecutive years in which the aerospace industry annually set records for export volume. The export decline contributed to a drop in the aerospace trade balance after six straight record years.



Despite the declines, the industry recorded strong surplus positions in both exports and trade balance. Aerospace exports totaled \$39.4 billion, down more than 12 percent from the previous year's exports of \$45 billion, but still the third highest level in history. The aerospace trade balance was \$27.2 billion, down 13 percent from 1992's \$31.4 billion.

U.S. aerospace imports, which had climbed to an all-time high of \$13.7 billion in 1992, fell off in 1993 to \$12.2 billion.

Aerospace exports amounted to 8.5 percent of all U.S. merchandise

exports in 1993; the figure compares with 10 percent in 1992 and 10.4 percent in 1991. As has been the case since 1964, civil exports accounted for most of the aerospace export volume—more than 80 percent. The 1993 civil export total of \$31.8 billion compares with \$36.9 billion in the previous year. In

terms of dollar value, roughly 57 percent of the civil export volume was in sales of airline transports. Military exports, at \$7.6 billion, were down from \$8.1 billion in the previous year.

A breakdown of civil exports shows sales of complete aircraft at \$19.8 billion (down more than 18 percent below the previous year's \$24.3 billion); aircraft and engine

parts, \$9.2 billion (down from \$10 billion); and aircraft engines, \$2.3 billion (approximately the same as in 1992).

More than 91 percent of the total dollar value of complete aircraft exports was in sales of transport aircraft. However, exports of transport aircraft declined more sharply than those of any other category of aircraft; they declined 19 percent from 1992's \$22.4 billion to \$18.1 billion in 1993. Complete aircraft exports also included exports of \$551 million in general aviation aircraft (down \$30 million); \$1 billion

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in used aircraft (down more than \$200 million); \$120 million in civil helicopters (roughly the same as the previous year); and \$293 million in a category listed as "other, including spacecraft"; this category of exports increased, up \$113 million to \$293 million.

Military exports in 1993 totaled \$7.6 billion and included \$1.5 billion in complete aircraft (down from \$2.1 billion); \$4.4 billion in aircraft and engine parts (up from \$4.2 billion); \$1.2 billion in guided missiles, rockets, and parts (down from \$1.4 billion); and \$190 million in aircraft engines (down from \$229 million).

Civil products accounted for 71 percent of the aerospace import volume in 1993; the \$12.2 billion total included \$8.6 billion in civil imports (down from \$9.7 billion) and \$3.6 billion in military imports (down from \$3.9 billion). Among civil imports in 1993 were complete aircraft valued at \$3.7 billion (down from \$3.9 billion); aircraft and engine parts worth \$3.6

billion (down from \$4.5 billion); and aircraft engines valued at \$1.3 billion (approximately the same as in the previous year).

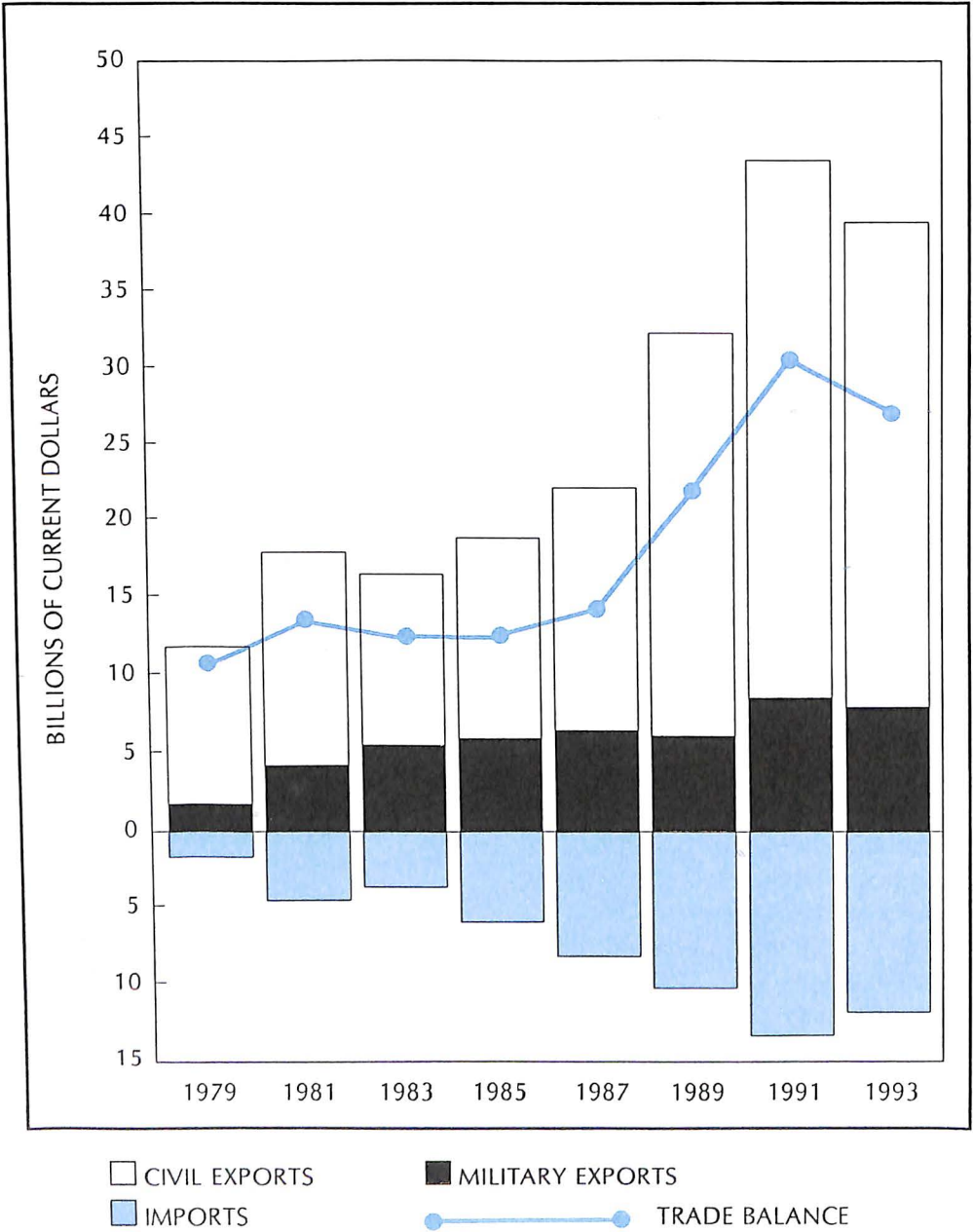
Military imports in 1993 included \$2.2 billion in aircraft and engine parts (down from \$2.5 billion) and \$1.3 billion in aircraft engines (down from \$1.4 billion).

The principal customers for U.S. aerospace exports in 1993 were Japan (\$3.6 billion), the United Kingdom (\$3.5 billion), France (\$3.3 bil-



lion), China (\$2.4 billion), and Taiwan (\$2.1 billion). The major countries of origin for U.S. aerospace imports were France (\$4.2 billion), the United Kingdom (\$2.5 billion), and Canada (\$2.1 billion).

# Aerospace Exports, Imports, and Trade Balance



SOURCE: AEROSPACE INDUSTRIES ASSOCIATION

U.S. TOTAL AND AEROSPACE FOREIGN TRADE<sup>a</sup>

Calendar Years 1964–1993  
(Millions of Dollars)

| Year | Total U.S. Merchandise Trade |                      |                      | Aerospace     |          |         |
|------|------------------------------|----------------------|----------------------|---------------|----------|---------|
|      | Trade Balance                | Exports              | Imports              | Trade Balance | Exports  | Imports |
| 1964 | \$ 7,006                     | \$ 25,690            | \$ 18,684            | \$ 1,518      | \$ 1,608 | \$ 90   |
| 1965 | 5,334                        | 26,699               | 21,366               | 1,459         | 1,618    | 159     |
| 1966 | 3,837                        | 29,379               | 25,542               | 1,370         | 1,673    | 303     |
| 1967 | 4,122                        | 30,934               | 26,812               | 1,961         | 2,248    | 287     |
| 1968 | 837                          | 34,063               | 33,226               | 2,661         | 2,994    | 333     |
| 1969 | 1,289                        | 37,332               | 36,043               | 2,831         | 3,138    | 307     |
| 1970 | 3,225                        | 43,176               | 39,952               | 3,097         | 3,405    | 308     |
| 1971 | (1,476) <sup>b</sup>         | 44,087               | 45,563               | 3,830         | 4,203    | 373     |
| 1972 | (5,729)                      | 49,854               | 55,583               | 3,230         | 3,795    | 565     |
| 1973 | 2,390                        | 71,865               | 69,476               | 4,360         | 5,142    | 782     |
| 1974 | (3,884)                      | 99,437               | 103,321              | 6,350         | 7,095    | 745     |
| 1975 | 9,551                        | 108,856              | 99,305               | 7,045         | 7,792    | 747     |
| 1976 | (7,820)                      | 116,794              | 124,614              | 7,267         | 7,843    | 576     |
| 1977 | (28,353)                     | 123,182              | 151,534              | 6,850         | 7,581    | 731     |
| 1978 | (30,205)                     | 145,847              | 176,052              | 9,058         | 10,001   | 943     |
| 1979 | (23,922)                     | 186,363              | 210,285              | 10,123        | 11,747   | 1,624   |
| 1980 | (19,696)                     | 225,566              | 245,262              | 11,952        | 15,506   | 3,554   |
| 1981 | (22,267)                     | 238,715              | 260,982              | 13,134        | 17,634   | 4,500   |
| 1982 | (27,510)                     | 216,442              | 243,952              | 11,035        | 15,603   | 4,568   |
| 1983 | (52,409)                     | 205,639              | 258,048              | 12,619        | 16,065   | 3,446   |
| 1984 | (106,703)                    | 223,976              | 330,678              | 10,082        | 15,008   | 4,926   |
| 1985 | (117,712)                    | 218,815              | 336,526              | 12,593        | 18,725   | 6,132   |
| 1986 | (138,279)                    | 227,159              | 365,438              | 11,826        | 19,728   | 7,902   |
| 1987 | (152,119)                    | 254,122              | 406,241              | 14,575        | 22,480   | 7,905   |
| 1988 | (118,526)                    | 322,426              | 440,952              | 17,860        | 26,947   | 9,087   |
| 1989 | (109,399)                    | 363,812              | 473,211              | 22,083        | 32,111   | 10,028  |
| 1990 | (101,718)                    | 393,592              | 495,311              | 27,282        | 39,083   | 11,801  |
| 1991 | (65,399)                     | 421,730              | 487,129              | 30,785        | 43,788   | 13,003  |
| 1992 | (84,501) <sup>r</sup>        | 448,164 <sup>r</sup> | 532,665 <sup>r</sup> | 31,356        | 45,018   | 13,662  |
| 1993 | (115,777)                    | 464,767              | 580,544              | 27,235        | 39,418   | 12,183  |

Source: Bureau of the Census, Foreign Trade Division and Aerospace Industries Association, based on data from International Trade Administration.

NOTE: The Commerce Department began reporting international trade using the Harmonized Tariff Schedules of the United States in 1989. Previous years based on the Tariff Schedules of the United States Annotated.

a Total U.S. and aerospace foreign trade are reported as (1) exports of domestic merchandise, including Department of Defense shipments and undocumented exports to Canada, f.a.s. (= free alongside ship) basis, (2) imports for consumption, customs value basis.

b First U.S. trade deficit since 1888.

r Revised.

## TOTAL U.S. EXPORTS AND EXPORTS OF AEROSPACE PRODUCTS

Calendar Years 1964–1993  
(Millions of Dollars)

| Year | TOTAL<br>Exports<br>of U.S.<br>Merchandise <sup>a</sup> | Exports of Aerospace Products |  |        |                 |          |
|------|---|-------------------------------|--|--------|-----------------|----------|
|      |   | TOTAL                         | Percent<br>of Total<br>U.S.<br>Exports | Civil  |                 | Military |
|      |   |                               |  | Total  | Trans-<br>ports |          |
| 1964 | \$ 25,690   | \$ 1,608                      | 6.3%                                   | \$ 764 | \$ 211          | \$ 844   |
| 1965 | 26,699  | 1,618                         | 6.1                                    | 854    | 353             | 764      |
| 1966 | 29,379  | 1,673                         | 5.7                                    | 1,035  | 421             | 638      |
| 1967 | 30,934  | 2,248                         | 7.3                                    | 1,380  | 611             | 868      |
| 1968 | 34,063  | 2,994                         | 8.8                                    | 2,289  | 1,200           | 705      |
| 1969 | 37,332  | 3,138                         | 8.4                                    | 2,027  | 947             | 1,111    |
| 1970 | 43,176  | 3,405                         | 7.9                                    | 2,516  | 1,283           | 889      |
| 1971 | 44,087  | 4,203                         | 9.5                                    | 3,080  | 1,567           | 1,123    |
| 1972 | 49,854  | 3,795                         | 7.6                                    | 2,954  | 1,119           | 841      |
| 1973 | 71,865  | 5,142                         | 7.2                                    | 3,788  | 1,664           | 1,354    |
| 1974 | 99,437  | 7,095                         | 7.1                                    | 5,273  | 2,655           | 1,822    |
| 1975 | 108,856   | 7,792                         | 7.2                                    | 5,324  | 2,397           | 2,468    |
| 1976 | 116,794   | 7,843                         | 6.7                                    | 5,677  | 2,468           | 2,166    |
| 1977 | 123,182   | 7,581                         | 6.2                                    | 5,049  | 1,936           | 2,532    |
| 1978 | 145,847   | 10,001                        | 6.9                                    | 6,018  | 2,558           | 3,983    |
| 1979 | 186,363   | 11,747                        | 6.3                                    | 9,772  | 4,998           | 1,975    |
| 1980 | 225,566   | 15,506                        | 6.9                                    | 13,248 | 6,727           | 2,258    |
| 1981 | 238,715   | 17,634                        | 7.4                                    | 13,312 | 7,180           | 4,322    |
| 1982 | 216,442   | 15,603                        | 7.2                                    | 9,608  | 3,834           | 5,995    |
| 1983 | 205,639   | 16,065                        | 7.8                                    | 10,595 | 4,683           | 5,470    |
| 1984 | 223,976   | 15,008                        | 6.7                                    | 9,659  | 3,195           | 5,350    |
| 1985 | 218,815   | 18,725                        | 8.6                                    | 12,942 | 5,518           | 5,783    |
| 1986 | 227,159   | 19,728                        | 8.7                                    | 14,851 | 6,276           | 4,875    |
| 1987 | 254,122   | 22,480                        | 8.8                                    | 15,768 | 6,377           | 6,714    |
| 1988 | 322,426   | 26,947                        | 8.4                                    | 20,298 | 8,766           | 6,651    |
| 1989 | 363,812   | 32,111                        | 8.8                                    | 25,619 | 12,313          | 6,492    |
| 1990 | 393,592   | 39,083                        | 9.9                                    | 31,517 | 16,691          | 7,566    |
| 1991 | 421,730   | 43,788                        | 10.4                                   | 35,548 | 20,881          | 8,239    |
| 1992 | 448,164 <sup>r</sup>                                    | 45,018                        | 10.0                                   | 36,904 | 22,379          | 8,114    |
| 1993 | 464,767   | 39,418                        | 8.5                                    | 31,821 | 18,146          | 7,598    |

Source: Bureau of the Census, Foreign Trade Division and Aerospace Industries Association, based on data from International Trade Administration.

NOTE: International trade reported using Harmonized Tariff Schedules after 1988.

a Includes DoD shipments and undocumented exports to Canada, free alongside ship basis.

r Revised.

**U.S. EXPORTS OF AEROSPACE PRODUCTS<sup>a</sup>  
BY MAJOR COUNTRIES OF DESTINATION**

Calendar Years 1989–1993  
(Millions of Dollars)

| Major Countries of Destination | 1989               | 1990               | 1991               | 1992               | 1993   |
|--------------------------------|--------------------|--------------------|--------------------|--------------------|--------|
| Australia .....                | \$1,270            | \$1,760            | \$1,596            | \$1,746            | \$ 543 |
| Belgium/Luxembourg .....       | 538 <sup>r</sup>   | 682 <sup>r</sup>   | 825                | 506                | 653    |
| Brazil .....                   | 813                | 925                | 1,491              | 1,032              | 627    |
| Canada .....                   | 2,137              | 2,238 <sup>r</sup> | 2,210              | 2,254 <sup>r</sup> | 1,872  |
| China .....                    | 664                | 861                | 1,244              | 2,247              | 2,384  |
| France .....                   | 2,764 <sup>r</sup> | 3,300 <sup>r</sup> | 4,359              | 3,912              | 3,339  |
| Germany .....                  | 3,135 <sup>r</sup> | 2,800 <sup>r</sup> | 3,939 <sup>r</sup> | 3,044 <sup>r</sup> | 1,764  |
| Israel .....                   | 453                | 503                | 738                | 957                | 967    |
| Italy .....                    | 625                | 737                | 1,051              | 1,214              | 546    |
| Japan .....                    | 2,700              | 4,186 <sup>r</sup> | 3,910 <sup>r</sup> | 4,505              | 3,581  |
| Korea, South .....             | 1,257              | 1,113              | 1,716 <sup>r</sup> | 1,715 <sup>r</sup> | 1,588  |
| Malaysia .....                 | 315                | 444                | 657                | 856                | 1,517  |
| Mexico .....                   | 432                | 462                | 608                | 991 <sup>r</sup>   | 554    |
| Netherlands .....              | 1,448              | 1,613              | 1,458              | 1,234              | 1,162  |
| Singapore .....                | 1,133              | 844                | 1,278              | 1,067              | 1,485  |
| Spain .....                    | 1,104 <sup>r</sup> | 1,198              | 972                | 776                | 417    |
| Sweden .....                   | 815                | 952                | 1,081              | 632                | 386    |
| Taiwan .....                   | 460                | 733                | 1,324              | 1,379              | 2,133  |
| Turkey .....                   | 292                | 468                | 580                | 800                | 1,223  |
| United Kingdom .....           | 3,520 <sup>r</sup> | 4,968 <sup>r</sup> | 3,961              | 3,483              | 3,533  |

Source: U.S. Department of Commerce, International Trade Administration.

NOTE: International trade reported using Harmonized Tariff Schedules after 1988.

a Includes all civil products, free alongside ship basis; excludes military products whose country of destination are not reported.

r Revised.

**U.S. IMPORTS OF AEROSPACE PRODUCTS<sup>a</sup>  
BY MAJOR COUNTRIES OF ORIGIN**

Calendar Years 1989–1993  
(Millions of Dollars)

| Major Countries of Origin | 1989               | 1990               | 1991               | 1992               | 1993   |
|---------------------------|--------------------|--------------------|--------------------|--------------------|--------|
| Brazil .....              | \$ 204             | \$ 360             | \$ 186             | \$ 164             | \$ 119 |
| Canada .....              | 1,920 <sup>r</sup> | 2,530 <sup>r</sup> | 2,734 <sup>r</sup> | 2,432 <sup>r</sup> | 2,072  |
| France .....              | 3,290              | 2,782              | 3,557              | 4,220 <sup>r</sup> | 4,249  |
| Germany, West .....       | 419                | 712                | 523                | 614                | 478    |
| Israel .....              | 186                | 227 <sup>r</sup>   | 291 <sup>r</sup>   | 230 <sup>r</sup>   | 203    |
| Italy .....               | 300                | 418                | 598                | 585                | 368    |
| Japan .....               | 474                | 566                | 661                | 655                | 538    |
| Netherlands .....         | 255                | 368                | 761                | 915                | 707    |
| Sweden .....              | 257                | 317                | 332                | 234                | 135    |
| United Kingdom .....      | 2,057 <sup>r</sup> | 2,700 <sup>r</sup> | 2,499 <sup>r</sup> | 2,805              | 2,523  |

Source: U.S. Department of Commerce, International Trade Administration.

a Includes civil and military products, c.i.f. (Cost, Insurance, and Freight) basis.

r Revised.

