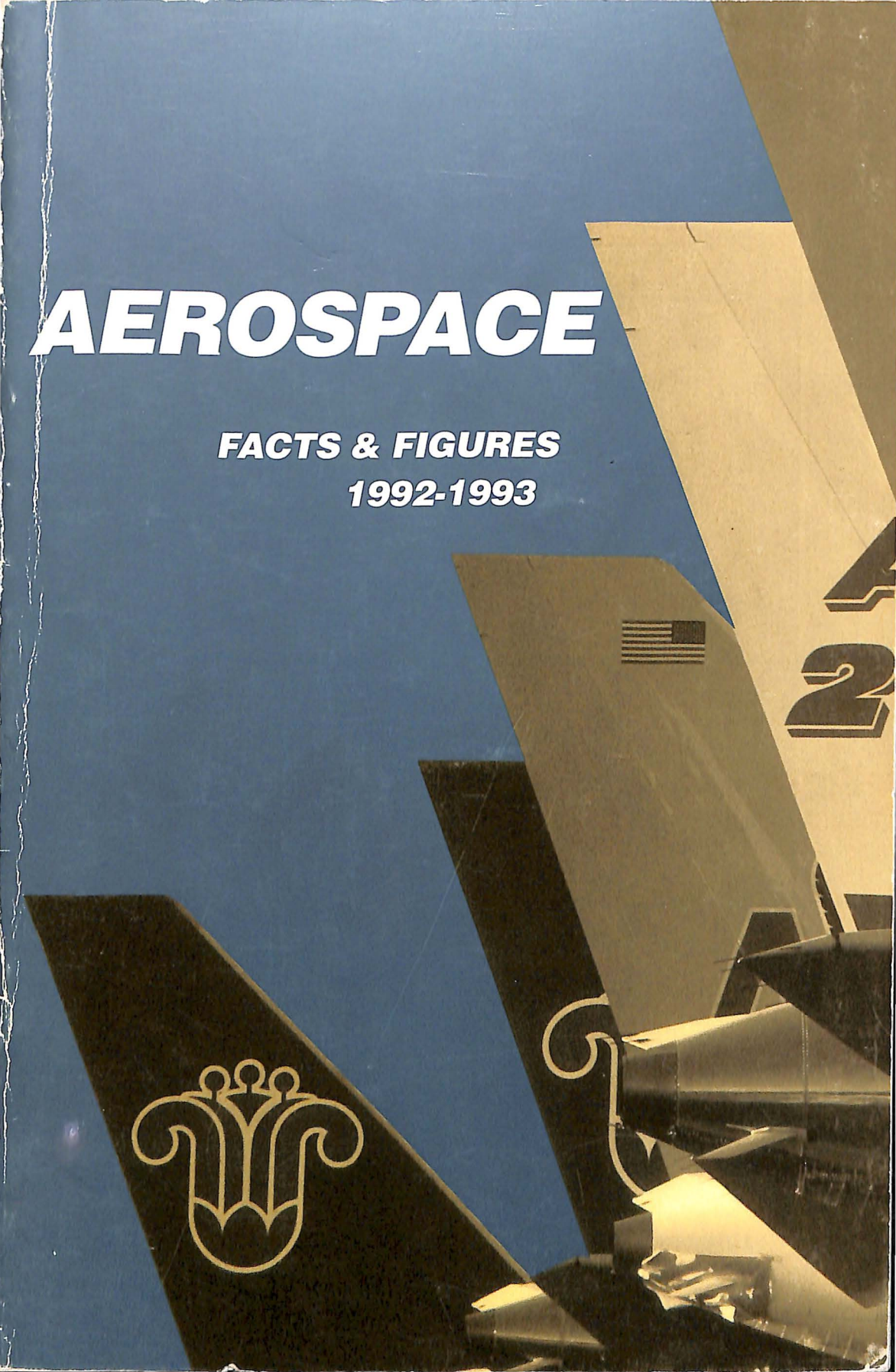
AEROSPACE

FACTS & FIGURES
1992-1993



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The Challenge of Change

In 1991, the aerospace industry reverberated to dramatic world changes that its defense systems and technology helped bring about. The dissolution of the Soviet Union, on the heels of the Persian Gulf War, showed that the national investment in defense has been sound. The growing militancy of regional powers reminds us that America will always need a strong aerospace capability.

Civil aircraft and space business are taking on even greater importance now as the growth segments of aerospace. Aerospace companies are diversifying, applying skills honed in the defense market to commercial and civil government activities. They are addressing a range of new technical problems, including issues of environmental quality.

Aerospace is being challenged to change, and it is in the forefront of change. Aerospace is meeting new national needs by continually advancing the technical frontiers.

Foreword

This volume presents the statistical story of the U.S. aerospace industry's activities in calendar year 1991, a contradictory year of record and near-record sales levels at a time of declining orders and backlog.

The industry's overall sales, at $139 billion, reached an all-time high in current dollar terms. In inflation-adjusted constant dollars, sales declined slightly but remained at a level higher than any year in the industry's history except for the record year 1990.

However, order and backlog statistics tell a less optimistic story. Net new orders placed with industry firms dropped sharply and, for the first time in recent memory, the yearend backlog fell below the prior year's level.

The reason for these declines was not, as might be expected, a downturn in military orders. Actually, new orders from the U.S. government increased substantially despite reduced defense appropriations. The marked decrease in 1991 orders stemmed from a huge plunge in non-government orders, meaning, for the most part, orders for commercial transport aircraft.