**U.S. EXPORTS OF AEROSPACE PRODUCTS**

Calendar Years 1990-1993  
(Millions of Dollars)

| Aerospace Exports   | 1990             | 1991             | 1992             | 1993             |
|---|------------------|------------------|------------------|------------------|
| <b>TOTAL</b> .....  | \$39,083         | \$43,788         | \$45,018         | \$39,418         |
| <b>TOTAL CIVIL</b> .....                                      | \$31,517         | \$35,548         | \$36,904         | \$31,821         |
| <b>Complete Aircraft—TOTAL</b> .....                          | <u>\$18,150</u>  | <u>\$22,385</u>  | <u>\$24,333</u>  | <u>\$19,844</u>  |
| Transports .....  | 16,691           | 20,881           | 22,379           | 18,146           |
| General Aviation <sup>a</sup> .....                           | 555              | 576              | 581              | 551              |
| Helicopters .....   | 161              | 168              | 118              | 120              |
| Used Aircraft .....   | 712              | 738              | 1,244            | 1,014            |
| Other, Incl. Spacecraft .....                                 | 360 <sup>b</sup> | 176 <sup>b</sup> | 180 <sup>b</sup> | 293 <sup>b</sup> |
| <b>Aircraft Engines—TOTAL</b> .....                           | <u>1,754</u>     | <u>2,127</u>     | <u>2,346</u>     | <u>2,333</u>     |
| Turbine Engines .....   | 1,679            | 2,050            | 2,271            | 2,246            |
| Piston Engines .....  | 75               | 77               | 74               | 87               |
| <b>Aircraft and Engine Parts<br/>Incl. Spares—TOTAL</b> ..... | <u>11,257</u>    | <u>10,878</u>    | <u>10,048</u>    | <u>9,178</u>     |
| Aircraft Parts & Accessories .....                            | 6,964            | 6,859            | 6,545            | 6,206            |
| Aircraft Engine Parts .....                                   | 4,293            | 4,018            | 3,503            | 3,152            |
| <b>TOTAL MILITARY</b> .....                                   | \$ 7,566         | \$ 8,239         | \$ 8,114         | \$ 7,598         |
| <b>Complete Aircraft—TOTAL<sup>c</sup></b> .....              | <u>\$ 1,481</u>  | <u>\$ 1,788</u>  | <u>\$ 2,086</u>  | <u>\$ 1,462</u>  |
| Fighters & Fighter Bombers .....                              | 533              | 323              | 1,288            | 764              |
| Transports .....  | 432              | 633              | 149              | —                |
| Helicopters .....   | 381              | 587              | 422              | 607              |
| Used Aircraft .....   | 75               | 146              | 81               | 46               |
| Other, Incl. Spacecraft .....                                 | 391 <sup>b</sup> | 253 <sup>b</sup> | 315 <sup>b</sup> | 313 <sup>b</sup> |
| <b>Aircraft Engines—TOTAL</b> .....                           | <u>203</u>       | <u>206</u>       | <u>229</u>       | <u>190</u>       |
| Turbine Engines .....   | 168              | 171              | 199              | 155              |
| Piston Engines .....  | 35               | 35               | 30               | 35               |
| <b>Aircraft and Engine Parts<br/>Incl. Spares—TOTAL</b> ..... | <u>4,261</u>     | <u>4,891</u>     | <u>4,208</u>     | <u>4,448</u>     |
| Aircraft Parts & Accessories .....                            | 3,640            | 4,202            | 3,603            | 3,857            |
| Aircraft Engine Parts .....                                   | 622              | 689              | 605              | 591              |
| <b>Guided Missiles, Rockets, &amp;<br/>Parts—TOTAL</b> .....  | <u>1,290</u>     | <u>1,200</u>     | <u>1,422</u>     | <u>1,230</u>     |
| Guided Missiles & Rockets .....                               | 551              | 298              | 576              | 485              |
| Missile & Rocket Parts .....                                  | 724              | 899              | 839              | 745              |
| Missile & Rocket Engines .....                                | 15               | 3                | 6                | 1                |
| Missile & Rocket Engine Parts ..                              | —                | —                | —                | —                |

Source: Aerospace Industries Association, based on data from International Trade Administration.

a All fixed-wing aircraft under 33,000 pounds.

b Products within this category are not designated civil or military by the Harmonized Tariff Schedules. Historically, aircraft herein have been predominantly civil. Also, spacecraft not included in "Complete Aircraft—Total."

c Includes aircraft exported under Military Assistance Programs and Foreign Military Sales.

**U.S. IMPORTS OF AEROSPACE PRODUCTS**  
**Calendar Years 1990–1993**  
**(Millions of Dollars)**

| Aerospace Imports   | 1990     | 1991     | 1992            | 1993     |
|---|----------|----------|-----------------|----------|
| <b>TOTAL</b> .....  | \$11,801 | \$13,003 | \$13,662        | \$12,183 |
| <b>TOTAL CIVIL</b> .....  | \$ 8,251 | \$ 9,268 | \$ 9,719        | \$ 8,627 |
| <b>Complete Aircraft—TOTAL</b> .....  | \$ 2,794 | \$ 3,413 | \$ 3,866        | \$ 3,725 |
| Transports .....  | 737      | 1,285    | 2,007           | 2,005    |
| General Aviation .....  | 1,581    | 1,567    | 1,375           | 1,238    |
| Helicopters .....   | 162      | 289      | 179             | 231      |
| Other, Including Used Aircraft, &<br>Gliders, Balloons, & Airships <sup>a</sup> ..... | 314      | 272      | 305             | 251      |
| <b>Aircraft Engines—TOTAL</b> .....   | 1,234    | 1,226    | 1,346           | 1,312    |
| Turbine Engines <sup>b</sup> .....  | 1,204    | 1,185    | 1,330           | 1,291    |
| Piston Engines .....  | 31       | 42       | 16              | 20       |
| <b>Aircraft &amp; Engine Parts—TOTAL</b> .....  | 4,222    | 4,629    | 4,507           | 3,590    |
| Aircraft Parts and Accessories <sup>b</sup> .....                                     | 2,751    | 3,166    | 2,726           | 2,059    |
| Turbine Engine Parts <sup>b</sup> .....   | 1,147    | 1,279    | 1,516           | 1,309    |
| Piston Engine Parts .....   | 57       | 43       | 46 <sup>r</sup> | 39       |
| Spacecraft, Other Parts &<br>Accessories <sup>c</sup> .....                           | 267      | 141      | 220             | 183      |
| <b>TOTAL MILITARY</b> .....   | \$ 3,550 | \$ 3,735 | \$ 3,943        | \$ 3,555 |
| <b>Complete Aircraft—TOTAL</b> .....  | \$ 44    | \$ 26    | \$ 55           | \$ 13    |
| <b>Aircraft Engines—TOTAL</b> .....   | 1,217    | 1,203    | 1,368           | 1,302    |
| Turbine Engines <sup>b</sup> .....  | 1,204    | 1,185    | 1,330           | 1,291    |
| Piston Engines Including Parts .....  | 13       | 18       | 38              | 11       |
| <b>Aircraft &amp; Engine Parts—TOTAL</b> .....  | 2,290    | 2,507    | 2,521           | 2,229    |
| Aircraft Parts <sup>b</sup> .....   | 858      | 1,033    | 717             | 655      |
| Turbine Engine Parts <sup>b</sup> .....   | 1,088    | 1,238    | 1,484           | 1,285    |
| Spacecraft, Missiles, Rockets,<br>Other Parts, & Accessories <sup>bc</sup> .....      | 343      | 236      | 320             | 289      |

Source: Aerospace Industries Association, based on data from International Trade Administration.

NOTE: International trade reported using Harmonized Tariff Schedules after 1989.

- a Products within this category are not designated civil or military by the Harmonized Tariff Schedules. Historically, these products have been predominantly civil.
- b Category contains products whose use (civil or military) is unspecified by the Harmonized Tariff Schedules. Figures for those products distributed equally between civil and military.
- c Includes satellites, propulsion engines, and parachutes.
- r Revised.



**U.S. EXPORTS OF MILITARY AIRCRAFT<sup>a</sup>**  
**Calendar Years 1989–1993**

|  | 1989  | 1990             | 1991                 | 1992             | 1993    |
|--|-------|------------------|----------------------|------------------|---------|
| <b>TOTAL NUMBER OF AIRCRAFT</b> ...        | 846   | 445              | 490                  | 428              | 632     |
| Fighters and Fighter Bombers .....         | 32    | 39               | 16                   | 65               | 47      |
| Transports .....                           | 74    | 43               | 40                   | 4                | —       |
| Helicopters .....                          | 36    | 47               | 72                   | 61               | 93      |
| New Aircraft, NEC .....                    | 505   | 258 <sup>r</sup> | 227 <sup>r</sup>     | 201 <sup>r</sup> | 378     |
| Used or Rebuilt Aircraft .....             | 199   | 58 <sup>r</sup>  | 135 <sup>r</sup>     | 97 <sup>r</sup>  | 114     |
| <b>TOTAL VALUE</b> (Millions of Dollars) . | \$892 | \$1,481          | \$1,784 <sup>r</sup> | \$2,083          | \$1,460 |
| Fighters and Fighter Bombers .....         | \$368 | \$ 533           | \$ 323               | \$1,288          | \$ 764  |
| Transports .....                           | 234   | 432              | 633                  | 149              | —       |
| Helicopters .....                          | 180   | 381              | 587                  | 422              | 607     |
| New Aircraft, NEC .....                    | 53    | 60 <sup>r</sup>  | 97 <sup>r</sup>      | 51 <sup>r</sup>  | 32      |
| Used or Rebuilt Aircraft .....             | 56    | 75               | 144 <sup>r</sup>     | 174 <sup>r</sup> | 57      |

Source: Aerospace Industries Association, based on data from the International Trade Administration.

a Includes aircraft exported under Military Assistance Programs and Foreign Military Sales.

NEC Not elsewhere classified.

r Revised

## U.S. EXPORTS OF CIVIL AIRCRAFT

Calendar Years 1989-1993

| Civil Aircraft Exports  | 1989     | 1990     | 1991     | 1992     | 1993     |
|---|----------|----------|----------|----------|----------|
| <b>TOTAL NUMBER OF AIRCRAFT<sup>a</sup></b> ..                | 3,564    | 3,375    | 3,071    | 1,988    | 1,533    |
| <b>Helicopters—TOTAL</b> .....                                | 294      | 349      | 318      | 212      | 175      |
| Under 2,200 lbs .....   | 186      | 266      | 246      | 175      | 143      |
| Over 2,200 lbs .....  | 108      | 83       | 72       | 37       | 32       |
| <b>General Aviation—TOTAL</b> .....                           | 1,310    | 809      | 534      | 358      | 333      |
| Single-Engine .....   | 1,119    | 561      | 345      | 186      | 97       |
| Multi-Engine, Under 4,400 lbs ...                             | 39       | 33       | 22       | 19       | 104      |
| Multi-Engine, 4,400-10,000 lbs ..                             | 104      | 136      | 98       | 93       | 74       |
| Multi-Engine, 10,000-33,000 lbs .                             | 48       | 79       | 69       | 60       | 58       |
| <b>Transports—TOTAL</b> .....                                 | 260      | 306      | 385      | 387      | 278      |
| Passenger Aircraft, Over<br>33,000 lbs .....                  | 256      | 294      | 371      | 376      | 272      |
| Cargo Aircraft, Over 33,000 lbs ..                            | 1        | 3        | 5        | 1        | 2        |
| Other, Over 33,000 lbs, Incl.<br>Pass./Cargo Combi .....      | 3        | 9        | 9        | 10       | 4        |
| <b>Other Aircraft—TOTAL<sup>a</sup></b> .....                 | 1,700    | 1,911    | 1,834    | 1,031    | 747      |
| Used or Rebuilt Aircraft .....                                | 1,700    | 1,911    | 1,834    | 1,031    | 747      |
| Other Aircraft, Including<br>Balloons, Gliders & Kites .....  | 2,888    | 1,448    | 1,133    | 386      | 452      |
| <b>TOTAL VALUE (Millions of Dollars)</b>                      | \$13,447 | \$18,150 | \$22,385 | \$24,333 | \$19,844 |
| <b>Helicopters—TOTAL</b> .....                                | \$ 156   | \$ 161   | \$ 168   | \$ 118   | \$ 120   |
| Under 2,200 lbs .....   | 29       | 39       | 40       | 35       | 37       |
| Over 2,200 lbs .....  | 127      | 123      | 129      | 83       | 83       |
| <b>General Aviation—TOTAL</b> .....                           | 413      | 555      | 576      | 581      | 551      |
| Single-Engine .....   | 56       | 44       | 40       | 61       | 36       |
| Multi-Engine, Under 4,400 lbs ...                             | 9        | 10       | 8        | 12       | 22       |
| Multi-Engine, 4,400-10,000 lbs ..                             | 184      | 256      | 249      | 213      | 169      |
| Multi-Engine, 10,000-33,000 lbs .                             | 164      | 245      | 279      | 295      | 324      |
| <b>Transports—TOTAL</b> .....                                 | 12,313   | 16,691   | 20,881   | 22,379   | 18,146   |
| Passenger Aircraft, Over<br>33,000 lbs .....                  | 11,859   | 15,307   | 19,349   | 21,252   | 17,237   |
| Cargo Aircraft, Over 33,000 lbs ..                            | 90       | 264      | 405      | 37       | 299      |
| Other, Over 33,000 lbs, Incl.<br>Pass./Cargo Combi .....      | 364      | 1,121    | 1,127    | 1,090    | 611      |
| <b>Other Aircraft—TOTAL</b> .....                             | 566      | 742      | 760      | 1,256    | 1,027    |
| Used or Rebuilt Aircraft .....                                | 533      | 712      | 738      | 1,244    | 1,014    |
| Other Aircraft, Including<br>Balloons, Gliders, & Kites ..... | 33       | 30       | 23       | 12       | 12       |

Source: Aerospace Industries Association, based on data from International Trade Administration.

NOTE: International trade reported using Harmonized Tariff Schedules after 1988.

a Numbers of gliders, balloons, &amp; kites excluded from civil aircraft totals.

**U.S. IMPORTS OF COMPLETE AIRCRAFT**  
**Calendar Years 1990–1993**

| Aircraft Imports   | 1990       | 1991                  | 1992                  | 1993                  |
|--|------------|-----------------------|-----------------------|-----------------------|
| <b>TOTAL NUMBER OF AIRCRAFT</b> .....                              | 848        | 1,036                 | 1,024                 | 1,384                 |
| <b>Civil Aircraft—TOTAL</b> .....                                  | <u>820</u> | <u>955</u>            | <u>949</u>            | <u>1,330</u>          |
| New Complete Aircraft:   |            |                       |                       |                       |
| Helicopters .....  | 167        | 244                   | 148                   | 159                   |
| General Aviation:  |            |                       |                       |                       |
| Single-Engine .....  | 80         | 72                    | 67                    | 96                    |
| Multi-Engine, Under 4,400 lbs ....                                 | 5          | 1                     | 7                     | —                     |
| Multi-Engine, 4,400-10,000 lbs ...                                 | 53         | 41                    | 18                    | 6                     |
| Multi-Engine, Turbojet/Turbofan,<br>10,000-33,000 lbs .....        | 63         | 45                    | 52                    | 66                    |
| Multi-Engine, Other, Including<br>Turboshaft, 10,000-33,000 lbs .. | 100        | 95                    | 72                    | 44                    |
| Transports, Multi-Engine, Over<br>33,000 lbs .....                 | 30         | 44                    | 64                    | 54                    |
| Other Civil Aircraft:  |            |                       |                       |                       |
| Used or Rebuilt .....  | 130        | 246                   | 176                   | 258                   |
| Aircraft Previously Exported<br>from U.S. ....                     | NA         | NA                    | NA                    | NA                    |
| Gliders <sup>a</sup> .....   | 184        | 140                   | 327                   | 587                   |
| Balloons & Airships <sup>a</sup> .....                             | 8          | 27                    | 18                    | 60                    |
| <b>Military Aircraft—TOTAL</b> .....                               | <u>28</u>  | <u>81<sup>b</sup></u> | <u>75<sup>b</sup></u> | <u>54<sup>b</sup></u> |
| New Complete Aircraft .....  | 28         | 8                     | 11                    | 3                     |

(Continued on next page)

**U.S. IMPORTS OF COMPLETE AIRCRAFT**  
(Continued)

| <b>Aircraft Imports</b>   | <b>1990</b>      | <b>1991</b>                | <b>1992</b>                | <b>1993</b>                |
|---|------------------|----------------------------|----------------------------|----------------------------|
| <b>VALUE</b> (Millions of Dollars) .....                        | \$2,838.3        | \$3,438.1                  | \$3,920.7                  | \$3,738.3                  |
| <b>Civil Aircraft—TOTAL</b> .....                               | <u>\$2,794.2</u> | <u>\$3,412.7</u>           | <u>\$3,866.2</u>           | <u>\$3,725.2</u>           |
| New Complete Aircraft:  |                  |                            |                            |                            |
| Helicopters .....   | 162.4            | 288.8                      | 179.2                      | 231.4                      |
| General Aviation:   |                  |                            |                            |                            |
| Single-Engine .....   | 9.0              | 23.4                       | 24.6                       | 28.6                       |
| Multi-Engine, Under 4,400 lbs .                                 | 1.3              | 0.0                        | 3.1                        | —                          |
| Multi-Engine, 4,400-10,000 lbs                                  | 217.3            | 176.3                      | 75.7                       | 14.8                       |
| Multi-Engine, Turbojet/Turbofan,<br>10,000-33,000 lbs .....     | 643.6            | 526.9                      | 612.0                      | 792.3                      |
| Multi-Engine, Other, Including<br>Turboshaft, 10,000-33,000 lbs | 709.9            | 840.3                      | 659.5                      | 402.1                      |
| Transports, Multi-Engine, Over<br>33,000 lbs .....              | 737.0            | 1,285.3                    | 2,006.9                    | 2,005.1                    |
| Other Civil Aircraft:   |                  |                            |                            |                            |
| Used or Rebuilt .....   | 292.4            | 269.5                      | 301.4                      | 245.7                      |
| Aircraft Previously Exported<br>from U.S. ....                  | 0.4              | —                          | —                          | —                          |
| Gliders <sup>a</sup> .....                                      | 0.8              | 0.9                        | 2.3                        | 2.1                        |
| Balloons & Airships <sup>a</sup> .....                          | 2.3              | 1.3                        | 1.4                        | 3.2                        |
| <b>Military Aircraft—TOTAL</b> .....                            | <u>\$ 44.2</u>   | <u>\$ 25.5<sup>b</sup></u> | <u>\$ 54.6<sup>b</sup></u> | <u>\$ 13.1<sup>b</sup></u> |
| New Complete Aircraft .....                                     | 44.2             | 21.0                       | 46.0                       | 9.9                        |

Source: Aerospace Industries Association, based on data from International Trade Administration.

a Products within this category are not designated civil or military by the Harmonized Tariff Schedules. Historically, these products have been predominantly civil.

b Includes used aircraft.

NA Not available.

**U.S. EXPORTS OF COMMERCIAL TRANSPORT AIRCRAFT<sup>a</sup>**  
**Calendar Years 1989–1993**

| <b>Region of Destination</b>                          | <b>1989</b>     | <b>1990</b>     | <b>1991</b>     | <b>1992</b>     | <b>1993</b>     |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>TOTAL NUMBER EXPORTED . . . .</b>                  | 260             | 306             | 385             | 387             | 278             |
| Canada & Greenland . . . . .                          | 9               | 4               | 3               | 7               | 2               |
| Latin America & Caribbean . . . . .                   | 28              | 25              | 32              | 40              | 14              |
| Europe . . . . .                                      | 151             | 172             | 228             | 171             | 89              |
| Middle East . . . . .                                 | 8               | 9               | 16              | 17              | 13              |
| Asia . . . . .  | 47              | 70              | 83              | 120             | 146             |
| Oceania . . . . .                                     | 8               | 16              | 14              | 23              | 8               |
| Africa . . . . .                                      | 9               | 10              | 9               | 9               | 6               |
| <b>TOTAL VALUE</b><br>(Millions of Dollars) . . . . . | <b>\$12,313</b> | <b>\$16,691</b> | <b>\$20,881</b> | <b>\$22,379</b> | <b>\$18,146</b> |
| Canada & Greenland . . . . .                          | \$ 535          | \$ 309          | \$ 221          | \$ 610          | \$ 114          |
| Latin America & Caribbean . . . . .                   | 726             | 1,001           | 1,472           | 1,904           | 805             |
| Europe . . . . .                                      | 6,335           | 8,166           | 10,461          | 8,105           | 5,130           |
| Middle East . . . . .                                 | 631             | 440             | 648             | 625             | 517             |
| Asia . . . . .  | 2,951           | 5,010           | 6,382           | 9,201           | 10,840          |
| Oceania . . . . .                                     | 640             | 1,256           | 1,177           | 1,461           | 351             |
| Africa . . . . .                                      | 496             | 509             | 520             | 471             | 389             |

Source: Aerospace Industries Association, based on data from the International Trade Administration.  
 a Airframe weight exceeding 33,000 pounds.

**U.S. EXPORTS OF CIVIL HELICOPTERS<sup>a</sup>**

Calendar Years 1989–1993

| Region of Destination                                 | 1989    | 1990    | 1991    | 1992    | 1993    |
|---|---------|---------|---------|---------|---------|
| <b>TOTAL NUMBER EXPORTED</b> . . . .                  | 294     | 349     | 318     | 212     | 175     |
| Canada & Greenland . . . . .                          | 11      | 11      | 20      | 8       | 11      |
| Latin America & Caribbean . . . . .                   | 54      | 46      | 45      | 46      | 67      |
| Europe . . . . .                                      | 170     | 140     | 125     | 91      | 61      |
| Middle East . . . . .                                 | 6       | 1       | 2       | 3       | 2       |
| Asia . . . . .  | 51      | 65      | 66      | 39      | 21      |
| Oceania . . . . .                                     | 33      | 68      | 38      | 19      | 13      |
| Africa . . . . .                                      | 9       | 18      | 22      | 6       | —       |
| <b>TOTAL VALUE</b><br>(Millions of Dollars) . . . . . | \$155.5 | \$161.2 | \$168.4 | \$117.7 | \$120.1 |
| Canada & Greenland . . . . .                          | \$ 2.6  | \$ 5.1  | \$ 7.9  | \$ 5.0  | \$ 6.2  |
| Latin America & Caribbean . . . . .                   | 39.7    | 20.1    | 19.6    | 26.2    | 24.8    |
| Europe . . . . .                                      | 37.1    | 46.8    | 56.3    | 38.2    | 62.2    |
| Middle East . . . . .                                 | 5.4     | 3.6     | 16.5    | 2.2     | 0.5     |
| Asia . . . . .  | 60.0    | 71.3    | 59.2    | 42.5    | 24.4    |
| Oceania . . . . .                                     | 9.2     | 8.7     | 5.7     | 2.3     | 1.9     |
| Africa . . . . .                                      | 1.6     | 5.6     | 3.1     | 1.3     | —       |

Source: Aerospace Industries Association, based on data from the International Trade Administration.

a Excludes used helicopters.

**U.S. IMPORTS OF CIVIL HELICOPTERS<sup>a</sup>**

Calendar Years 1989–1993

| Country of Origin                                     | 1989    | 1990    | 1991                 | 1992    | 1993    |
|---|---------|---------|----------------------|---------|---------|
| <b>TOTAL NUMBER IMPORTED</b> . . . .                  | 124     | 167     | 244                  | 148     | 159     |
| Canada . . . . .                                      | 52      | 82      | 146                  | 104     | 114     |
| France . . . . .                                      | 45      | 49      | 57                   | 25      | 22      |
| Germany . . . . .                                     | 25      | 25      | 30                   | 16      | 18      |
| Italy . . . . .                                       | 2       | 11      | 10                   | 1       | 3       |
| Others <sup>b</sup> . . . . .                         | —       | —       | 1                    | 2       | 2       |
| <b>TOTAL VALUE</b><br>(Millions of Dollars) . . . . . | \$108.7 | \$162.4 | \$288.8 <sup>r</sup> | \$179.2 | \$231.3 |
| Canada . . . . .                                      | \$ 44.5 | \$ 86.3 | \$182.1              | \$147.4 | \$176.1 |
| France . . . . .                                      | 32.0    | 29.9    | 53.6                 | 14.0    | 28.6    |
| Germany . . . . .                                     | 28.9    | 34.9    | 35.6                 | 14.8    | 15.0    |
| Italy . . . . .                                       | 3.3     | 11.3    | 16.9                 | 2.1     | 9.1     |
| Others <sup>b</sup> . . . . .                         | —       | —       | 0.7                  | 0.9     | 2.5     |

Source: Aerospace Industries Association, based on data from the International Trade Administration.

a Excludes used helicopters.

b Includes 1 from New Zealand in 1991; 2 from Japan in 1992; and 1 from Japan and 1 from Russia in 1993.

r Revised.

**U.S. EXPORTS OF GENERAL AVIATION AIRCRAFT<sup>a</sup>**  
**Calendar Years 1989–1993**

| <b>Region of Destination</b>                      | <b>1989</b> | <b>1990</b> | <b>1991</b> | <b>1992</b> | <b>1993</b> |
|---|-------------|-------------|-------------|-------------|-------------|
| <b>TOTAL NUMBER EXPORTED</b> ..                   | 1,310       | 809         | 534         | 358         | 333         |
| Canada & Greenland .....                          | 35          | 34          | 9           | 21          | 20          |
| Latin America & Caribbean ....                    | 155         | 133         | 80          | 78          | 59          |
| Europe .....                                      | 634         | 379         | 317         | 142         | 115         |
| Middle East .....                                 | 7           | 15          | 11          | 13          | 16          |
| Asia .....  | 154         | 55          | 54          | 47          | 77          |
| Oceania .....                                     | 164         | 72          | 18          | 22          | 15          |
| Africa .....                                      | 161         | 121         | 45          | 35          | 31          |
| <b>TOTAL VALUE</b><br>(Millions of Dollars) ..... | \$413.1     | \$554.9     | \$576.0     | \$580.8     | \$550.5     |
| Canada & Greenland .....                          | \$ 11.7     | \$ 41.7     | \$ 31.2     | \$ 55.3     | \$ 27.5     |
| Latin America & Caribbean ....                    | 120.4       | 152.8       | 142.9       | 191.8       | 117.5       |
| Europe .....                                      | 168.0       | 197.1       | 253.1       | 169.5       | 163.4       |
| Middle East .....                                 | 4.7         | 18.1        | 21.7        | 17.9        | 65.2        |
| Asia .....  | 43.0        | 47.9        | 95.0        | 36.3        | 106.8       |
| Oceania .....                                     | 18.0        | 22.0        | 6.9         | 41.0        | 27.2        |
| Africa .....                                      | 47.4        | 75.3        | 25.2        | 69.0        | 42.9        |

Source: Aerospace Industries Association, based on data from the International Trade Administration.

a All fixed-wing aircraft under 33,000 pounds.

**U.S. IMPORTS OF GENERAL AVIATION AIRCRAFT<sup>a</sup>**

Calendar Years 1989–1993

| Country of Origin                                     | 1989      | 1990      | 1991      | 1992      | 1993      |
|---|-----------|-----------|-----------|-----------|-----------|
| <b>TOTAL NUMBER IMPORTED . . .</b>                    | 212       | 301       | 254       | 216       | 212       |
| Brazil . . . . .                                      | 30        | 51        | 24        | 21        | 15        |
| Canada . . . . .                                      | 31        | 32        | 42        | 50        | 33        |
| France . . . . .                                      | 65        | 93        | 92        | 81        | 66        |
| Israel . . . . .                                      | 8         | 12        | 8         | 5         | 7         |
| Japan . . . . .                                       | —         | —         | —         | —         | 2         |
| United Kingdom . . . . .                              | 49        | 77        | 48        | 37        | 26        |
| Other . . . . .                                       | 38        | 36        | 40        | 22        | 63        |
| <b>TOTAL VALUE</b><br>(Millions of Dollars) . . . . . | \$1,112.8 | \$1,581.2 | \$1,566.8 | \$1,374.9 | \$1,237.8 |
| Brazil . . . . .                                      | \$ 175.6  | \$ 306.9  | \$ 152.2  | \$ 136.3  | \$ 94.2   |
| Canada . . . . .                                      | 275.2     | 354.7     | 469.8     | 527.2     | 466.2     |
| France . . . . .                                      | 335.0     | 336.2     | 469.9     | 388.9     | 410.4     |
| Israel . . . . .                                      | 41.5      | 70.6      | 51.7      | 33.6      | 45.9      |
| Japan . . . . .                                       | —         | —         | —         | —         | 1.0       |
| United Kingdom . . . . .                              | 212.7     | 414.6     | 276.9     | 235.1     | 201.6     |
| Other . . . . .                                       | 72.8      | 98.1      | 146.3     | 53.8      | 18.5      |

Source: Aerospace Industries Association, based on data from the International Trade Administration.

a All fixed-wing aircraft under 33,000 pounds.



**U.S. EXPORTS OF AIRCRAFT ENGINES**

Calendar Years 1991–1993  
(Values in Millions of Dollars)

|                              | 1991   |         | 1992   |         | 1993   |         |
|------------------------------|--------|---------|--------|---------|--------|---------|
|                              | Number | Value   | Number | Value   | Number | Value   |
| <b>TOTAL</b> .....           | 10,651 | \$2,333 | 10,742 | \$2,575 | 10,633 | \$2,524 |
| <b>Turbine Engines</b> ..... | 3,199  | \$2,221 | 3,464  | \$2,471 | 3,020  | \$2,401 |
| Civil .....                  | 2,114  | 2,050   | 2,250  | 2,271   | 2,283  | 2,246   |
| Military .....               | 1,085  | 171     | 1,214  | 199     | 737    | 155     |
| <b>Piston Engines</b> .....  | 7,452  | 112     | 7,278  | 104     | 7,613  | 123     |
| Civil, New, Under 500 HP .   | 1,168  | 17      | 782    | 13      | 703    | 13      |
| Civil, New, Over 500 HP ..   | 76     | 4       | 115    | 3       | 98     | 5       |
| Civil, Used .....            | 3,486  | 56      | 3,743  | 58      | 3,792  | 69      |
| Military .....               | 2,722  | 35      | 2,638  | 30      | 3,020  | 35      |

Source: Aerospace Industries Association, based on data from the International Trade Administration.

**U.S. IMPORTS OF AIRCRAFT ENGINES<sup>a</sup>**

Calendar Years 1991–1993  
(Values in Millions of Dollars)

|                              | 1991   |         | 1992   |         | 1993   |         |
|------------------------------|--------|---------|--------|---------|--------|---------|
|                              | Number | Value   | Number | Value   | Number | Value   |
| <b>Turbine Engines</b> ..... | 2,032  | \$2,370 | 1,961  | \$2,660 | 2,401  | \$2,583 |
| <b>Piston Engines</b> .....  | 9,379  | 53      | 2,987  | 43      | 2,517  | 31      |
| Military .....               | 6,648  | 12      | 1,828  | 27      | 2,182  | 11      |
| Civil, New, Small .....      | 2,085  | 3       | 337    | 1       | 124    | 1       |
| Civil, New, Large .....      | 29     | 29      | 466    | 1       | 33     | 6       |
| Civil, Used .....            | 617    | 9       | 356    | 14      | 178    | 14      |

Source: Aerospace Industries Association, based on data from the International Trade Administration.

a New and used.

**EXPORT-IMPORT BANK LENDING AUTHORITY  
AND GROSS AUTHORIZATIONS SUMMARY**

Fiscal Years 1984–1993  
(Millions of Dollars)

**LOANS**

| Year | Lending Authority | Authorizations Summary    |                  |                    |
|------|-------------------|---------------------------|------------------|--------------------|
|      |                   | Direct Loans <sup>a</sup> |                  |                    |
|      |                   | TOTAL                     | Direct Credits   | Other <sup>b</sup> |
| 1984 | \$ 3,865          | \$ 1,465                  | \$1,122          | \$ 343             |
| 1985 | 3,865             | 659                       | 320              | 339                |
| 1986 | 1,059             | 578                       | 371              | 207                |
| 1987 | 680               | 599                       | 332              | 267                |
| 1988 | 693               | 685                       | 465              | 220                |
| 1989 | 719               | 695                       | 517              | 202                |
| 1990 | 614               | 614                       | 318              | 296                |
| 1991 | 750               | 777 <sup>r</sup>          | 425 <sup>r</sup> | 352 <sup>r</sup>   |
| 1992 | (c)               | 817                       | 661              | 156                |
| 1993 | (c)               | 1,748                     | 1,635            | 113                |

**GUARANTEES AND INSURANCE**

| Year | Lending Authority   | Authorizations Summary |                    |                    |
|------|---------------------|------------------------|--------------------|--------------------|
|      |                     | TOTAL                  | Guarantees         | Insurance          |
| 1984 | \$10,000            | \$ 7,151               | \$1,333            | \$5,818            |
| 1985 | 10,000              | 7,850                  | 1,320              | 6,530              |
| 1986 | 11,484 <sup>d</sup> | 5,508                  | 1,128              | 4,380              |
| 1987 | 11,355              | 7,958                  | 1,514              | 6,444              |
| 1988 | 13,406              | 5,735                  | 601                | 5,134              |
| 1989 | 17,901              | 5,637                  | 1,292              | 4,345              |
| 1990 | 10,191              | 8,174                  | 3,333              | 4,841              |
| 1991 | 11,349              | 10,588 <sup>r</sup>    | 6,034              | 4,554 <sup>r</sup> |
| 1992 | (c)                 | 11,521 <sup>r</sup>    | 7,301 <sup>r</sup> | 4,220 <sup>r</sup> |
| 1993 | (c)                 | 13,324                 | 9,095              | 4,229              |

Source: Export-Import Bank of the United States.

a The value of Direct Loans may exceed Lending Authority because of the inclusion in Direct Loans of the full amount of Certificates of Loan, portions of which are subsequently sold to commercial banks.

b Includes discount loans, medium term, and small business credits.

c No lending limit set on the value of loans or guarantees and insurance beginning with 1992. Instead the subsidy cost of these transactions limited to \$603 million in 1992 and \$757 million in 1993. However, in 1993, the combined value of loans, guarantees, and insurance transactions could not exceed \$15.5 billion.

d Includes \$1.800 million proposed I-MATCH Program which would replace direct lending and would allow an estimated \$100 million in commercial loan interest buy-down.

r Revised.

**EXPORT-IMPORT BANK**  
**TOTAL AUTHORIZATIONS OF LOANS AND GUARANTEES**  
**AND AUTHORIZATIONS IN SUPPORT OF AIRCRAFT EXPORTS**  
 Fiscal Years 1979–1993  
 (Millions of Dollars)

| Year                     | TOTAL AUTHORIZATIONS | Authorizations in Support of Aircraft Exports |                                 |                                      |                             |
|--------------------------|----------------------|---|---------------------------------|--------------------------------------|-----------------------------|
|                          |                      | TOTAL   | Percent of TOTAL Authorizations | Commercial Jet Aircraft <sup>a</sup> | Other Aircraft <sup>b</sup> |
| <b>LOANS<sup>c</sup></b> |                      |   |                                 |                                      |                             |
| 1979                     | \$4,475              | \$1,469.4                                     | 32.8%                           | \$1,399.4                            | \$ 70.0                     |
| 1980                     | 4,578                | 1,743.3                                       | 38.1                            | 1,692.6                              | 50.7                        |
| 1981                     | 5,431                | 2,576.6                                       | 47.4                            | 2,550.3                              | 26.3                        |
| 1982                     | 3,516                | 263.9   | 7.5                             | 199.1                                | 64.8                        |
| 1983                     | 845                  | 396.7   | 46.9                            | 383.8                                | 12.9                        |
| 1984                     | 1,465                | 608.0   | 41.5                            | 531.8                                | 76.2                        |
| 1985                     | 659                  | 39.7  | 6.0                             | 12.6                                 | 27.1                        |
| 1986                     | 578                  | 54.6  | 9.4                             | 46.4                                 | 8.2                         |
| 1987                     | 599                  | 17.0  | 2.8                             | 13.3                                 | 3.7                         |
| 1988                     | 685                  | —   | —                               | —                                    | —                           |
| 1989                     | 695                  | 166.4   | 23.9                            | 158.0                                | 8.4                         |
| 1990                     | 614                  | 5.0   | 0.8                             | —                                    | 5.0                         |
| 1991                     | 777 <sup>r</sup>     | —   | —                               | —                                    | —                           |
| 1992                     | 817                  | —   | —                               | —                                    | —                           |
| 1993                     | 1,748                | —   | —                               | —                                    | —                           |
| <b>GUARANTEES</b>        |                      |   |                                 |                                      |                             |
| 1979                     | \$ 908               | \$ 261.4                                      | 28.8%                           | \$ 239.3                             | \$ 22.1                     |
| 1980                     | 2,510                | 1,131.9                                       | 45.1                            | 1,088.1                              | 43.8                        |
| 1981                     | 1,506                | 562.6   | 37.4                            | 533.4                                | 29.2                        |
| 1982                     | 727                  | 104.2   | 14.3                            | 78.4                                 | 25.8                        |
| 1983                     | 1,741                | 629.6   | 36.2                            | 601.3                                | 28.3                        |
| 1984                     | 1,333                | 355.5   | 26.7                            | 293.5                                | 62.0                        |
| 1985                     | 1,320                | 322.4   | 24.4                            | 788.9                                | 33.5                        |
| 1986                     | 1,128                | 329.2   | 29.2                            | 77.4                                 | 51.8                        |
| 1987                     | 1,514                | 808.3   | 53.4                            | 808.3                                | —                           |
| 1988                     | 601                  | 89.2  | 14.8                            | 73.4                                 | 15.8                        |
| 1989                     | 1,292                | 496.4   | 38.4                            | 390.4                                | 106.0                       |
| 1990                     | 3,333                | 1,666.3                                       | 50.0                            | 224.7                                | 1,441.6                     |
| 1991                     | 6,034                | 606.0   | 10.1                            | 566.9                                | 40.0                        |
| 1992                     | 7,301                | 1,667.0                                       | 22.8                            | 1,597.1                              | 69.9                        |
| 1993                     | 9,095                | 3,488.6                                       | 38.4                            | 3,488.6                              | —                           |

Source: Export-Import Bank of the United States.

a Includes complete aircraft, engines, parts, and retrofits.

b Includes business aircraft, general aviation aircraft, helicopters, and related goods and services.

c Loans are commitments for financing by the Eximbank to foreign buyers of U.S. equipment and services, which are made to commercial banks and may subsequently be guaranteed by the Eximbank, in which case the value of the loans is also included with Guarantees.

d Guarantees by the Export-Import Bank provide assurances of repayment of principal and interest on loans made by private lending institutions, such as commercial banks, for major export transactions. Excludes insurance.

r Revised.

**EXPORT-IMPORT BANK**  
**SUMMARY OF COMMERCIAL JET AIRCRAFT AUTHORIZATIONS**  
**FOR LOANS<sup>a</sup> AND GUARANTEES<sup>b</sup>**

Fiscal Years 1957–1993  
(Value in Millions of Dollars)

| Year   | No. of Jet Aircraft <sup>c</sup> |            | Export Value <sup>c</sup> |            | No. of New Commitments |            | Gross Authorizations |                  |
|--|----------------------------------|------------|---------------------------|------------|------------------------|------------|----------------------|------------------|
|  | Loans                            | Guarantees | Loans                     | Guarantees | Loans                  | Guarantees | Loans                | Guarantees       |
| <b>New Authorizations:</b>                     |                                  |            |                           |            |                        |            |                      |                  |
| 1957 <sup>d</sup> –1975                        | 1,244                            | 93         | \$13,639                  | \$ 620     | 464                    | 247        | \$ 5,547             | \$ 1,398         |
| 1976   | 77                               | 6          | 1,017                     | 139        | 34                     | 11         | 398                  | 87               |
| Tr. Qtr.                                       | 15                               | 5          | 219                       | 182        | 6                      | 3          | 94                   | 59               |
| 1977   | 31                               | 25         | 330                       | 902        | 16                     | 14         | 138                  | 294              |
| 1978   | 29                               | 5          | 479                       | 253        | 18                     | 5          | 189                  | 77               |
| 1979   | 118                              | 7          | 2,938                     | 317        | 35                     | 10         | 1,399                | 239              |
| 1980   | 136                              | 21         | 3,975                     | 901        | 36                     | 24         | 1,693                | 1,088            |
| 1981   | 121                              | 18         | 4,568                     | 637        | 26                     | 17         | 2,550                | 533              |
| 1982   | 11                               | 6          | 441                       | 113        | 5                      | 2          | 199                  | 78               |
| 1983   | 21                               | 9          | 779                       | 619        | 3                      | 4          | 384                  | 601              |
| 1984   | 37                               | 8          | 1,023                     | 327        | 7                      | 4          | 532                  | 294              |
| 1985   | —                                | 14         | 19                        | 481        | 1                      | 5          | 13                   | 289              |
| 1986   | 3                                | 13         | 74                        | 451        | 1                      | 9          | 46                   | 277              |
| 1987   | —                                | 27         | 22                        | 1,449      | 1                      | 14         | 13                   | 808              |
| 1988   | —                                | 2          | —                         | 94         | —                      | 2          | —                    | 73               |
| 1989   | 3                                | 5          | 253                       | 459        | 1                      | 2          | 158 <sup>f</sup>     | 390 <sup>f</sup> |
| 1990   | —                                | 6          | —                         | 264        | —                      | 2          | —                    | 225              |
| 1991   | —                                | 12         | —                         | 665        | —                      | 3          | —                    | 567              |
| 1992   | —                                | 37         | —                         | 1,889      | —                      | 12         | —                    | 1,597            |
| 1993   | —                                | 70         | —                         | 4,122      | —                      | 27         | —                    | 3,489            |
| 1957–1993                                      |                                  |            |                           |            |                        |            |                      |                  |
| Cumulative New                                 |                                  |            |                           |            |                        |            |                      |                  |
| Authorizations . . .                           | 1,846                            | 389        | \$29,775                  | \$14,902   | 654                    | 417        | \$13,353             | \$12,464         |
| Transfers, Reversals,<br>& Participation . . . | —                                | —          | (8)                       | 8          | 4                      | —          | (140)                | (20)             |
| Cumulative Gross                               |                                  |            |                           |            |                        |            |                      |                  |
| Authorizations (net<br>of Adjustments) . . .   | 1,846                            | 389        | \$29,767                  | \$14,910   | 658                    | 417        | \$13,213             | \$12,444         |

Source: Export-Import Bank of the United States.

a Loans are commitments for direct financing by the Export-Import Bank to foreign buyers of U.S. equipment and services, which are made by the Export-Import Bank to commercial banks and which subsequently may be guaranteed by the Export-Import Bank in which case the value of the loans is included with Guarantees.

b Guarantees by the Export-Import Bank provide assurances of repayment of principal and interest on loans made by private lending institutions, such as commercial banks, for major export transactions.

c For Export-Import Bank commitments including both loan and guarantee authorization, number of aircraft and export value reported under "Loans."

d First year of commercial jet aircraft authorizations.

r Revised.

Tr. Qtr. See Glossary.

**EXPORT-IMPORT BANK**  
**AUTHORIZATIONS OF LOANS AND GUARANTEES**  
**IN SUPPORT OF EXPORTS OF COMMERCIAL JET AIRCRAFT**

Fiscal Years 1991–1993  
(Values in Millions of Dollars)

| Customer<br>(Country/Airline)                       | Number and<br>Aircraft Model<br>or<br>Related Product | Export<br>Value | Authorization             |                                       |                  |                                      |         |
|---|---|-----------------|---------------------------|---------------------------------------|------------------|--------------------------------------|---------|
|   |   |                 | Loans<br>(Direct Credits) |                                       |                  | Guar-<br>antees                      |         |
|   |   |                 | Amount                    | Percent<br>Cover-<br>age <sup>a</sup> | Interest<br>Rate | Repay-<br>ment<br>Terms <sup>b</sup> | Amount  |
| <b>FY 1993</b>                                      |   |                 |                           |                                       |                  |                                      |         |
| <b>TOTALS</b> .....                                 | 70 aircraft   | \$4,122         | —                         | —                                     | —                | —                                    | \$3,489 |
| Argentina/Various .....                             | 7 x MD-80   | 206             | —                         | —                                     | —                | —                                    | 176     |
| Australia/Australian Airlines                       | 2 x 737   | 64              | —                         | —                                     | —                | —                                    | 55      |
| Austria/Lauda Air .....                             | 1 x 737,<br>1 x 767                                   | 107             | —                         | —                                     | —                | —                                    | 91      |
| Bahrain/Gulf Air .....                              | 2 x 767   | 146             | —                         | —                                     | —                | —                                    | 125     |
| Brazil/Varig .....                                  | 2 x MD-11   | 210             | —                         | —                                     | —                | —                                    | 173     |
| Canada/Air Canada .....                             | 1 x 767   | 76              | —                         | —                                     | —                | —                                    | 58      |
| China/China Eastern<br>Airlines .....               | 1 x MD-11   | 113             | —                         | —                                     | —                | —                                    | 95      |
| China/Shanghai Airlines ..                          | 2 x 757   | 232             | —                         | —                                     | —                | —                                    | 197     |
| China/Air China .....                               | 2 x 737   | 64              | —                         | —                                     | —                | —                                    | 51      |
| China/Xiamen Airlines, Ltd                          | 2 x 757   | 105             | —                         | —                                     | —                | —                                    | 89      |
| Hungary/Malev Hungarian<br>Airlines .....           | 2 x 767   | 148             | —                         | —                                     | —                | —                                    | 126     |
| Indonesia/Ministry of<br>Finance of Indonesia ..    | 7 x 737,<br>2 x 747                                   | 618             | —                         | —                                     | —                | —                                    | 527     |
| Israel/El Al-Israel Airlines ..                     | 2 x 747   | 321             | —                         | —                                     | —                | —                                    | 274     |
| Italy/Alitalia-Linee Aeree<br>Italiene .....        | 4 x MD-80,<br>1 x MD-11                               | 227             | —                         | —                                     | —                | —                                    | 191     |
| Luxembourg/Luxair .....                             | 2 x 737   | 58              | —                         | —                                     | —                | —                                    | 49      |
| Luxembourg/Cargolux<br>Airlines International S.A.  | 2 x 747   | 278             | —                         | —                                     | —                | —                                    | 238     |
| Malaysia/Malaysian Airline<br>System .....          | 13 x 737,<br>1 x 747                                  | 541             | —                         | —                                     | —                | —                                    | 455     |
| Malta/Air Malta .....                               | 1 x 737   | 33              | —                         | —                                     | —                | —                                    | 29      |
| Nauru/Victoria Aircraft<br>Leasing Corporation .... | 2 x 737   | 78              | —                         | —                                     | —                | —                                    | 67      |
| Norway/Brathens S.A.F.E ..                          | 2 x 737   | 54              | —                         | —                                     | —                | —                                    | 46      |
| Romania/TAROM-Romanian<br>Air Transport .....       | 2 x 737   | 57              | —                         | —                                     | —                | —                                    | 49      |
| South Africa/Transnet, Ltd.                         | 2 x 747   | 222             | —                         | —                                     | —                | —                                    | 189     |
| Thailand/Thai Airways ...                           | 1 x 747   | 135             | —                         | —                                     | —                | —                                    | 115     |
| Tunisia/Société Tunisienne<br>de L'Air .....        | 1 x 737   | 29              | —                         | —                                     | —                | —                                    | 24      |

(Continued on next page)

**EXPORT-IMPORT BANK  
LOAN AND GUARANTEE AUTHORIZATIONS  
(Continued)**

| Customer<br>(Country/Airline)                 | Number and<br>Aircraft Model<br>or Related<br>Product | Export<br>Value | Authorization             |                                       |                  |                                      |         |
|---|---|-----------------|---------------------------|---------------------------------------|------------------|--------------------------------------|---------|
|   |   |                 | Loans<br>(Direct Credits) |                                       |                  | Guar-<br>antees                      |         |
|   |   |                 | Amount                    | Percent<br>Cover-<br>age <sup>a</sup> | Interest<br>Rate | Repay-<br>ment<br>Terms <sup>b</sup> | Amount  |
| <b>FY 1992</b>                                |   |                 |                           |                                       |                  |                                      |         |
| <b>TOTALS</b> .....                           | 37 aircraft   | \$1,889         | —                         | —                                     | —                | —                                    | \$1,597 |
| Australia/Australian Airlines                 | 5 x 737   | 153             | —                         | —                                     | —                | —                                    | 131     |
| Brazil/Varig .....                            | 2 x 737   | 60              | —                         | —                                     | —                | —                                    | 42      |
| China/China Eastern<br>Airlines .....         | 2 x MD-11   | 221             | —                         | —                                     | —                | —                                    | 186     |
| Czechoslovakia/<br>Czechoslovak Airline ..... | 5 x 737   | 144             | —                         | —                                     | —                | —                                    | 123     |
| India/Air India .....                         | 4 x 747   | 704             | —                         | —                                     | —                | —                                    | 600     |
| Mexico/Banco Nac De<br>Comercio Exterio ..... | 1 x 737   | 38              | —                         | —                                     | —                | —                                    | 30      |
| Morocco/RAM Leasing ...                       | 4 x 737   | 134             | —                         | —                                     | —                | —                                    | 114     |
| Norway/Braathens S.A.F.E.                     | 2 x 737   | 50              | —                         | —                                     | —                | —                                    | 42      |
| Pakistan/Pakistan Int'l<br>Airline .....      | 1 x 737   | 35              | —                         | —                                     | —                | —                                    | 30      |
| Poland/LOT Polisa Airlines                    | 9 x 737   | 289             | —                         | —                                     | —                | —                                    | 246     |
| Tunisia/Societe<br>Tunisienne De L'Air .....  | 2 x 737   | 62              | —                         | —                                     | —                | —                                    | 53      |
| <b>FY 1991</b>                                |   |                 |                           |                                       |                  |                                      |         |
| <b>TOTALS</b> .....                           | 12 aircraft   | \$ 657          | —                         | —                                     | —                | —                                    | \$ 566  |
| Bahrain/Gulf Air Co. ....                     | 6 x 767   | 427             | —                         | —                                     | —                | —                                    | 366     |
| Greece/Olympic Airways .                      | 6 x 737   | 230             | —                         | —                                     | —                | —                                    | 200     |

Source: Aerospace Industries Association, based on data from the Export-Import Bank of the United States.

NOTE: For definitions of Loans and Guarantees, see Export-Import Bank tables on previous pages.

a. Amount of loan as percent of export value.

b. Number of payments and frequency (S=semi-annual).

## EMPLOYMENT

**D**riven by the combined effects of the defense draw-down and a temporary lull in commercial aircraft manufacturing activity, employment in the aerospace industry continued to decline in 1993. On an annual average employment basis, the aerospace labor force was reduced by more than 12 percent to a level of 966,000. This compared with 1,100,000 in the previous year and marked the first time aerospace employment had dipped below the one million level since 1978. The dual recession situation, wherein the industry's two main business segments are simultaneously depressed, is expected to continue at least until 1996, when a rebound in commercial aircraft production is anticipated. The outlook is for further employment reductions; an AIA projection estimated that total industry employment would fall to 836,000 by December 1994, bringing the total reduction to 495,000 or 37 percent of the labor force in place in the peak year 1989. The 1993 employment figure represented 5.4 percent of the total employment in all U.S. manufacturing indus-

tries, down from 6.1 percent in the previous year. It also represented 9.5 percent of the total employment by U.S. companies producing durable goods; the 1992 figure was 10.7 percent.

The industry segment engaged in manufacture of aircraft, engines, and parts once again suffered the greatest number of lost jobs. Annual average employment in that category was 542,000, down 70,000 from 1992's 612,000.

Employment averaged 124,000 (down 22,000) in the industry segment producing missile and space systems. Average employment for all other categories combined fell from 342,000 in 1992 to 300,000 in 1993.

The total number of production workers declined by more than 13 percent, from 355,000 in 1992 to



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308,000 in 1993. In aircraft, engine, and parts manufacture, production workers numbered 252,000, more than 80 percent of the total but the lowest number employed since 1978.

The industry's 1993 payroll amounted to \$30.6 billion, down 8 percent from the previous year's \$33.3 billion; both figures include lump-sum payments made by many aerospace companies in lieu of general wage or cost of living increases. Average weekly earnings (again including lump-sum payments) came to \$725, up from \$693; average hourly earnings were \$17.44, up from \$16.67.

As is customarily the case, the Pacific region dominated in a geographic breakdown of aerospace employment. The Pacific region led with 39.7 percent of the total, followed by New England (13.2 percent), West North Central (10.1 percent), South Central (8.8 percent), East North Central (8.1 percent), South Atlantic (7.2 percent), Middle Atlantic (6.6 percent), and Mountain (6.3 percent).

The Pacific region also led in the largest share of employment in most product group breakdowns. In the civil aircraft sector,

employment at Pacific-based companies constituted 50.4 percent of the total. The East and West North Central regions combined had 24.9 percent of civil aircraft manufacturing employment, while the New England region had 9.9 percent. The Pacific region also had the largest share of employees engaged in military aircraft production—23.8 percent—followed by the New England (16.9 percent), West North Central (15.7 percent), and South Central (13.6 percent) regions. The combined New England/Middle Atlantic regions accounted for 39.9 percent of employment in missile manufacture; the Pacific region for 38.8 percent. The Pacific region accounted for 44.4 percent of employees engaged in space fabrication, followed by the Mountain (17.8 percent) and the South Atlantic (14.9 percent) regions.





**ANNUAL AVERAGE EMPLOYMENT IN ALL MANUFACTURING,  
DURABLE GOODS, AND AEROSPACE INDUSTRIES**

Calendar Years 1979–1993  
(Thousands of Employees)

| Year              | All Manu-<br>facturing<br>Industries | Durable<br>Goods<br>Industries | Aerospace Industry <sup>a</sup> |                        |                   |
|-------------------|--------------------------------------|--------------------------------|---------------------------------|------------------------|-------------------|
|                   |                                      |                                | TOTAL                           | As Percent of          |                   |
|                   |                                      |                                |                                 | All Manufac-<br>turing | Durable<br>Goods  |
| 1979              | 21,040                               | 12,730                         | 1,007                           | 4.8%                   | 7.9%              |
| 1980              | 20,285                               | 12,159                         | 1,080                           | 5.3                    | 8.9               |
| 1981              | 20,170                               | 12,082                         | 1,087                           | 5.4                    | 9.0               |
| 1982              | 18,780 <sup>r</sup>                  | 11,014                         | 1,038                           | 5.5                    | 9.4               |
| 1983              | 18,432 <sup>r</sup>                  | 10,707                         | 1,019                           | 5.5                    | 9.5               |
| 1984              | 19,372 <sup>r</sup>                  | 11,476 <sup>r</sup>            | 1,058                           | 5.5                    | 9.2               |
| 1985              | 19,248 <sup>r</sup>                  | 11,458 <sup>r</sup>            | 1,151                           | 6.0                    | 10.1 <sup>r</sup> |
| 1986              | 18,947 <sup>r</sup>                  | 11,195 <sup>r</sup>            | 1,241                           | 6.6 <sup>r</sup>       | 11.1              |
| 1987              | 18,999 <sup>r</sup>                  | 11,154 <sup>r</sup>            | 1,282                           | 6.8 <sup>r</sup>       | 11.5              |
| 1988              | 19,314 <sup>r</sup>                  | 11,363 <sup>r</sup>            | 1,294                           | 6.7                    | 11.4              |
| 1989              | 19,391 <sup>r</sup>                  | 11,394 <sup>r</sup>            | 1,314                           | 6.8                    | 11.5              |
| 1990              | 19,076 <sup>r</sup>                  | 11,109 <sup>r</sup>            | 1,302                           | 6.8                    | 11.7              |
| 1991              | 18,406 <sup>r</sup>                  | 10,569 <sup>r</sup>            | 1,214                           | 6.6                    | 11.5              |
| 1992 <sup>r</sup> | 18,104                               | 10,277                         | 1,100                           | 6.1                    | 10.7              |
| 1993              | 18,003                               | 10,172                         | 966                             | 5.4                    | 9.5               |

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly) and Aerospace Industries Association estimates.

a See Glossary for detailed explanation of "Aerospace Employment."

r Revised.

**ANNUAL PAYROLL**  
**AEROSPACE INDUSTRY AND ALL MANUFACTURING INDUSTRIES**  
 Calendar Years 1979–1993  
 (Millions of Dollars)

| Year              | All<br>Manufacturing<br>Industries <sup>a</sup> | Aerospace Industry <sup>b</sup> |                       |                  | Aerospace<br>As Percent<br>of All<br>Manufacturing |
|-------------------|---|---------------------------------|-----------------------|------------------|--|
|                   |   | TOTAL                           | Production<br>Workers | Other<br>Workers |  |
| 1979              | \$334,800                                       | \$15,150                        | \$ 6,465              | \$ 8,685         | 4.5%   |
| 1980              | 355,600   | 18,026                          | 7,658                 | 10,368           | 5.1  |
| 1981              | 386,700   | 19,906                          | 8,152                 | 11,754           | 5.1  |
| 1982              | 384,000   | 20,750                          | 8,043                 | 12,707           | 5.4  |
| 1983              | 397,400   | 21,644                          | 8,071                 | 13,573           | 5.4  |
| 1984              | 439,100   | 23,773                          | 8,746                 | 15,027           | 5.4  |
| 1985              | 460,900   | 26,749                          | 9,837                 | 16,911           | 5.8  |
| 1986              | 473,200   | 29,547                          | 11,038                | 18,509           | 6.2  |
| 1987              | 490,300   | 31,101                          | 11,700                | 19,401           | 6.3  |
| 1988              | 524,000   | 32,566                          | 11,744                | 20,822           | 6.2  |
| 1989              | 541,800   | 34,154                          | 12,440                | 21,714           | 6.3  |
| 1990              | 556,100   | 35,590                          | 13,020                | 22,570           | 6.4  |
| 1991              | 556,900   | 34,520                          | 12,536                | 21,984           | 6.2  |
| 1992 <sup>f</sup> | 577,600   | 33,131                          | 11,815                | 21,316           | 5.7  |
| 1993              | 577,300   | 30,427                          | 10,682                | 19,745           | 5.3  |

**AEROSPACE — INCLUDING LUMP-SUM PAYMENTS<sup>c</sup>**

| Year              | TOTAL     | Production<br>Workers | Other<br>Workers | Aerospace<br>As Percent<br>of All<br>Manufacturing |
|-------------------|-----------|-----------------------|------------------|--|
| 1984              | \$ 23,813 | \$ 8,786              | \$15,027         | 5.4%   |
| 1985              | 26,782    | 9,871                 | 16,911           | 5.8  |
| 1986              | 29,611    | 11,102                | 18,509           | 6.3  |
| 1987              | 31,262    | 11,862                | 19,401           | 6.4  |
| 1988              | 32,757    | 11,935                | 20,822           | 6.3  |
| 1989              | 34,396    | 12,682                | 21,714           | 6.3  |
| 1990              | 35,862    | 13,292                | 22,570           | 6.4  |
| 1991              | 34,688    | 12,704                | 21,984           | 6.2  |
| 1992 <sup>f</sup> | 33,269    | 11,953                | 21,316           | 5.8  |
| 1993              | 30,576    | 10,831                | 19,745           | 5.3  |

Source: Bureau of Economic Analysis, "Survey of Current Business" (Monthly) and Aerospace Industries Association estimates based on Bureau of Labor Statistics, "Employment and Earnings" (Monthly).

a See Glossary for explanation of "Payroll, All Manufacturing."

b Based on combined annual average employment and average weekly earnings for SICs 372 and 376.

c Many aerospace manufacturers have included lump-sum payments in labor settlements since late 1983 in lieu of general wage increases and/or cost of living adjustments. These payments are reported by BLS in separate wage series for SICs 3721 & 3761 and are included by AIA in the totals for production workers and all aerospace.

f Revised.

**EMPLOYMENT IN THE AEROSPACE INDUSTRY<sup>a</sup>**

Calendar Years 1979–1993  
(Annual Average, Thousands of Employees)

| Year                      | TOTAL            | Aircraft,<br>Engines, &<br>Parts<br>(SIC 372) | Missiles<br>& Space<br>Vehicles<br>(SIC 376) | Other <sup>b</sup> |
|---------------------------|------------------|---|--|--------------------|
| <b>TOTAL EMPLOYMENT</b>   |                  |   |  |                    |
| 1979                      | 1,007            | 593   | 102  | 313                |
| 1980                      | 1,080            | 633   | 111  | 336                |
| 1981                      | 1,087            | 626   | 123  | 338                |
| 1982                      | 1,038            | 584   | 131  | 323                |
| 1983                      | 1,019            | 562   | 141  | 317                |
| 1984                      | 1,058            | 575   | 154  | 329                |
| 1985                      | 1,151            | 616   | 177  | 358                |
| 1986                      | 1,241            | 656   | 200  | 386                |
| 1987                      | 1,282            | 678   | 206  | 399                |
| 1988                      | 1,294            | 684   | 208  | 402                |
| 1989                      | 1,314            | 711   | 194  | 408                |
| 1990                      | 1,302            | 712   | 185  | 405                |
| 1991                      | 1,214            | 669   | 168  | 378                |
| 1992 <sup>r</sup>         | 1,100            | 612   | 146  | 342                |
| 1993                      | 966              | 542   | 124  | 300                |
| <b>PRODUCTION WORKERS</b> |                  |   |  |                    |
| 1979                      | 380 <sup>r</sup> | 322   | 33   | 25 <sup>r</sup>    |
| 1980                      | 406 <sup>r</sup> | 344   | 35   | 27 <sup>r</sup>    |
| 1981                      | 396 <sup>r</sup> | 333   | 37   | 26 <sup>r</sup>    |
| 1982                      | 360 <sup>r</sup> | 296   | 40   | 24                 |
| 1983                      | 342 <sup>r</sup> | 274   | 46   | 23 <sup>r</sup>    |
| 1984                      | 351 <sup>r</sup> | 276   | 52   | 23 <sup>r</sup>    |
| 1985                      | 382 <sup>r</sup> | 295   | 62   | 25 <sup>r</sup>    |
| 1986                      | 417 <sup>r</sup> | 323   | 67   | 28 <sup>r</sup>    |
| 1987                      | 434 <sup>r</sup> | 339   | 67   | 29 <sup>r</sup>    |
| 1988                      | 422 <sup>r</sup> | 331   | 63   | 28 <sup>r</sup>    |
| 1989                      | 432 <sup>r</sup> | 344   | 60   | 29 <sup>r</sup>    |
| 1990                      | 430 <sup>r</sup> | 345   | 57   | 29 <sup>r</sup>    |
| 1991                      | 399 <sup>r</sup> | 324   | 48   | 27 <sup>r</sup>    |
| 1992                      | 355 <sup>r</sup> | 291   | 40   | 24 <sup>r</sup>    |
| 1993                      | 308              | 252   | 35   | 20                 |

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly) and Aerospace Industries Association estimates.

<sup>a</sup> See Glossary for detailed explanation of "Aerospace Employment."

<sup>b</sup> Communications, navigation, flight control, and displays (aerospace-related portions of SICs 366, 381, & 382).

<sup>r</sup> Revised.

**EMPLOYMENT IN THE AIRCRAFT, ENGINES, AND PARTS INDUSTRY<sup>a</sup>**  
**Calendar Years 1979–1993**  
**(Annual Average, Thousands of Employees)**

| Year                      | TOTAL<br>(SIC 372) | Airframes<br>(SIC 3721) | Engines<br>and Parts<br>(SIC 3724) | Other Parts<br>& Equipment<br>(SIC 3728) |
|---------------------------|--------------------|-------------------------|------------------------------------|--|
| <b>TOTAL EMPLOYMENT</b>   |                    |                         |                                    |  |
| 1979                      | 592.5              | 333.2                   | 151.6                              | 107.8                                    |
| 1980                      | 633.1              | 349.3                   | 162.9                              | 120.9                                    |
| 1981                      | 626.4              | 344.2                   | 162.5                              | 119.8                                    |
| 1982                      | 584.0              | 319.9                   | 148.8                              | 115.3                                    |
| 1983                      | 561.6              | 304.7                   | 140.1                              | 116.9                                    |
| 1984                      | 574.9              | 306.1                   | 140.2                              | 128.7                                    |
| 1985                      | 616.2              | 325.6                   | 147.5                              | 143.2                                    |
| 1986                      | 655.8              | 338.9                   | 153.6                              | 163.2                                    |
| 1987                      | 678.0              | 356.4                   | 158.2                              | 163.4                                    |
| 1988                      | 683.5              | 368.5                   | 155.8                              | 159.3                                    |
| 1989                      | 711.0              | 382.2                   | 153.5                              | 175.2                                    |
| 1990                      | 712.3              | 381.0                   | 151.7                              | 179.5                                    |
| 1991                      | 669.2              | 355.6                   | 143.2                              | 170.3                                    |
| 1992 <sup>r</sup>         | 611.7              | 332.1                   | 126.6                              | 153.0                                    |
| 1993                      | 541.8              | 300.8                   | 109.8                              | 131.1                                    |
| <b>PRODUCTION WORKERS</b> |                    |                         |                                    |  |
| 1979                      | 322.1              | 165.9                   | 86.4                               | 70.2                                     |
| 1980                      | 343.9              | 173.7                   | 93.0                               | 77.4                                     |
| 1981                      | 332.7              | 167.0                   | 92.4                               | 73.5                                     |
| 1982                      | 296.2              | 144.7                   | 84.2                               | 67.3                                     |
| 1983                      | 273.9              | 131.5                   | 74.7                               | 67.1                                     |
| 1984                      | 276.0              | 128.2                   | 73.0                               | 73.3                                     |
| 1985                      | 294.6              | 135.5                   | 74.8                               | 82.2                                     |
| 1986                      | 322.5              | 146.6                   | 78.7                               | 94.3                                     |
| 1987                      | 338.5              | 159.1                   | 80.5                               | 96.3                                     |
| 1988                      | 331.3              | 162.1                   | 77.1                               | 92.1                                     |
| 1989                      | 343.7              | 167.4                   | 76.8                               | 99.5                                     |
| 1990                      | 344.6              | 164.1                   | 77.2                               | 103.2                                    |
| 1991                      | 323.6              | 151.6                   | 73.1                               | 98.8                                     |
| 1992 <sup>r</sup>         | 291.4              | 137.8                   | 64.3                               | 89.2                                     |
| 1993                      | 252.4              | 122.5                   | 53.9                               | 75.9                                     |

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly).

a See Glossary for detailed explanation of "Aerospace Employment."

r Revised.

**AEROSPACE INDUSTRY EMPLOYMENT<sup>a</sup>  
BY OCCUPATIONAL CLASSIFICATION**

As of December<sup>b</sup> 1982–1994  
(Thousands of Employees)

| Year              | TOTAL | Production<br>Workers | Scientists<br>& Engineers | Technicians     | Others           |
|-------------------|-------|-----------------------|---------------------------|-----------------|------------------|
| 1982              | 765   | 353                   | 134                       | 54              | 224              |
| 1983              | 765   | 344                   | 135                       | 55              | 231              |
| 1984              | 817   | 365                   | 147                       | 60              | 245              |
| 1985              | 898   | 405                   | 163                       | 66              | 264              |
| 1986              | 948   | 436                   | 168                       | 67              | 277              |
| 1987              | 968   | 436                   | 175                       | 69              | 288              |
| 1988              | 977   | 431                   | 184                       | 66              | 296              |
| 1989              | 992   | 439                   | 198                       | 68              | 287              |
| 1990              | 946   | 422                   | 205                       | 67 <sup>r</sup> | 252 <sup>r</sup> |
| 1991              | 879   | 386                   | 205                       | 60              | 228              |
| 1992              | 775   | 335                   | 165                       | 57              | 218              |
| 1993 <sup>p</sup> | 677   | 287                   | 153                       | 52              | 185              |
| 1994 <sup>e</sup> | 641   | 269                   | 146                       | 50              | 176              |

Source: Aerospace Industries Association, company reports and Bureau of Labor Statistics, "Employment and Earnings" (Monthly).

a Totals for employment by occupational classification reflect only establishments in SICs 372, 376, 366, 381, and 382. As a result, they do not match the totals for aerospace employment by product group which include other industries with employment related to aerospace.

b End-of-year figures often differ from annual averages appearing in other tables.

e Estimate.

p Preliminary.

r Revised.

**TOTAL EMPLOYMENT AND SCIENTISTS & ENGINEERS  
IN COMMERCIAL TRANSPORT AIRCRAFT  
& HELICOPTER MANUFACTURING ESTABLISHMENTS<sup>a</sup>  
As of December 1982–1993**

| Year              | Commercial Transport Aircraft |                           | Helicopters |                           |
|-------------------|-------------------------------|---------------------------|-------------|---------------------------|
|                   | Total                         | Scientists<br>& Engineers | Total       | Scientists<br>& Engineers |
| 1982              | 61,800                        | 10,200                    | 26,500      | 3,100                     |
| 1983              | 46,100                        | 8,100                     | 27,600      | 3,500                     |
| 1984              | 54,800                        | 8,900                     | 31,300      | 3,800                     |
| 1985              | 65,000                        | 10,500                    | 37,900      | 5,000                     |
| 1986              | 75,300                        | 12,500                    | 37,400      | 4,000                     |
| 1987              | 87,400                        | 14,700                    | 39,000      | 4,300                     |
| 1988              | 98,800                        | 16,200                    | 36,600      | 4,200                     |
| 1989              | 120,100                       | 15,100                    | 34,200      | 4,900                     |
| 1990              | 122,400                       | 16,700                    | 30,600      | 4,500                     |
| 1991 <sup>r</sup> | 124,200                       | 16,100                    | 30,100      | 4,400                     |
| 1992              | 111,600                       | 14,800                    | 28,200      | 4,400                     |
| 1993 <sup>p</sup> | 91,500                        | 13,000                    | 26,800      | 4,200                     |

Source: Aerospace Industries Association, company reports and AIA estimates.

a Includes only establishments identified as prime manufacturers of commercial transport aircraft and of civil and military helicopters. Excludes subcontractors and propulsion manufacturers.

p Preliminary.

r Revised.

**GEOGRAPHIC DISTRIBUTION OF AEROSPACE EMPLOYMENT  
BY OCCUPATIONAL CLASSIFICATION AND PRODUCT GROUP**

As of December 1993

| PERCENT DISTRIBUTION BY OCCUPATION |        |                    |                        |             |            |
|------------------------------------|--------|--------------------|------------------------|-------------|------------|
| Region                             | TOTAL  | Production Workers | Scientists & Engineers | Technicians | All Others |
| <b>TOTAL</b> .....                 | 100.0% | 100.0%             | 100.0%                 | 100.0%      | 100.0%     |
| New England .....                  | 13.2%  | 17.5%              | 11.2%                  | 9.7%        | 10.6%      |
| Middle Atlantic .....              | 6.6    | 5.3                | 7.7                    | 4.6         | 7.7        |
| East North Central .....           | 8.1    | 12.6               | 6.1                    | 5.6         | 4.9        |
| West North Central .....           | 10.1   | 12.4               | 10.0                   | 10.8        | 7.1        |
| South Atlantic .....               | 7.2    | 4.6                | 8.4                    | 7.7         | 9.3        |
| South Central .....                | 8.8    | 8.0                | 8.8                    | 7.3         | 10.2       |
| Mountain .....                     | 6.3    | 4.8                | 7.5                    | 6.4         | 7.2        |
| Pacific .....                      | 39.7   | 34.8               | 40.3                   | 47.9        | 43.0       |

| PERCENT DISTRIBUTION BY PRODUCT GROUP |        |          |          |          |        |        |          |
|---------------------------------------|--------|----------|----------|----------|--------|--------|----------|
| Region <sup>a</sup>                   | Total  | Aircraft |          | Missiles | Space  | Other  |          |
|                                       |        | Civil    | Military |          |        | Aero   | Non-Aero |
| <b>TOTAL</b> .....                    | 100.0% | 100.0%   | 100.0%   | 100.0%   | 100.0% | 100.0% | 100.0%   |
| New England .....                     | 13.2%  | 9.9%     | 16.9%    | 39.9%    | 13.2%  | 6.7%   | 46.9%    |
| Middle Atlantic ...                   | 6.6    | 1.7      | 7.6      | 7.6      | 13.2%  | 12.9   | 46.9%    |
| East North Central ..                 | 8.1    | 24.9     | 8.5      | 7.1      | 0.8    | 15.9   | 11.3     |
| West North Central                    | 10.1   | 24.9     | 15.7     | 7.1      | 0.8    | 15.9   | 11.3     |
| South Atlantic .....                  | 7.2    | 8.3      | 10.9     | 7.1      | 14.9   | 8.4    | 0.4      |
| South Central .....                   | 8.8    | 8.3      | 13.6     | 7.1      | 8.9    | 6.8    | 0.4      |
| Mountain .....                        | 6.3    | 4.8      | 3.0      | 7.1      | 17.8   | 6.0    | 41.1     |
| Pacific .....                         | 39.7   | 50.4     | 23.8     | 38.8     | 44.4   | 43.3   | 41.1     |

Source: Aerospace Industries Association, company reports.

NOTE: Employment in 37 surveyed aerospace manufacturing corporations accounted for approximately two-thirds of total industry employment.

a Data for two regions are combined where employment for one region within a product group represented three or fewer companies.

## AVERAGE HOURLY EARNINGS IN THE AEROSPACE INDUSTRY

Production Workers Only  
Calendar Years 1975-1993

| Year  | TOTAL <sup>a</sup> | Aircraft (SIC 372) |                      |                            |                                    | Guided Missiles, Space Vehicles & Parts (SIC 376) | Complete Guided Missiles, & Space Vehicles (SIC 3761) |
|---|--------------------|--------------------|----------------------|----------------------------|------------------------------------|---|---|
|   |                    | TOTAL <sup>a</sup> | Airframes (SIC 3721) | Engines & Parts (SIC 3724) | Other Parts & Equipment (SIC 3728) |   |   |
| <b>AVERAGE HOURLY EARNINGS<sup>b</sup></b>                                  |                    |                    |                      |                            |                                    |   |   |
| 1975  | \$ 6.00            | \$ 6.00            | \$ 6.21              | \$ 6.04                    | \$ 5.47                            | \$ 6.02   | \$ 5.99   |
| 1976  | 6.44               | 6.44               | 6.63                 | 6.46                       | 5.95                               | 6.48  | 6.49  |
| 1977  | 6.93               | 6.92               | 7.07                 | 7.05                       | 6.44                               | 7.04  | 7.15  |
| 1978  | 7.54               | 7.54               | 7.70                 | 7.80                       | 6.93                               | 7.56  | 7.72  |
| 1979  | 8.26               | 8.26               | 8.50                 | 8.53                       | 7.48                               | 8.25  | 8.38  |
| 1980  | 9.27               | 9.28               | 9.66                 | 9.42                       | 8.40                               | 9.22  | 9.33  |
| 1981  | 10.29              | 10.31              | 10.74                | 10.41                      | 9.35                               | 10.06   | 10.34   |
| 1982  | 11.20              | 11.23              | 11.85                | 11.16                      | 10.17                              | 10.95   | 11.21   |
| 1983  | 11.79              | 11.82              | 12.58                | 11.61                      | 10.73                              | 11.59   | 11.84   |
| 1984  | 12.24              | 12.32              | 12.91                | 12.40                      | 11.37                              | 11.82   | 12.01   |
| 1985  | 12.54              | 12.62              | 13.18                | 12.85                      | 11.66                              | 12.14   | 12.36   |
| 1986  | 12.75              | 12.86              | 13.48                | 13.08                      | 11.90                              | 12.20   | 12.48   |
| 1987  | 13.10              | 13.17              | 13.74                | 13.33                      | 12.23                              | 12.73   | 13.09   |
| 1988  | 13.48              | 13.55              | 14.18                | 13.80                      | 12.28                              | 13.13   | 13.53   |
| 1989  | 14.10              | 14.17              | 14.89                | 14.42                      | 12.81                              | 13.70   | 14.20   |
| 1990  | 14.73              | 14.79              | 15.66                | 14.84                      | 13.37                              | 14.39   | 14.82   |
| 1991  | 15.51              | 15.60              | 16.72                | 15.38                      | 14.05                              | 14.90   | 15.21   |
| 1992  | 16.46 <sup>r</sup> | 16.53 <sup>r</sup> | 17.70                | 16.28                      | 14.89 <sup>r</sup>                 | 15.99   | 16.45   |
| 1993  | 17.19              | 17.24              | 18.43                | 16.70                      | 15.74                              | 16.80   | 17.43   |
| <b>AVERAGE HOURLY EARNINGS INCLUDING LUMP-SUM WAGE PAYMENTS<sup>c</sup></b> |                    |                    |                      |                            |                                    |   |   |
| 1984  | \$12.37            | \$12.46            | \$13.11              | \$12.40                    | \$11.37                            | \$11.92   | \$12.14   |
| 1985  | 12.69              | 12.77              | 13.40                | 12.85                      | 11.66                              | 12.29   | 12.56   |
| 1986  | 12.94              | 13.06              | 13.80                | 13.08                      | 11.90                              | 12.33   | 12.66   |
| 1987  | 13.37              | 13.48              | 14.32                | 13.33                      | 12.23                              | 12.80   | 13.19   |
| 1988  | 13.73              | 13.79              | 14.65                | 13.80                      | 12.28                              | 13.36   | 13.87   |
| 1989  | 14.37              | 14.44              | 15.41                | 14.42                      | 12.81                              | 13.98   | 14.63   |
| 1990  | 15.04              | 15.10              | 16.32                | 14.84                      | 13.37                              | 14.67   | 15.26   |
| 1991  | 15.71              | 15.81              | 17.16                | 15.38                      | 14.05                              | 15.09   | 15.49   |
| 1992  | 16.67 <sup>r</sup> | 16.75 <sup>r</sup> | 18.18                | 16.28                      | 14.89 <sup>r</sup>                 | 16.05 <sup>r</sup>                                | 16.54 <sup>r</sup>                                    |
| 1993  | 17.44              | 17.53              | 19.00                | 16.70                      | 15.74                              | 16.83   | 17.47   |

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly) and Aerospace Industries Association estimates.

a TOTAL columns are employment-based weighted averages.

b Includes overtime premiums.

c Many aerospace manufacturers have included lump-sum payments in labor settlements since late 1983 in lieu of general wage increases and/or cost of living adjustments. These payments are reported by BLS in separate wage series for SICs 3721 & 3761 and are included by AIA in totals.

r Revised.



## AVERAGE WEEKLY EARNINGS IN THE AEROSPACE INDUSTRY

Production Workers Only  
Calendar Years 1979–1993

| Year   | TOTAL <sup>a</sup> | Aircraft (SIC 372) |                      |                            | Guided Missiles, Space Vehicles & Parts (SIC 376) | Complete Guided Missiles, & Space Vehicles (SIC 3761) |                                    |
|--|--------------------|--------------------|----------------------|----------------------------|---|---|------------------------------------|
|  |                    | TOTAL <sup>a</sup> | Airframes (SIC 3721) | Engines & Parts (SIC 3724) |   |   | Other Parts & Equipment (SIC 3728) |
| <b>AVERAGE WEEKLY EARNINGS<sup>b</sup></b>                             |                    |                    |                      |                            |   |   |                                    |
| 1979   | \$351              | \$351              | \$360                | \$361                      | \$322   | \$347   | \$348                              |
| 1980   | 389                | 390                | 404                  | 394                        | 358   | 378   | 383                                |
| 1981   | 424                | 426                | 444                  | 422                        | 396   | 410   | 420                                |
| 1982   | 460                | 462                | 485                  | 454                        | 426   | 447   | 461                                |
| 1983   | 486                | 487                | 513                  | 476                        | 453   | 480   | 494                                |
| 1984   | 513                | 516                | 532                  | 523                        | 486   | 496   | 508                                |
| 1985   | 531                | 534                | 547                  | 542                        | 506   | 515   | 527                                |
| 1986   | 545                | 550                | 568                  | 561                        | 520   | 517   | 533                                |
| 1987   | 556                | 558                | 578                  | 567                        | 523   | 541   | 556                                |
| 1988   | 573                | 575                | 596                  | 582                        | 529   | 567   | 585                                |
| 1989   | 593                | 594                | 616                  | 616                        | 542   | 589   | 611                                |
| 1990   | 624                | 626                | 656                  | 637                        | 570   | 612   | 634                                |
| 1991   | 648                | 651                | 694                  | 654                        | 583   | 632   | 649                                |
| 1992   | 685 <sup>r</sup>   | 689 <sup>r</sup>   | 736                  | 689                        | 615 <sup>r</sup>                                  | 652   | 666                                |
| 1993   | 715                | 717                | 756                  | 715                        | 658   | 696   | 727                                |
| <b>AVERAGE WEEKLY EARNINGS INCLUDING LUMP-SUM PAYMENTS<sup>c</sup></b> |                    |                    |                      |                            |   |   |                                    |
| 1984   | \$515              | \$518              | \$540                | \$523                      | \$486   | \$501   | \$514                              |
| 1985   | 532                | 535                | 556                  | 542                        | 506   | 521   | 535                                |
| 1986   | 548                | 553                | 581                  | 561                        | 520   | 523   | 541                                |
| 1987   | 563                | 567                | 603                  | 567                        | 523   | 544   | 561                                |
| 1988   | 583                | 584                | 615                  | 582                        | 529   | 577   | 599                                |
| 1989   | 605                | 605                | 638                  | 616                        | 542   | 601   | 629                                |
| 1990   | 637                | 639                | 684                  | 637                        | 570   | 624   | 653                                |
| 1991   | 657                | 659                | 712                  | 654                        | 583   | 640   | 661                                |
| 1992   | 693 <sup>r</sup>   | 698 <sup>r</sup>   | 756                  | 689                        | 615 <sup>r</sup>                                  | 655   | 670 <sup>r</sup>                   |
| 1993   | 725                | 729                | 779                  | 715                        | 658   | 697   | 728                                |

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly) and Aerospace Industries Association estimates.

a TOTAL columns are employment-based weighted averages.

b Includes overtime premiums.

c Many aerospace manufacturers have included lump-sum payments in labor settlements since late 1983 in lieu of general wage increases and/or cost of living adjustments. These payments are reported by BLS in separate wage series for SICs 3721 & 3761 and are included by AIA in totals.

r Revised.

## AVERAGE HOURS IN THE AEROSPACE INDUSTRY

Production Workers Only  
Calendar Years 1979–1993

| Year                                 | TOTAL <sup>a</sup> | Aircraft (SIC 372) |                      |                            |                                    | Guided Missiles, Space Vehicles & Parts (SIC 376) | Complete Guided Missiles, & Space Vehicles (SIC 3761) |
|--------------------------------------|--------------------|--------------------|----------------------|----------------------------|------------------------------------|---|---|
|                                      |                    | TOTAL <sup>a</sup> | Airframes (SIC 3721) | Engines & Parts (SIC 3724) | Other Parts & Equipment (SIC 3728) |   |   |
| <b>AVERAGE WEEKLY HOURS</b>          |                    |                    |                      |                            |                                    |   |   |
| 1979                                 | 42.5               | 42.5               | 42.3                 | 42.3                       | 43.1                               | 42.0  | 41.5  |
| 1980                                 | 41.9               | 42.0               | 41.8                 | 41.8                       | 42.6                               | 41.0  | 41.1  |
| 1981                                 | 41.3               | 41.3               | 41.3                 | 40.5                       | 42.4                               | 40.8  | 40.6  |
| 1982                                 | 41.1               | 41.1               | 40.9                 | 40.7                       | 41.9                               | 40.8  | 41.1  |
| 1983                                 | 41.2               | 41.2               | 40.8                 | 41.0                       | 42.2                               | 41.4  | 41.7  |
| 1984                                 | 41.9               | 41.9               | 41.2                 | 42.2                       | 42.7                               | 42.0  | 42.3  |
| 1985                                 | 42.3               | 42.3               | 41.5                 | 42.2                       | 43.4                               | 42.4  | 42.6  |
| 1986                                 | 42.7               | 42.8               | 42.1                 | 42.9                       | 43.7                               | 42.4  | 42.7  |
| 1987                                 | 42.4               | 42.4               | 42.1                 | 42.5                       | 42.8                               | 42.5  | 42.5  |
| 1988                                 | 42.5               | 42.4               | 42.0                 | 42.2                       | 43.1                               | 43.2  | 43.2  |
| 1989                                 | 42.1               | 41.9               | 41.4                 | 42.7                       | 42.3                               | 43.0  | 43.0  |
| 1990                                 | 42.3               | 42.3               | 41.9                 | 42.9                       | 42.6                               | 42.5  | 42.8  |
| 1991                                 | 41.8               | 41.7               | 41.5                 | 42.5                       | 41.5                               | 42.4  | 42.7  |
| 1992                                 | 41.6               | 41.7               | 41.6                 | 42.3                       | 41.3                               | 40.8  | 40.5  |
| 1993                                 | 41.6               | 41.6               | 41.0                 | 42.8                       | 41.8                               | 41.4  | 41.7  |
| <b>AVERAGE WEEKLY OVERTIME HOURS</b> |                    |                    |                      |                            |                                    |   |   |
| 1979                                 | 4.7                | 4.7                | 4.1                  | 5.1                        | 5.3                                | 4.4   | 3.8   |
| 1980                                 | 4.1                | 4.2                | 3.5                  | 5.0                        | 5.0                                | 3.6   | 3.2   |
| 1981                                 | 3.5                | 3.5                | 3.1                  | 3.5                        | 4.4                                | 3.2   | 2.9   |
| 1982                                 | 3.2                | 3.2                | 2.7                  | 3.6                        | 3.7                                | 3.1   | 3.1   |
| 1983                                 | 3.1                | 3.1                | 2.5                  | 3.7                        | 3.7                                | 3.3   | 3.5   |
| 1984                                 | 3.9                | 4.0                | 3.0                  | 5.1                        | 4.6                                | 3.3   | 3.4   |
| 1985                                 | 4.6                | 4.6                | 3.5                  | 5.4                        | 5.3                                | 4.6   | 5.0   |
| 1986                                 | 4.8                | 4.9                | 4.2                  | 5.5                        | 5.5                                | 4.4   | 4.7   |
| 1987                                 | 4.8                | 4.9                | 4.4                  | 5.0                        | 5.4                                | 4.2   | 4.3   |
| 1988                                 | 4.6                | 4.6                | 4.3                  | 4.6                        | 5.1                                | 4.5   | 4.6   |
| 1989                                 | 5.0                | 5.1                | 5.0                  | 5.4                        | 5.0                                | 4.4   | 4.5   |
| 1990                                 | 4.5                | 4.6                | 4.3                  | 5.3                        | 4.5                                | 3.8   | 4.1   |
| 1991                                 | 4.0                | 4.0                | 4.1                  | 4.5                        | 3.5                                | 3.9   | 4.5   |
| 1992                                 | 3.6                | 3.7                | 3.6                  | 4.4                        | 3.3                                | 2.8   | 3.1 <sup>r</sup>                                      |
| 1993                                 | 3.8                | 3.9                | 3.7                  | 4.6                        | 3.7                                | 2.9   | 3.2   |

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly) and Aerospace Industries Association estimates.

a TOTAL columns are employment-based weighted averages.

r Revised.

## EMPLOYMENT IN NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PROGRAMS

End of Fiscal Years 1961–1995

| Year              | TOTAL   | NASA<br>Employees | Contractor<br>Employees <sup>a</sup> |
|-------------------|---------|-------------------|--------------------------------------|
| 1961              | 74,577  | 17,077            | 57,500                               |
| 1962              | 137,656 | 22,156            | 115,500                              |
| 1963              | 246,304 | 27,904            | 218,400                              |
| 1964              | 379,084 | 31,984            | 347,100                              |
| 1965              | 409,900 | 33,200            | 376,700                              |
| 1966              | 393,924 | 33,924            | 360,000                              |
| 1967              | 306,926 | 33,726            | 273,200                              |
| 1968              | 267,871 | 32,471            | 235,400                              |
| 1969              | 218,345 | 31,745            | 186,600                              |
| 1970              | 160,850 | 31,350            | 129,500                              |
| 1971              | 143,578 | 29,478            | 114,100                              |
| 1972              | 138,800 | 27,500            | 111,300                              |
| 1973              | 134,850 | 26,850            | 108,000                              |
| 1974              | 125,220 | 25,020            | 100,200                              |
| 1975              | 127,733 | 24,333            | 103,400                              |
| 1976              | 130,739 | 24,039            | 108,000                              |
| 1977              | 124,136 | 23,636            | 100,500                              |
| 1978              | 124,637 | 23,237            | 101,400                              |
| 1979              | 131,931 | 22,831            | 109,100                              |
| 1980              | 135,613 | 22,613            | 113,000                              |
| 1981              | 133,473 | 21,873            | 111,600                              |
| 1982              | 128,730 | 22,430            | 106,300                              |
| 1983              | 129,246 | 22,246            | 107,000                              |
| 1984              | 162,080 | 22,080            | 140,000                              |
| 1985              | 131,991 | 21,991            | 110,000                              |
| 1986              | 154,660 | 21,660            | 133,000                              |
| 1987              | 165,001 | 22,001            | 143,000                              |
| 1988              | 172,326 | 22,326            | 150,000                              |
| 1989              | 213,054 | 23,054            | 190,000                              |
| 1990              | 221,829 | 23,829            | 198,000                              |
| 1991              | 223,149 | 24,149            | 199,000                              |
| 1992              | 230,513 | 24,513            | 206,000                              |
| 1993              | 228,674 | 24,174            | 204,500                              |
| 1994 <sup>E</sup> | 218,512 | 24,475            | 194,037                              |
| 1995 <sup>E</sup> | 206,372 | 23,638            | 182,734                              |

Source: Office of Management and Budget, "Budget of the United States Government" (Annually) and NASA Headquarters.  
 a Includes estimates of manpower for hardware and related contracts, as well as actual work-years for support service contracts. Increase in FY 1984 caused by change in estimating methodology to reflect more accurately the mix of support and development contractors.  
 E Estimate.

**FEDERAL CIVILIAN EMPLOYMENT<sup>a</sup>  
IN THE DEPARTMENT OF DEFENSE**

Fiscal Years 1967–1995

| Year              | TOTAL     | Civil Functions <sup>b</sup> | Military Functions <sup>c</sup> |
|-------------------|-----------|------------------------------|---------------------------------|
| 1967              | 1,225,637 | 31,980                       | 1,193,657                       |
| 1968              | 1,288,130 | 32,062                       | 1,256,068                       |
| 1969              | 1,257,091 | 31,214                       | 1,225,877                       |
| 1970              | 1,159,935 | 30,293                       | 1,129,642                       |
| 1971              | 1,092,804 | 30,063                       | 1,062,741                       |
| 1972              | 1,040,147 | 30,585                       | 1,009,562                       |
| 1973              | 987,281   | 29,971                       | 957,310                         |
| 1974              | 1,002,850 | 29,072                       | 973,778                         |
| 1975              | 983,790   | 29,069                       | 954,721                         |
| 1976              | 951,034   | 28,648                       | 922,386                         |
| 1977              | 940,549   | 28,912                       | 911,637                         |
| 1978              | 933,071   | 28,962                       | 904,109                         |
| 1979              | 914,582   | 28,592                       | 885,990                         |
| 1980              | 907,700   | 27,700                       | 880,000                         |
| 1981              | 981,400   | 34,400                       | 947,000                         |
| 1982              | 1,009,192 | 31,111                       | 978,081                         |
| 1983              | 1,015,622 | 30,816                       | 984,806                         |
| 1984              | 1,040,213 | 28,681                       | 1,011,532                       |
| 1985              | 1,065,624 | 28,754                       | 1,036,870                       |
| 1986              | 1,069,863 | 28,511                       | 1,041,352                       |
| 1987              | 1,059,669 | 28,352                       | 1,031,317                       |
| 1988              | 1,053,000 | 28,419                       | 1,024,581                       |
| 1989              | 1,051,166 | 28,081                       | 1,023,085                       |
| 1990              | 1,048,814 | 27,651                       | 1,021,163                       |
| 1991              | 1,001,183 | 27,385                       | 973,798                         |
| 1992              | 1,000,453 | 27,584                       | 972,869                         |
| 1993              | 958,855   | 27,055                       | 931,800                         |
| 1994 <sup>E</sup> | 914,500   | 28,500                       | 886,000                         |
| 1995 <sup>E</sup> | 882,700   | 27,800                       | 854,900                         |

Source: Office of Management and Budget, "The Budget of the United States Government" (Annually).

a Full-time equivalent civilian employment.

b Data are estimated for portions of Civil Functions.

c The Department of Defense is exempt from full-time equivalent controls. Data shown are estimated civilian employment for military functions and military assistance.

E Estimate.

**OCCUPATIONAL INJURY AND ILLNESS INCIDENCE RATES<sup>a</sup>**  
**ALL MANUFACTURING AND AEROSPACE INDUSTRIES**  
**Calendar Years 1988–1992**

|   | 1988  | 1989  | 1990  | 1991  | 1992  |
|---|-------|-------|-------|-------|-------|
| <b>All Manufacturing:</b>                                     |       |       |       |       |       |
| Total Cases .....   | 13.0  | 13.1  | 13.2  | 12.7  | 12.5  |
| Lost Workday Cases .....                                      | 5.7   | 5.8   | 5.8   | 5.6   | 5.4   |
| Nonfatal Cases without Lost Workdays .                        | 7.3   | 7.3   | 7.3   | 7.1   | 7.1   |
| Lost Workdays .....   | 107.3 | 113.0 | 120.7 | 121.5 | 124.6 |
| <b>Aircraft and Parts (SIC 372):</b>                          |       |       |       |       |       |
| Total Cases .....   | 9.9   | 10.1  | 10.4  | 10.9  | 11.1  |
| Lost Workday Cases .....                                      | 3.6   | 3.7   | 4.0   | 4.3   | 4.5   |
| Nonfatal Cases without Lost Workdays .                        | 6.3   | 6.4   | 6.4   | 6.6   | 6.6   |
| Lost Workdays .....   | 67.9  | 70.2  | 90.3  | 114.4 | 125.4 |
| <b>Aircraft (SIC 3721):</b>                                   |       |       |       |       |       |
| Total Cases .....   | 10.1  | 10.2  | 10.0  | 10.2  | 10.7  |
| Lost Workday Cases .....                                      | 3.3   | 3.5   | 3.9   | 4.2   | 4.4   |
| Nonfatal Cases without Lost Workdays .                        | 6.7   | 6.7   | 6.1   | 6.0   | 6.3   |
| Lost Workdays .....   | 66.1  | 70.5  | 95.3  | 128.2 | 141.8 |
| <b>Aircraft Engines and Parts (SIC 3724):</b>                 |       |       |       |       |       |
| Total Cases .....   | 8.7   | 7.9   | 9.3   | 10.0  | 9.7   |
| Lost Workday Cases .....                                      | 3.7   | 3.7   | 4.2   | 4.3   | 3.9   |
| Nonfatal Cases without Lost Workdays .                        | 5.0   | 4.2   | 5.1   | 5.7   | 5.7   |
| Lost Workdays .....   | 81.9  | 72.5  | 89.5  | 91.3  | 85.1  |
| <b>Aircraft Parts (SIC 3728):</b>                             |       |       |       |       |       |
| Total Cases .....   | 10.5  | 12.0  | 11.9  | 12.9  | 13.1  |
| Lost Workday Cases .....                                      | 3.9   | 4.1   | 3.9   | 4.4   | 5.0   |
| Nonfatal Cases without Lost Workdays .                        | 6.6   | 7.8   | 8.0   | 8.5   | 8.1   |
| Lost Workdays .....   | 59.1  | 67.7  | 80.5  | 105.3 | 122.3 |
| <b>Guided Missiles, Space Vehicles &amp; Parts (SIC 376):</b> |       |       |       |       |       |
| Total Cases .....   | 4.6   | 4.8   | 4.0   | 4.3   | 4.0   |
| Lost Workday Cases .....                                      | 2.2   | 2.2   | 1.9   | 2.1   | 1.8   |
| Nonfatal Cases without Lost Workdays .                        | 2.4   | 2.6   | 2.1   | 2.2   | 2.3   |
| Lost Workdays .....   | 41.3  | 39.7  | 39.5  | 51.0  | 50.3  |
| <b>Guided Missiles &amp; Space Vehicles (SIC 3761):</b>       |       |       |       |       |       |
| Total Cases .....   | 4.6   | 4.6   | 4.0   | 4.3   | 4.0   |
| Lost Workday Cases .....                                      | 2.3   | 2.2   | 1.9   | 2.2   | 1.9   |
| Nonfatal Cases without Lost Workdays .                        | 2.3   | 2.5   | 2.1   | 2.1   | 2.1   |
| Lost Workdays .....   | 44.6  | 41.4  | 37.3  | 54.2  | 53.0  |
| <b>Space Propulsion Units &amp; Parts (SIC 3764):</b>         |       |       |       |       |       |
| Total Cases .....   | 4.5   | 4.6   | 4.4   | 4.5   | 3.6   |
| Lost Workday Cases .....                                      | 1.9   | 2.1   | 2.2   | 2.0   | 1.5   |
| Nonfatal Cases without Lost Workdays .                        | 2.6   | 2.5   | 2.2   | 2.5   | 2.2   |
| Lost Workdays .....   | 32.6  | 33.5  | 48.7  | 44.1  | 42.5  |
| <b>Other Space Vehicle Equipment (SIC 3769):</b>              |       |       |       |       |       |
| Total Cases .....   | NA    | 5.6   | 3.6   | 3.9   | 5.1   |
| Lost Workday Cases .....                                      | NA    | 2.3   | 1.6   | 1.6   | 1.8   |
| Nonfatal Cases without Lost Workdays .                        | NA    | 3.3   | 2.3   | 2.3   | 3.3   |
| Lost Workdays .....   | NA    | 41.5  | 38.4  | 40.8  | 47.1  |

Source: Bureau of Labor Statistics, "Occupational Injuries and Illnesses in the United States by Industry" (Annually).

a Defined as the number of injuries and illnesses per 100 full-time workers. Separate incidence rates also available for occupational injuries only.

NA Not available.

**AEROSPACE INDUSTRY WORK STOPPAGES<sup>a</sup>**  
**Calendar Years 1979–1993**

| Year              | Number<br>of<br>Strikes <sup>b</sup> | Number of<br>Workers<br>Involved | Work-Days<br>Idle<br>in Year |
|-------------------|--------------------------------------|----------------------------------|------------------------------|
| 1979              | 12                                   | 6,600                            | 103,400                      |
| 1980              | 17                                   | 4,400                            | 92,900                       |
| 1981              | 12                                   | 6,100                            | 188,900                      |
| 1982 <sup>c</sup> | 4                                    | 11,900                           | 45,200                       |
| 1983              | 2                                    | 8,700                            | 404,100                      |
| 1984              | 4                                    | 14,600                           | 188,200                      |
| 1985              | 4                                    | 19,700                           | 289,800                      |
| 1986              | —                                    | —                                | —                            |
| 1987              | —                                    | —                                | —                            |
| 1988              | 3                                    | 10,600                           | 415,800                      |
| 1989              | 2                                    | 58,500                           | 1,848,000                    |
| 1990              | 1                                    | 2,300                            | 56,700                       |
| 1991              | 1                                    | 1,500                            | —                            |
| 1992              | 1                                    | 3,800                            | 11,400                       |
| 1993              | 2                                    | 27,800                           | 34,600                       |

Source: Bureau of Labor Statistics, "Compensation and Working Conditions" (Monthly).

a Based on SIC 372 of the 1967 Code, which includes missile and space propulsion units and parts and missile and space vehicle equipment not elsewhere classified, but which excludes complete guided missiles and space vehicles.

b Strikes beginning during calendar year.

c Effective 1982, data not available for work stoppages involving fewer than 1,000 employees.

## FINANCE

The aerospace industry reported a 1993 net income after taxes of \$4.6 billion on sales of \$128.7 billion. The income figure does not directly compare with that of the previous year, because in 1992 the industry had a technical loss (\$1.8 billion) resulting from an accounting change rather than an operational loss due to declining business volume. The industry's income from operations offers a valid comparison; for 1993 it was \$7 billion, up from \$6.9 billion in 1992.

Expressed as a percentage of sales, the industry's profit amounted to 3.6 percent, compared with the average for all U.S. manufacturing industries of 2.8 percent. As a percentage of assets, the aerospace figure was 3.5 percent; the all-industry average was 2.9 percent. As a percentage of equity, aerospace income amounted to 13.2 percent, the highest figure recorded by the industry since 1988; the all-manufacturing figure was 8.1 percent.

At \$3.2 billion, the aerospace industry's 1993 outlays for new plant and equipment were down substantially from 1992's \$4.4 billion. For 1994, the Bureau of the Census esti-

mated a further decline in capital investment to \$2.7 billion.

The aerospace balance sheet for 1993, as reported by the Bureau of the Census, showed a decline in net working capital, from \$15.2 billion in 1992 to \$14.2 billion in 1993. Total assets increased to \$132.7 billion, up from \$127.8 billion in the previous year.

McDonnell Douglas Corporation once again headed the list of Department of Defense contractors in terms of contract dollar value in



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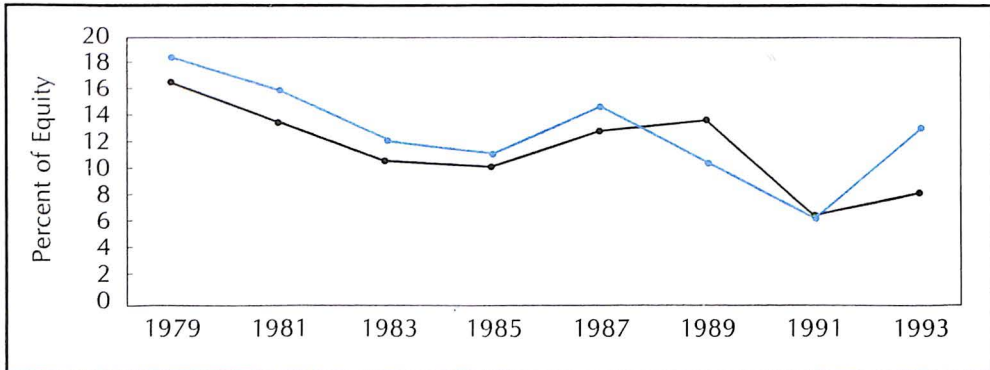
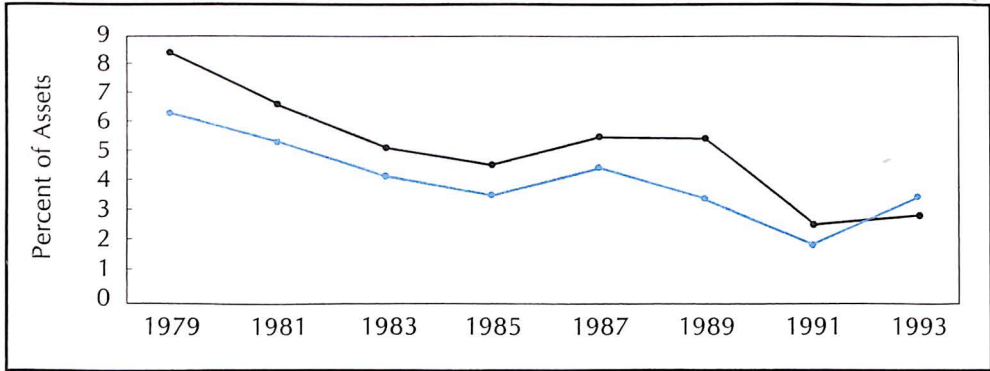
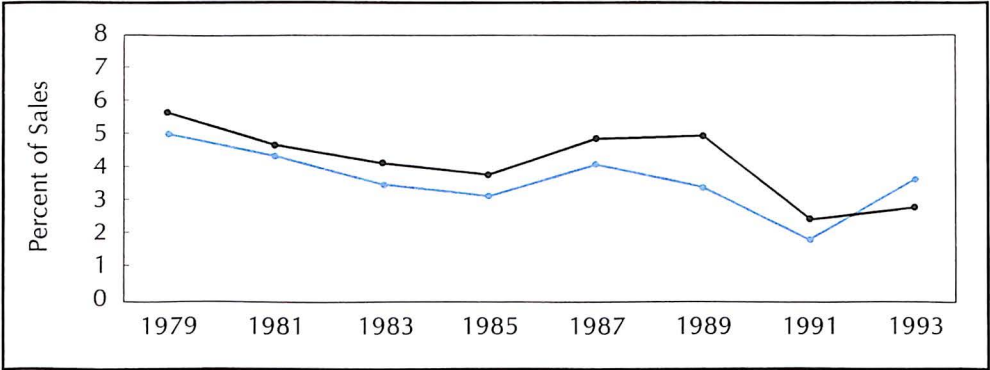
Fiscal Year 1993; the company received awards totaling \$7.5 billion, which compares with \$5.3 billion in FY 1992. In second place was Lockheed Corporation with \$6.9 billion, followed by Martin Marietta Corporation (\$4.7 billion), General Motors Corporation (\$4.1 billion), and Raytheon Company (\$3.2 billion). General Motors and Raytheon moved up to the top five from sixth and seventh rank, respectively, in FY 1992; Martin Marietta jumped from 10th to third. Rounding out 1993's top 10 contractors in terms of awards were United Technologies Corporation (\$3.1 billion), Northrop Corporation (\$3 billion), General Dynamics Corporation (\$2.1 billion), Loral Corporation (\$1.7 billion), and Grumman Corporation (\$1.7 billion). Perennial leader Rockwell Interna-

tional Corporation once again topped the list of NASA contractors for FY 1993. Rockwell had contracts valued at \$1.5 billion, nearly the same as in the previous year. In second place was McDonnell Douglas Corporation, with contracts worth \$1 billion, followed by Lockheed Space Operations Company (\$590 million), The Boeing Company (\$502 million), and Thiokol Corporation (\$479 million). The rest of NASA's top 10 contractors included Lockheed Missiles & Space Company (\$430 million), Rockwell Space Operations (\$351 million), Martin Marietta Corporation (\$325 million), General Electric Company (\$286 million), and Lockheed Engineering & Science Company (\$256 million). The same 10 companies made up the top 10 in the previous year.





# Net Profit After Taxes



— ALL MANUFACTURING      — AEROSPACE INDUSTRY

SOURCE: AEROSPACE INDUSTRIES ASSOCIATION

**NET PROFIT AFTER TAXES  
AS A PERCENT OF SALES, ASSETS, AND EQUITY  
FOR ALL MANUFACTURING CORPORATIONS  
AND THE AEROSPACE INDUSTRY**

Calendar Years 1979-1993

**PERCENT OF SALES**

| Year | All<br>Manufacturing<br>Corporations | Non-<br>Durable<br>Goods | Durable<br>Goods | Aerospace <sup>a</sup><br>Industry |
|------|--------------------------------------|--------------------------|------------------|------------------------------------|
| 1979 | 5.7%                                 | 6.1%                     | 5.2%             | 5.0%                               |
| 1980 | 4.8                                  | 5.6                      | 4.0              | 4.3                                |
| 1981 | 4.7                                  | 5.1                      | 4.3              | 4.4                                |
| 1982 | 3.5                                  | 4.6                      | 2.4              | 3.3                                |
| 1983 | 4.1                                  | 4.9                      | 3.1              | 3.5                                |
| 1984 | 4.6                                  | 4.8                      | 4.4              | 4.1                                |
| 1985 | 3.8                                  | 4.1                      | 3.4              | 3.1                                |
| 1986 | 3.7                                  | 4.6                      | 2.9              | 2.8                                |
| 1987 | 4.9                                  | 5.2                      | 4.5              | 4.1                                |
| 1988 | 6.0                                  | 6.7                      | 5.2              | 4.3                                |
| 1989 | 5.0                                  | 5.8                      | 4.1              | 3.3                                |
| 1990 | 4.0                                  | 4.9                      | 3.0              | 3.4                                |
| 1991 | 2.5                                  | 4.2                      | 0.6              | 1.8 <sup>b</sup>                   |
| 1992 | 1.0                                  | 3.2                      | (1.4)            | (1.4) <sup>b</sup>                 |
| 1993 | 2.8                                  | 3.7                      | 1.9              | 3.6                                |

| Year | Percent of Assets <sup>c</sup> |                                    | Percent of Equity <sup>c</sup> |                                    |
|------|--------------------------------|------------------------------------|--------------------------------|------------------------------------|
|      | All<br>Manufacturing           | Aerospace <sup>a</sup><br>Industry | All<br>Manufacturing           | Aerospace <sup>a</sup><br>Industry |
| 1979 | 8.4%                           | 6.3%                               | 16.5%                          | 18.4%                              |
| 1980 | 6.9                            | 5.2                                | 13.9                           | 16.0                               |
| 1981 | 6.7                            | 5.2                                | 13.6                           | 16.0                               |
| 1982 | 4.5                            | 3.7                                | 9.2                            | 12.0                               |
| 1983 | 5.1                            | 4.1                                | 10.5                           | 12.1                               |
| 1984 | 6.0                            | 4.7                                | 12.5                           | 14.1                               |
| 1985 | 4.6                            | 3.6                                | 10.1                           | 11.1                               |
| 1986 | 4.2                            | 3.1                                | 9.5                            | 9.4                                |
| 1987 | 5.6                            | 4.4                                | 12.8                           | 14.6                               |
| 1988 | 6.9                            | 4.4                                | 16.2                           | 14.9                               |
| 1989 | 5.6                            | 3.3                                | 13.7                           | 10.7                               |
| 1990 | 4.3                            | 3.4                                | 10.7                           | 11.5                               |
| 1991 | 2.6                            | 1.9 <sup>b</sup>                   | 6.4                            | 6.1 <sup>b</sup>                   |
| 1992 | 1.0                            | (1.2) <sup>b</sup>                 | 2.6                            | (5.2) <sup>b</sup>                 |
| 1993 | 2.9                            | 3.5                                | 8.1                            | 13.2                               |

Source: Bureau of the Census, "Quarterly Financial Report for Manufacturing, Mining, and Trade Corporations" (Quarterly).

a Based on a sample of corporate entities classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, their propulsion, and parts.

b Reflects unusually large non-operating expenses totalling \$3.4 and \$8.7 billion in 1991 and 1992, respectively, due to restructuring changes and the implementation of a change in accounting for future retirement benefit costs.

c Average of four quarters

( ) Net loss after taxes.

## INCOME STATEMENT AND OPERATING RATIOS FOR AEROSPACE COMPANIES<sup>a</sup>

Calendar Years 1990–1993  
(Millions of Dollars)

| INCOME STATEMENT  | 1990             | 1991             | 1992              | 1993             |
|---|------------------|------------------|-------------------|------------------|
| Net Sales, Receipts, Operating Revenues . . . .   | \$ 133,618       | \$ 135,175       | \$ 134,420        | \$ 128,651       |
| Less: Depreciation, Depletion, & Amortization<br>of Property, Plant, and Equipment . . . . .                            | 4,250            | 4,353            | 4,443             | 4,474            |
| Less: All Other Operating Costs & Expenses,<br>Including Selling Costs & General &<br>Administrative Expenses . . . . . | 122,678          | 123,208          | 123,075           | 117,162          |
| <b>Income (or Loss) from Operations . . . . .</b>   | <b>\$ 6,692</b>  | <b>\$ 7,614</b>  | <b>\$ 6,900</b>   | <b>\$ 7,015</b>  |
| Net Non-Operating Income (Expense) . . . . .  | (544)            | (3,432)          | (8,666)           | (307)            |
| <b>Income (or Loss) Before Income<br/>Taxes (= Total Income) . . . . .</b>  | <b>\$ 6,147</b>  | <b>\$ 4,181</b>  | <b>\$ (1,766)</b> | <b>\$ 6,708</b>  |
| Less: Provision for Current & Deferred<br>Domestic Income Taxes . . . . .   | 1,660            | 1,698            | 71                | 2,086            |
| <b>Income (or Loss) after Income<br/>Taxes (= Net Profit) . . . . .</b>   | <b>\$ 4,487</b>  | <b>\$ 2,484</b>  | <b>\$ (1,836)</b> | <b>\$ 4,621</b>  |
| Cash Dividends Charged to Retained<br>Earnings . . . . .  | 1,823            | 1,678            | 1,610             | 3,279            |
| <b>Net Income Retained in Business . . . . .</b>  | <b>\$ 2,665</b>  | <b>\$ 806</b>    | <b>\$ (3,449)</b> | <b>\$ 1,342</b>  |
| Retained Earnings at Beginning of Year <sup>b</sup> . . . .   | 28,227           | 30,694           | 30,647            | 25,358           |
| Adjustments to Retained Earnings <sup>c</sup> . . . . .   | (350)            | (707)            | (1,673)           | (754)            |
| <b>Retained Earnings at End of Year<sup>d</sup> . . . . .</b>   | <b>\$ 30,541</b> | <b>\$ 30,793</b> | <b>\$ 25,528</b>  | <b>\$ 25,946</b> |

### OPERATING RATIOS

|   |      |      |        |      |
|---|------|------|--------|------|
| Income before Taxes as Percent of<br>Net Sales . . . . .  | 4.6% | 3.1% | (1.3)% | 5.2% |
| Provision for Current & Deferred Domestic<br>Income Taxes as Percent of Income<br>before Taxes (Total Income) . . . . . | 27.0 | 40.6 | (0.4)  | 31.1 |
| Income after Taxes (Net Profit) as Percent<br>of Net Sales . . . . .  | 3.4  | 1.8  | (1.4)  | 3.6  |
| Income after Taxes (Net Profit) as Percent<br>of Stockholders' Equity <sup>e</sup> . . . . .                            | 11.5 | 6.1  | (5.2)  | 13.2 |
| Income after Taxes (Net Profit) as Percent<br>of Total Assets <sup>e</sup> . . . . .                                    | 3.4  | 1.9  | (1.2)  | 3.5  |

Source: Bureau of the Census, "Quarterly Financial Report for Manufacturing, Mining, and Trade Corporations" (Quarterly).  
NOTE: Detail may not add to totals because of rounding.

- a Based on sample of corporate entities classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, and their propulsion, and parts.
- b Beginning-of-year retained earnings for any particular year do not equal end-of-year retained earnings for the previous year because of rotation of small companies in survey sample.
- c Other direct credits (or charges) to retained earnings (net), including stock and other non-cash dividends, etc.
- d Retained Earnings at End of Year CALCULATED AS Retained Earnings at Beginning of Year PLUS Income (Loss) after Income Taxes MINUS Cash Dividends Charged to Retained Earnings PLUS Adjustments to Retained Earnings.
- e Average of four quarters.

BALANCE SHEET FOR AEROSPACE COMPANIES<sup>a</sup>

December 31, 1990–1993

(Millions of Dollars)

|   | 1990             | 1991             | 1992             | 1993             |
|---|------------------|------------------|------------------|------------------|
| <b>Assets:</b>  |                  |                  |                  |                  |
| Current Assets:   |                  |                  |                  |                  |
| Cash .....  | \$ 2,172         | \$ 2,950         | \$ 3,963         | \$ 3,544         |
| Securities, Commercial Paper, & Other<br>Short-term Financial Investments ..... | 2,920            | 3,468            | 3,269            | 3,316            |
| Total Cash and U.S. Government<br>and Other Securities .....                    | \$ 5,092         | \$ 6,418         | \$ 7,233         | \$ 6,860         |
| Receivables (Total) .....   | 19,620           | 17,812           | 15,762           | 15,991           |
| Inventories (Gross) .....   | 50,423           | 49,973           | 44,010           | 42,276           |
| Other Current Assets .....  | 2,327            | 2,166            | 3,930            | 4,396            |
| <b>Total Current Assets</b> .....   | <b>\$ 77,463</b> | <b>\$ 76,370</b> | <b>\$ 70,934</b> | <b>\$ 69,524</b> |
| Net Plant, Property, & Equipment .....  | 26,161           | 26,557           | 27,483           | 27,698           |
| Other Non-Current Assets .....  | 28,199           | 28,012           | 29,354           | 35,526           |
| <b>Total Assets</b> .....   | <b>\$131,823</b> | <b>\$130,939</b> | <b>\$127,770</b> | <b>\$132,747</b> |
| <b>Liabilities:</b>   |                  |                  |                  |                  |
| Current Liabilities:  |                  |                  |                  |                  |
| Short Term Loans .....  | \$ 2,677         | \$ 1,943         | \$ 1,735         | \$ 2,031         |
| Trade Accounts & Notes Payable .....  | 12,445           | 12,188           | 11,290           | 11,491           |
| Income Taxes Accrued .....  | 2,002            | 1,151            | 1,288            | 1,882            |
| Installments Due on Long Term Debts ..  | 1,392            | 1,767            | 2,264            | 1,260            |
| Other Current Liabilities .....   | 44,690           | 44,823           | 39,175           | 38,697           |
| <b>Total Current Liabilities</b> .....  | <b>\$ 63,205</b> | <b>\$ 61,871</b> | <b>\$ 55,752</b> | <b>\$ 55,360</b> |
| Long Term Debt .....  | 20,979           | 20,682           | 19,241           | 20,452           |
| Other Non-Current Liabilities .....   | 7,741            | 8,123            | 18,318           | 20,505           |
| <b>Total Liabilities</b> .....  | <b>\$ 91,926</b> | <b>\$ 90,676</b> | <b>\$ 93,310</b> | <b>\$ 96,316</b> |
| <b>Stockholders' Equity:</b>  |                  |                  |                  |                  |
| Capital Stock .....   | \$ 9,510         | \$ 9,681         | \$ 8,037         | \$ 10,346        |
| Retained Earnings .....   | 30,386           | 30,581           | 26,424           | 26,086           |
| <b>Total Stockholders' Equity</b> .....   | <b>\$ 39,896</b> | <b>\$ 40,262</b> | <b>\$ 34,460</b> | <b>\$ 36,431</b> |
| <b>Total Liabilities &amp; Stockholders' Equity</b> ....                        | <b>\$131,823</b> | <b>\$130,939</b> | <b>\$127,770</b> | <b>\$132,747</b> |
| <b>Net Working Capital</b> .....  | <b>\$ 14,257</b> | <b>\$ 14,499</b> | <b>\$ 15,183</b> | <b>\$ 14,164</b> |

Source: Bureau of the Census, "Quarterly Financial Report for Manufacturing, Mining, and Trade Corporations" (Quarterly).

NOTE: Detail may not add to totals because of rounding.

a Based on sample of corporate entities classified in SIC codes 372 and 376, having as their principal activity the manufacture of aircraft, guided missiles, space vehicles, their propulsion, and parts.

## NEW PLANT AND EQUIPMENT EXPENDITURES

Calendar Years 1965–1994  
(Billions of Dollars)

| Year              | All Industries | All Manufacturing Industries | Durable Goods | Aerospace <sup>a</sup> |                               |
|-------------------|----------------|------------------------------|---------------|------------------------|-------------------------------|
|                   |                |                              |               | Current Dollars        | Constant Dollars <sup>b</sup> |
| 1965              | \$ 59.52       | \$ 25.41                     | \$13.49       | \$0.53                 | \$1.57                        |
| 1966              | 70.40          | 31.37                        | 17.23         | 1.17                   | 3.38                          |
| 1967              | 72.75          | 32.25                        | 17.83         | 1.25                   | 3.49                          |
| 1968              | 76.42          | 32.34                        | 17.93         | 1.23                   | 3.32                          |
| 1969              | 85.74          | 36.27                        | 19.97         | 1.29                   | 3.37                          |
| 1970              | 91.91          | 36.99                        | 19.80         | 0.88                   | 2.19                          |
| 1971              | 92.91          | 33.60                        | 16.78         | 0.63                   | 1.51                          |
| 1972              | 103.40         | 35.42                        | 18.22         | 0.68                   | 1.59                          |
| 1973              | 120.03         | 42.35                        | 22.63         | 0.79                   | 1.79                          |
| 1974              | 139.67         | 52.48                        | 26.77         | 1.21                   | 2.40                          |
| 1975              | 142.42         | 53.66                        | 25.37         | 1.19                   | 2.04                          |
| 1976              | 158.44         | 58.53                        | 27.50         | 1.02                   | 1.64                          |
| 1977              | 184.82         | 67.48                        | 32.77         | 1.14                   | 1.72                          |
| 1978              | 216.81         | 78.13                        | 39.02         | 1.77                   | 2.48                          |
| 1979              | 255.26         | 95.13                        | 47.72         | 2.71                   | 3.50                          |
| 1980              | 286.40         | 112.60                       | 54.82         | 3.60                   | 4.20                          |
| 1981              | 324.73         | 126.68                       | 58.93         | 3.40                   | 3.59                          |
| 1982              | 326.19         | 123.97                       | 54.58         | 3.45                   | 3.45                          |
| 1983              | 321.16         | 117.35                       | 51.61         | 2.95                   | 2.87                          |
| 1984              | 373.83         | 139.61                       | 64.57         | 3.63                   | 3.45                          |
| 1985              | 410.12         | 152.88                       | 70.87         | 3.51                   | 3.27                          |
| 1986              | 399.36         | 137.95                       | 65.68         | 3.86                   | 3.52                          |
| 1987              | 410.52         | 141.06                       | 68.03         | 3.60                   | 3.22                          |
| 1988              | 455.49         | 163.45                       | 77.04         | 3.49                   | 3.05                          |
| 1989              | 507.40         | 183.80                       | 82.56         | 4.17                   | 3.51                          |
| 1990              | 532.61         | 192.61                       | 82.58         | 4.02                   | 3.27                          |
| 1991              | 528.39         | 182.81                       | 77.64         | 4.05                   | 3.20                          |
| 1992 <sup>r</sup> | 546.60         | 174.02                       | 73.32         | 4.36                   | 3.38                          |
| 1993              | 585.64         | 179.18                       | 81.33         | 3.23                   | 2.46                          |
| 1994 <sup>E</sup> | 632.76         | 192.69                       | 89.09         | 2.68                   | NA                            |

Source: Bureau of the Census, "Plant and Equipment Expenditures and Plans" (Quarterly).

a Data are company-based (not establishment nor product-based) and represent corporations and other entities whose principal activity falls in SIC codes 372 and 376.

b Based on the Producer Price Index, Capital Equipment (1982=100).

E Estimate.

NA Not Available.

r Revised.

**DEPARTMENT OF DEFENSE  
PRIME CONTRACT AWARDS OVER \$25,000  
FOR SELECTED MAJOR MILITARY HARD GOODS**

By Geographic Region  
Fiscal Years 1991, 1992, and 1993

| Program and Region  | Millions of Dollars |          |          | Percent of Program Total |        |        |
|---|---------------------|----------|----------|--------------------------|--------|--------|
|   | 1991                | 1992     | 1993     | 1991                     | 1992   | 1993   |
| <b>AIRCRAFT—TOTAL</b> . . . . .   | \$26,227            | \$26,440 | \$26,183 | 100.0%                   | 100.0% | 100.0% |
| New England . . . . .   | 3,206               | 2,981    | 2,717    | 12.2                     | 11.3   | 10.4   |
| Middle Atlantic . . . . .   | 2,442               | 2,859    | 1,808    | 9.3                      | 10.8   | 6.9    |
| East North Central . . . . .  | 1,877               | 1,538    | 1,533    | 7.2                      | 5.8    | 5.9    |
| West North Central . . . . .  | 4,513               | 2,811    | 4,728    | 17.2                     | 10.6   | 18.1   |
| South Atlantic . . . . .  | 2,504               | 4,394    | 4,972    | 9.5                      | 16.6   | 19.0   |
| East South Central . . . . .  | 379                 | 407      | 355      | 1.4                      | 1.5    | 1.4    |
| West South Central . . . . .  | 4,515               | 3,205    | 3,595    | 17.2                     | 12.1   | 13.7   |
| Mountain . . . . .  | 730                 | 474      | 830      | 2.8                      | 1.8    | 3.2    |
| Pacific <sup>a</sup> . . . . .  | 6,062               | 7,772    | 5,645    | 23.1                     | 29.4   | 21.6   |
| <b>MISSILE &amp; SPACE<br/>SYSTEMS—TOTAL</b> . . . . .                    | \$17,990            | \$14,468 | \$14,460 | 100.0%                   | 100.0% | 100.0% |
| New England . . . . .   | 2,516               | 1,715    | 2,168    | 14.0                     | 11.9   | 15.0   |
| Middle Atlantic . . . . .   | 1,489               | 1,088    | 766      | 8.3                      | 7.5    | 5.3    |
| East North Central . . . . .  | 140                 | 81       | 85       | 0.8                      | 0.6    | 0.6    |
| West North Central . . . . .  | 1,169               | 445      | 592      | 6.5                      | 3.1    | 4.1    |
| South Atlantic . . . . .  | 1,243               | 1,370    | 1,244    | 6.9                      | 9.5    | 8.6    |
| East South Central . . . . .  | 748                 | 848      | 753      | 4.2                      | 5.9    | 5.2    |
| West South Central . . . . .  | 1,632               | 1,268    | 1,062    | 9.1                      | 8.8    | 7.3    |
| Mountain . . . . .  | 3,077               | 2,241    | 2,608    | 17.1                     | 15.5   | 18.0   |
| Pacific <sup>a</sup> . . . . .  | 5,977               | 5,411    | 5,181    | 33.2                     | 37.4   | 35.8   |
| <b>ELECTRONICS &amp;<br/>COMMUNICATIONS<br/>EQUIPMENT—TOTAL</b> . . . . . | \$17,470            | \$15,777 | \$16,467 | 100.0%                   | 100.0% | 100.0% |
| New England . . . . .   | 1,680               | 1,435    | 1,304    | 9.6                      | 9.1    | 7.9    |
| Middle Atlantic . . . . .   | 3,444               | 2,707    | 2,559    | 19.7                     | 17.2   | 15.5   |
| East North Central . . . . .  | 1,292               | 1,143    | 1,409    | 7.4                      | 7.2    | 8.6    |
| West North Central . . . . .  | 800                 | 874      | 797      | 4.6                      | 5.5    | 4.8    |
| South Atlantic . . . . .  | 4,595               | 4,061    | 4,682    | 26.3                     | 25.7   | 28.4   |
| East South Central . . . . .  | 210                 | 175      | 420      | 1.2                      | 1.1    | 2.6    |
| West South Central . . . . .  | 1,013               | 848      | 887      | 5.8                      | 5.4    | 5.4    |
| Mountain . . . . .  | 485                 | 565      | 624      | 2.8                      | 3.6    | 3.8    |
| Pacific <sup>a</sup> . . . . .  | 3,951               | 3,969    | 3,784    | 22.6                     | 25.2   | 23.0   |

Source: Department of Defense, "Prime Contract Awards by Region and State" (Annually).

NOTE: Detail may not add to totals because of rounding.

a Includes Alaska and Hawaii.

## DEPARTMENT OF DEFENSE MAJOR CONTRACTORS

Fiscal Years 1989-1993

Listed by rank according to net value of  
prime contracts awarded during last fiscal year  
(Millions of Dollars)

| Company                           | 1989      | 1990      | 1991      | 1992      | 1993      |
|-----------------------------------|-----------|-----------|-----------|-----------|-----------|
| <b>TOTAL CONTRACTS</b> .....      | \$128,958 | \$130,758 | \$136,640 | \$121,438 | \$123,713 |
| McDonnell Douglas Corp. ....      | \$ 8,617  | \$ 8,211  | \$ 8,057  | \$ 5,311  | \$ 7,540  |
| Lockheed Corp. ....               | 3,652     | 3,553     | 2,667     | 4,650     | 6,911     |
| Martin Marietta Corp. ....        | 3,337     | 3,492     | 2,689     | 2,356     | 4,727     |
| General Motors Corp. ....         | 3,692     | 4,107     | 4,427     | 3,694     | 4,076     |
| Raytheon Co. ....                 | 3,761     | 4,071     | 4,090     | 2,841     | 3,233     |
| United Technologies Corp. ....    | 3,556     | 2,856     | 2,825     | 2,803     | 3,083     |
| Northrop Corp. ....               | 631       | 746       | 3,319     | 4,851     | 3,004     |
| General Dynamics Corp. ....       | 6,899     | 6,306     | 7,848     | 4,464     | 2,147     |
| Loral Corp. ....                  | 451       | 618       | 1,283     | 1,815     | 1,729     |
| Grumman Corp. ....                | 2,373     | 2,697     | 2,363     | 2,183     | 1,705     |
| The Boeing Co. ....               | 2,868     | 2,267     | 1,166     | 2,495     | 1,664     |
| General Electric Co. ....         | 5,771     | 5,589     | 4,866     | 4,008     | 1,606     |
| Westinghouse Electric Corp. ....  | 1,650     | 2,243     | 1,812     | 1,147     | 1,569     |
| Litton Industries Inc. ....       | 1,437     | 1,576     | 1,601     | 2,334     | 1,555     |
| National Steel & Shipbuilding Co. | (a)       | (a)       | 189       | 197       | 1,398     |
| Rockwell International Corp. .... | 2,133     | 2,217     | 1,708     | 1,233     | 1,317     |
| TRW Inc. ....                     | 1,294     | 1,087     | 1,092     | 1,013     | 1,160     |
| Bath Holding Corp. ....           | 218       | 734       | 872       | 1,148     | 997       |
| Texas Instruments Inc. ....       | 946       | 704       | 982       | 731       | 968       |
| Textron Inc. ....                 | 908       | 1,190     | 997       | 1,161     | 955       |
| Tenneco Inc. ....                 | 916       | 2,410     | 363       | 585       | 906       |
| AT&T Co. ....                     | 754       | 769       | 699       | 1,338     | 870       |
| IBM Corp. ....                    | 1,309     | 1,286     | 773       | 932       | 849       |
| Foundation Health Corp. ....      | 639       | 515       | 433       | 761       | 818       |
| Science Application Int'l Corp. . | 415       | 510       | 513       | 686       | 786       |
| E-Systems Inc. ....               | 284       | 460       | 603       | 501       | 754       |
| Unisys Corp. ....                 | 1,245     | 1,376     | 1,379     | 834       | 717       |
| GTE Corp. ....                    | 2,342     | 1,294     | 801       | 724       | 714       |
| ITT Corp. ....                    | 1,163     | 870       | 948       | 797       | 614       |
| Alliant Techsystems Inc. ....     | (a)       | (a)       | 7         | 610       | 612       |

Source: Department of Defense, "100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards" (Annually).

a Not in top 100 companies for indicated year(s).

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MAJOR CONTRACTORS

Fiscal Years 1990–1993  
By rank according to net value of NASA prime  
contracts awarded during last fiscal year  
(Millions of Dollars)

| Company                                  | 1990     | 1991     | 1992     | 1993     |
|--|----------|----------|----------|----------|
| <b>TOTAL PROCUREMENTS</b> .....          | \$12,565 | \$13,159 | \$13,478 | \$13,160 |
| <b>Awards to Business Firms</b> .....    | 10,072   | 10,417   | 10,717   | 10,498   |
| <b>% of TOTAL PROCUREMENTS</b> ....      | 80%      | 79%      | 79%      | 80%      |
| Rockwell International Corp. ....        | \$ 1,747 | \$ 1,560 | \$ 1,449 | \$ 1,491 |
| McDonnell Douglas Corp. ....             | 851      | 1,089    | 1,045    | 997      |
| Lockheed Space Operations Co. ...        | 583      | 591      | 599      | 590      |
| The Boeing Co. ....                      | 399      | 468      | 500      | 502      |
| Thiokol Corp. ....                       | 498      | 438      | 510      | 479      |
| Lockheed Missiles & Space Co. ...        | 294      | 458      | 530      | 430      |
| Rockwell Space Operations Inc. ...       | 309      | 343      | 346      | 351      |
| Martin Marietta Corp. ....               | 507      | 572      | 445      | 325      |
| General Electric Co. ....                | 402      | 308      | 299      | 286      |
| Lockheed Engrg. & Science Co. ...        | 234      | 259      | 270      | 256      |
| AlliedSignal Technical Services ....     | (a)      | (a)      | (a)      | 231      |
| EG&G Florida Inc. ....                   | 191      | 227      | 213      | 221      |
| TRW Inc. ....                            | 241      | 192      | 194      | 218      |
| Computer Sciences Corp. ....             | 183      | 207      | 232      | 195      |
| USBI Booster Production Co. ....         | 233      | 198      | 207      | 177      |
| Grumman Aerospace Corp. ....             | 86       | 100      | 103      | 163      |
| Boeing Computer Support Services .       | 165      | 159      | 140      | 155      |
| Loral Aerospace Corp. <sup>b</sup> ..... | 174      | 186      | 141      | 137      |
| Sverdrup Technology Inc. ....            | 79       | 97       | 109      | 107      |
| United Technologies Corp. ....           | 136      | 133      | 136      | 97       |
| Space Systems Loral, Inc. ....           | (a)      | (a)      | 95       | 77       |
| Johnson Controls World Serv. Inc. .      | (a)      | 70       | 76       | 67       |
| CAE Link Corp. ....                      | 53       | 45       | 61       | 65       |
| Harris Space Systems Corp. ....          | 25       | 45       | 60       | 63       |
| Orbital Sciences Corp. ....              | 35       | 36       | 56       | 62       |
| Sterling Federal Systems Inc. ....       | (a)      | 34       | 44       | 58       |
| BAMSI Inc. ....                          | 38       | 52       | 59       | 57       |
| Teledyne Industries Inc. ....            | 73       | 65       | 54       | 56       |
| IBM Corp. ....                           | 102      | 68       | 76       | 55       |
| GTE Gov't Systems Corp. ....             | (a)      | (a)      | 50       | 54       |

Source: National Aeronautics and Space Administration, "Annual Procurement Report" (Annually).

a Not in list of major contractors for indicated year(s).

b Includes awards previously reported as Ford Aerospace Corporation.



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## Glossary

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**Aeronautics:** the science that treats of the operation of aircraft, also, the art or science of operating aircraft.

**Aerospace Employment:** annual average calculated as one-twelfth of the sum of monthly estimates of total number of persons employed during a designated pay period by the aircraft, missile, and space industries (SICs 372 and 376) plus estimated aerospace-related employment in the communications equipment (SIC 3662), instruments (SICs 381 and 382), and in certain other industries (SICs 28, 35, 73, 89, etc.)

**Aerospace Industry:** the industry engaged in research, development, and manufacture of aerospace systems including: manned and unmanned aircraft; missiles; spacecraft; space launch vehicles; propulsion, guidance, and control units for all of the foregoing; and a variety of airborne and ground-based equipment essential to the test, operation, and maintenance of flight vehicles.

**Aerospace Payroll:** estimated on the basis of average weekly *earnings* for a given calendar year for *production workers* plus an estimated annual salary for other employees.

**Aerospace Sales:** the AIA estimate of aerospace industry sales, developed by summing: DoD expenditures for aircraft, missiles, and space-related *procurement* and RDT&E; NASA expenditures for *research and development* and space flight control and data communications; *outlays* for space activities by other U.S. government departments and agencies; commercial sales of space-related products; net domestic and export sales of civil aircraft, engines, and parts; *Foreign*

*Military Sales* and commercial exports of military aircraft, missiles, propulsion, and related parts; sales of *related products and services* including: electronics, software, and ground support equipment; and sales of *non-aerospace products* which are produced in aerospace-manufacturing *establishments* and which use technology, processes, and materials derived from the *aerospace industry*.

**AIA:** Aerospace Industries Association of America, Inc., formerly Aircraft Industries Association.

**Air Carriers:** the commercial system of air transportation, consisting of domestic and international scheduled and charter service.

**Aircraft:** all airborne vehicles supported either by buoyancy or by dynamic action. Used in this volume in a restricted sense to mean an airplane—any winged aircraft including helicopters, but excluding gliders and guided missiles.

**Aircraft Agreement (Agreement on Trade in Civil Aircraft):** negotiated the Tokyo Round of the *Multilateral Trade Negotiations* and implemented January 1, 1980, providing for elimination of tariff and non-tariff trade barriers in the civil aircraft sector.

**Aircraft Industry:** the industry primarily engaged in the manufacture of aircraft, aircraft engines, and parts including propellers and auxiliary equipment. A sector of the *Aerospace Industry*.

**Airframe:** the structural components of an airplane, such as: fuselage, empennage, wings, landing gear, and engine mounts, but excluding such items as:

engines, accessories, electronics, and other parts that may be replaced from time to time.

**Airlines:** see *Air Carriers*.

**Appropriation (Federal Budget):** an act of Congress authorizing an agency to incur *obligations* and make payments out of funds held by the Department of the Treasury.

**Assets, Net:** the sum of all recorded assets after reducing such amount by allowance of reserve for bad debts, *depreciation*, and amortization, but before deducting any liabilities, mortgages, or other indebtedness.

**Astronautics:** the art and science of designing, building, and operating manned or unmanned space objects.

**Average Weekly Hours:** average hours for which pay was received; different from standard or scheduled hours.

**Avionics:** communications, navigation, flight controls, and displays.

**Backlog:** the sales value of orders accepted (supported by legal documents) that have not yet passed through the sales account.

**Budget Authority:** authority provided by the Congress; mainly in the form of *Appropriations*, which allows Federal agencies to incur *obligations* to spend or lend money.

**Bureau of Economic Analysis (BEA):** an agency of the Department of Commerce.

**Bureau of Labor Statistics (BLS):** an agency of the Department of Labor.

**Bureau of the Census:** an agency of the Department of Commerce.

**Constant Dollars:** calculated by dividing current ("then-year") dollars by

appropriate price *deflator* and multiplying the result by 100.

**Deflator:** index used to convert a price level to one comparable with the price level at a different time, offsetting the effect of inflation. The base period, which equals 100, is usually specified as either a given fiscal or calendar year.

**Depreciation:** the general conversion of the depreciable cost of a fixed asset into expense, spread over its remaining life. There are a number of methods, all based on a periodic charge to an expense account and a corresponding credit to a reserve account.

**Development:** the process or activity of working out a basic design, idea, or piece of equipment. See also *Research and Development*.

**DoD:** Department of Defense.

**DoE:** Department of Energy.

**DoT:** Department of Transportation.

**Durable Goods Industry:** comprised of major manufacturing industry groups with SIC Codes 24, 25, and 32-39. All major manufacturing industry groups in SIC Codes 20-23 and 26-31 are considered nondurable goods manufacturing industry groups.

**Earnings:** the actual return to the worker for a stated period of time. Irregular bonuses, retroactive items, payments of various welfare benefits, and payroll taxes paid by employers are excluded.

**Average Hourly Earnings:** on a "gross" basis, reflecting not only changes in basic hourly and incentive wage rates, but also such variable factors as: premium pay for overtime, late shift work, and changes in output of workers paid for an incentive plan.

**Average Weekly Earnings:** derived by multiplying *average weekly hours* by *average hourly earnings*.

**Establishment:** the basis for reporting to the Census of Manufacturers; an operating facility in a single location.

**Evaluation (Department of Defense):** determination of technical suitability of material, equipment, or a system. See *RDT&E*.

**Expenditures (Federal Budget):** see *Outlays*.

**Export-Import Bank of the United States (Eximbank):** created in 1934 and established as an independent U.S. government agency in 1945, Eximbank is designed ". . . to aid in financing and to facilitate *exports* . . ." Eximbank receives no *appropriations* from the U.S. Congress. It is directed by statute to: (1) offer financing that is competitive with that offered exporters of other countries by their official export credit institutions, (2) determine that the transactions supported provide for a reasonable assurance of repayment, (3) supplement, but not compete with private sources of export financing, and (4) take into account the effect of its activities on small business, the domestic economy, and U.S. employment.

**Exports:** domestic merchandise including commodities which are grown, produced, or manufactured in the United States and commodities of foreign origin which have been changed in the United States from the form in which they were imported or which have been enhanced in value by further manufacture in the United States and which are traded or sold to other nations.

**FAA:** Federal Aviation Administration (formerly the Federal Aviation Agency),

an agency of the Department of Transportation.

**Facility:** a physical plant or installation including: real property, building, structures, improvements, and plant equipment.

**Fiscal Year (Federal Budget):** beginning October 1, 1976, the fiscal years run from October 1 through September 30 and are designated by the year in which they end.

**Flyaway Value:** includes the cost of the airframe, engines, electronics, communications, armament, and other installed equipment.

**Foreign Military Sales (FMS):** export sales to foreign governments arranged through the Department of Defense, whereby DoD recovers full purchase price and administrative costs; often mistakenly used to include foreign military aid and foreign commercial sales as well.

**FY:** see *Fiscal Year*.

**GDP (Gross Domestic Product):** the market value of goods and services produced by labor and property located in the United States.

**General Agreement on Tariffs and Trade (GATT):** a multilateral treaty among over 100 governments whose primary mission is the reduction of trade barriers. A World Trade Organization will be created by 1997 to implement the agreement and provide a forum to discuss trade issues.

**General Aviation:** all civil flying except that of *air carriers*.

**Helicopter:** a rotary-wing *aircraft* which depends principally for its support and motion in the air upon the lift generated by one or more power-driven

rotors, rotating on substantially vertical axes. A helicopter is a *VISTOL*.

**Heliport:** an area, either at ground level or elevated on a structure, that is used for the landing and take-off of helicopters and includes some or all of the various facilities useful to helicopter operations such as: helicopter parking, hangar, waiting room, fueling, and maintenance equipment.

**Helistop:** a minimum facility *heliport*, either at ground level or elevated on a structure for the landing and takeoff of helicopters, but without such auxiliary facilities as: waiting room, hangar parking, etc.

**ICBM:** InterContinental Ballistic Missile, with a range of more than 5,000 miles.

**Imports:** classified as "general imports" or "imports for consumption." This volume refers generally to "imports for consumption," which are entries for immediate consumption plus merchandise withdrawn from bonded storage warehouses for consumption. Data are compiled from Import Entries filed with U.S. Customs officials and are in general based on the market value or price in the foreign country at the time of exportation of such merchandise, including the cost of containers and coverings, as well as other charges and expenses incidental to placing the merchandise in condition, packed and ready for shipment to the United States, but excluding import duties, insurance, freight, and other charges incidental to arrival of the goods in the United States. The foreign values of imported merchandise are converted into U.S. currency at the rate of exchange prevailing on the day the merchandise is shipped to the United States.

## **Income:**

**Net Operating Income:** total sales less total operating costs.

**Other Income and Expenses:** includes interest income, royalty income, capital gains and losses, interest expense, cash discounts, etc.

**Net Income (Before Income Taxes):**  
*Net Operating Income* plus or minus  
*Other Income and Expenses*.

**Net Income (After Income Taxes):**  
*Net Income (Before Income Taxes)* less  
federal income taxes.

**Lump-Sum Wage Payment:** a one-time payment given in lieu of general wage increases and/or cost of living adjustments in labor settlements.

**Manufacturing Industries:** those *establishments* engaged in the mechanical or chemical transformation of inorganic or organic substances into new products, and usually described as plants, factories, or mills, which characteristically use power-driven machines and materials-handling equipment; also *establishments* engaged in assembling component parts of manufactured products if the new product is neither a structure nor other fixed improvement.

**Merchandise Trade Balance:** the difference between the value of U.S. goods exported to other countries and foreign goods imported into this country. The trade balance is generally regarded as "favorable" when *exports* exceed *imports*—a trade surplus—and "unfavorable" when *imports* exceed *exports*—a trade deficit.

**Missile:** sometimes applied to space launch vehicles, but more properly connotes automated weapons of warfare, i.e., a weapon which has an integral system of guidance, as opposed to the unguided rocket.

**Multilateral Trade Negotiations (MTN):** a forum within the *GATT* in which countries negotiate to overcome their trade problems. Awaiting ratification by each of the 123 nations involved in the MTN, the “Uruguay Round” seeks to strengthen the *GATT* and expand its disciplines to new areas such as: services, agriculture, and trade-related intellectual property rights.

**NASA:** National Aeronautics and Space Administration.

**NATO:** North Atlantic Treaty Organization.

**New Obligational Authority (Federal Budget):** see *Budget Authority*.

**Non-Aerospace Products and Services:** products and services other than aircraft, missiles, space vehicles, and related propulsion and parts, produced or performed by *establishments* whose principal business is the development and/or manufacture of aerospace products.

**OASD:** Office of the Assistant Secretary of Defense.

**Obligations (Federal Budget):** commitments made by Federal agencies to pay out money for products, services, or other purposes—as distinct from the actual payments. Obligations incurred may not be larger than *budget authority*.

**Orders, Net New:** the sales value of new orders (supported by legal documents) minus cancellations during the period.

**Other Aerospace Products and Services:** all conversions, modifications, site activation, other aerospace products (including drones), services, plus *research and development* under contract, defined as: basic and applied research in the sciences and in engineering and design

and *development* of prototype products and processes.

**Other Customers:** all customers other than the U.S. government to include but not limited to: *air carriers*, private citizens and corporations, and state, local, and foreign governments.

**Outlays:** checks issued, interest accrued on the public debt, or other payments made, net of refunds and reimbursements.

**Overtime Hours:** that portion of the gross average *weekly hours* which was in excess of regular hours and for which premium payments were made.

**Passenger-Mile:** one passenger moved one mile.

**Payroll, All Manufacturing:** includes the gross *earnings* paid in the calendar year to all employees on the payroll of operating manufacturing *establishments*. Includes all forms of compensation paid directly to workers such as: salaries, wages, commissions, dismissal pay, all bonuses, vacation and sick leave pay, and compensation in kind; prior to such deductions as: employees’ Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. Does not include employers’ Social Security contributions or other non-payroll labor costs such as: employees’ pension plans, group insurance premiums, and workmen’s compensation.

**Procurement:** the process whereby the executive agencies of the Federal Government acquire goods and services from enterprises other than the Federal Government.

**Production Workers:** includes working foremen and all non-supervisory workers (including lead-men and trainees) engaged in fabricating, processing,

assembling, inspection, receiving, storage, handling, janitorial services, product development, auxiliary production for plant's own use, and record keeping and services closely associated with the above production operations.

**RDT&E (Department of Defense):**

Research, Development, Test, and Evaluation.

**Related Products and Services:** sales of electronics, software, and ground equipment in support of aerospace products, plus sales by aerospace manufacturing establishments of systems and equipment which are generally derived from the industry's aerospace technological expertise in design, materials, and processes, but which are intended for applications other than flight.

**Research:** see *Research and Development*.

**Research and Development:**

**Research:** systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Research is classified as either basic or applied according to the objectives of the sponsoring agency. *Applied Research:* with the objective of gaining knowledge or understanding necessary for determining the means by which a recognized and specific need may be met. *Basic Research:* with the objective of gaining fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products in mind.

**Development:** the systematic use of scientific knowledge directed toward the production of useful materials, devices, systems, or methods including design and development of prototypes and processes.

**Independent Research and Development (IR&D):** a term devised by the Department of Defense and used by Federal agencies to differentiate between a contractor's research and development technical effort performed under a contract, grant, or other arrangement (R&D) and that which is self-initiated and self-funded (IR&D).

**Industrial Research and Development:** research and development work performed within company facilities, funded by company or Federal funds, and excluding company-financed research and development contracted to outside organizations such as: research institutions, universities and colleges, or other non-profit organizations.

**Rotorcraft:** an aircraft which, in all its usual flight attitudes, is supported in the air wholly or in part by a rotor or rotors (i.e. airfoils rotating or revolving about an axis). See *Helicopter*.

**Sales:** net of returns, allowances, and discounts, the dollar value of shipments, including dealer's commissions, if any, which have passed through the sales account.

**Satellite:** a body that revolves around a larger body, such as the Moon revolving around the Earth, or a man-made object revolving about any body such as the Sun, Earth, or Moon.

**SIC (Standard Industrial Classification):** a system developed by the U.S. government to define the industrial composition of the economy, facilitating comparability of statistics. See *Aerospace Industry* for explanation of SIC codes applicable to the aerospace industry.

**Space Vehicle:** an artificial body operating in outer space (beyond the Earth's atmosphere).

**Stockholder's Equity:** assets minus all obligations of the corporation, except those to stockholders. Annual data are average equity for the year (using four end-of-quarter figures). For details, see "Quarterly Financial Report for Manufacturing, Mining and Trade Corporations," compiled by the *Bureau of the Census*.

**STOL:** short take-off and landing aircraft.

**Test (Department of Defense):** an experiment designed to assess progress in attainment or accomplishment of *development* objectives (see *RDT&E*).

**Thrust:** the driving force exerted by an engine, particularly an aircraft or missile engine, in propelling the vehicle to which it is attached.

**Ton-Mile:** one ton moved one mile.

**Total Obligational Authority:** the sum of *budget authority* granted or requested from the Congress in a given year, plus unused *budget authority* from prior years.

**Trade Balance:** see *Merchandise Trade Balance*.

**Transition Quarter (Tr. Qtr.):** the three-month interval from July 1, 1976 to September 30, 1976 belonging to nei-

ther Fiscal Year 1976 nor Fiscal Year 1977. See *Fiscal Year*.

**Turbine, Turbo:** a mechanical device or engine that spins in reaction to a fluid flow that passes through or over it. Frequently used in "turboprop" or "turbojet."

**UK:** United Kingdom.

**US:** United States of America.

**USA:** United States Army, an agency of the U.S. Department of Defense.

**USAF:** United States Air Force, an agency of the U.S. Department of Defense.

**USN:** United States Navy, an agency of the U.S. Department of Defense.

**USSR:** Union of Soviet Socialist Republics. Statistics continue to exclude this region until official data from the now independent republics become available.

**Utility Aircraft:** an aircraft designed for general purpose flying.

**V/STOL:** vertical short take-off and/or landing aircraft.

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AAI Corporation  
Aerojet, A Segment of GenCorp  
AlliedSignal Aerospace  
Aluminum Company of America  
American Pacific Corporation  
Argo-Tech Corporation  
B.H. Aircraft Company, Inc.  
The Boeing Company  
Chrysler Technologies Corporation  
Coltec Industries Inc.  
    Chandler Evans  
    Delavan Gas Turbine  
    Menasco Aerosystems  
    Walbar  
Computing Devices International  
Digital Equipment Corporation  
Dowty Aerospace  
    Yakima  
    Los Angeles  
DuPont Company  
Dynamic Engineering Incorporated  
E-Systems, Inc.  
FMC Corporation  
GEC-Marconi Electronic Systems  
    Corporation  
General Dynamics Corporation  
General Electric Company  
General Motors Corporation  
    General Motors Hughes Electronics  
    Delco Electronics  
    Hughes Aircraft Company  
The BFGoodrich Company  
    Landing Systems  
    Maintenance, Repair, and Overhaul  
    Safety Systems  
    Sensors and Integrated Systems  
Gulfstream Aerospace Corporation  
Harris Corporation  
Heath Tecna Aerospace Company  
HEICO Corporation  
Hercules Incorporated  
Hexcel Corporation  
Honeywell Inc.  
ITT Defense and Electronics Inc.  
Kaman Aerospace Corporation  
Lockheed Corporation  
Loral Vought Systems Corporation  
Lord Corporation  
Lucas Aerospace Inc.  
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McDonnell Douglas Corporation  
Northrop Grumman Corporation  
Parker Hannifin Corporation  
Raytheon Company  
Reflectone, Inc.  
Rockwell International Corporation  
Rohr, Inc.  
Sundstrand Corporation  
Teledyne, Inc.  
    Teledyne Brown Engineering  
    Teledyne Controls  
Teleflex Aerospace/Defense  
Texas Instruments Incorporated  
    Defense Systems & Electronics Group  
Textron Inc.  
Thiokol Corporation  
TRW Inc.  
United Technologies Corporation  
    Aerospace/Defense:  
    Pratt & Whitney  
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