Due primarily to the financial difficulties being experienced by nearly all the world's air carriers, new non-government orders fell off by more than 25 percent. This will significantly compound the problems the industry anticipates in the 1990s; where industry officials had looked to increased commercial sales to offset declining military business, it must now contend with reduced commercial aircraft deliveries in the mid-1990s. This, however, is a temporary situa-

tion; we expect resumption of orders when an end to the global recession improves the airlines' financial health, and a higher rate of deliveries in the late years of the decade.

The bright side of the industry's story in 1991 was, once again, its performance in international trade. The U.S. as a whole recorded a $66 billion merchandise trade deficit, the lowest since1983, and the aerospace industry made a very significant contribution by exporting $43.8 billion worth of aerospace products.

Aerospace exports amounted to 10.4 percent of all U.S. merchandise exports. The export figure was, of course, a record, in fact the seventh straight export record, and it made possible the fifth consecutive aerospace trade surplus record. The industry's foreign trade performance underscores once again the importance to the U.S. economy of high value, high technology aerospace exports.

Our continuing success in the global marketplace leads us to believe that we can further expand our export volume because American aerospace products have won a worldwide reputation for excellence. To do so in a fiercely competitive world, industry must improve its competitive posture by further cutting costs and effecting new efficiencies in every phase of its operation. Our companies are already working hard in that direction.

We need something else: a national strategy for expanded exports whose principal thrust is active U.S. government support of its exporting industries. The government must create new and modernized administrative machinery to spur exports, and it must remove the multitude of roadblocks to export sales it has erected over the years. Recent events have encouraged industry officials to believe that the urgency of the times has brought a change in government attitudes and that some help in those directions will be forthcoming.

The industry outlook for the rest of this century is continuing decline in defense business to a level not currently predictable except in broadest terms: serious, but not catastrophic. AIA expects that some, but not all, of the slack will be taken up by continuing high levels of commercial transport and civil space sales; the breadth of the gap will depend upon the degree of success the industry realizes in its quest for expanded exports.

We face, therefore, the prospect of a smaller industry operating at a substantially reduced sales level. It can, however, be a more effective industry; the efficiencies we must pursue as a matter of competitive necessity will inevitably improve the industry's financial, technological and competitive posture over the long term.

Don Fuqua
President, Aerospace Industries Association

In 1991, a big boost in commercial sales more than offset a decline in sales to the Department of Defense and brought about a moderate increase in the U.S. aerospace industry's total sales, according to data compiled by Aerospace Industries Association (AIA). The sales level reported by AIA was the highest ever for the industry in current dollar terms; in inflation-adjusted constant dollars, it fell just slightly short of the previous year's all-time peak.

Here is a breakdown of the industry's performance in 1991:

Sales

Total industry sales amounted to $138.9 billion, an increase of 3.4 percent over 1990's $134.4 billion. Despite declines in every year since 1987, aerospace sales to the Department of Defense (DoD) continued to lead in a breakdown of major customer groups with $55.9 billion, or 40 percent of the total.

In a breakdown by product category, aircraft sector sales predominated. Aircraft sector sales (civil and military combined) totaled $76.1 billion, up from $71.4 billion, in 1990. The 1991 figure represented 55 percent of total sales; and it was split almost evenly between military and civil aircraft.

Space sales accounted for more than 20 percent of total sales. At $28.7 billion in 1991, they were up almost nine percent over 1990's $26.4 billion.

Sales of missile systems declined sharply, from $14.2 billion in 1990 to $10.9 billion in 1991.

"Related products and services" sales totaled $23.1

billion, up from $22.4 billion.

For 1991, aerospace industry sales represented 2.4 percent of the Gross Domestic Product (as in 1990) and 4.9 percent (up from 4.7 percent) of total sales by all U. S. manufacturing industries.

Earnings

The industry recorded a 1991 net profit of $2.5 billion, down from $4.5 billion in the previous year. The big drop was due primarily to extremely large non-operating costs incurred as a result of industry downsizing due to sharply declining defense sales and the initial implementation of a change in accounting for future retirement benefits costs.

Expressed as a percentage of sales, the profit amounted to 1.8 percent (it marked only the second drop below two percent in the last 30 years). The 1.8 percent figure compares with 3.4 percent in 1990 and the five year (1986-90) average 3.6 percent.

Aerospace ratios remained below the average for all U.S. manufacturing industries. The all-manufacturing profit-to-sales ratio was 2.5 percent in 1991. As a percentage of assets, aerospace profit was 1.9 percent, all-manufacturing 2.6 percent; as a percentage of equity, it was aerospace 6.1 percent, all-manufacturing 6.4 percent.

Orders and Backlog

For the second straight year, net new orders placed with aerospace industry firms dropped sharply, to $132.6 billion from the previous year's $146 billion. But where the 1990 dip was due to sharply declining U.S. government orders, it was the other way around in 1991:

non-U.S. government orders, which for the most part are orders for civil transport aircraft, plunged more than 26 percent, while military orders increased by more than 18 percent. The breakdown was: U.S government orders $66.7 billion (up from $56.3 billion) and non-U.S. government orders $66 billion (down from $89.7 billion).

The industry's backlog at year-end fell below the previous year's but remained at a very healthy $247.6

billion level (versus $250 billion at year-end 1990). There was an increase in the U.S. government backlog ($84.8 billion, up from $82 billion) and a decline in the non-U.S. government area ($162.8 billion, down from $168.1 billion).

Civil Aircraft Production

New aircraft shipments during 1991 fell off by 87 units, to 2,181 airplanes compared with 2,268 in 1990. The 1991 figure included 1,021 general aviation aircraft (down from 1,144), 571 helicopters (down from 603) and 589 civil transports (up from 521).

However, the far greater unit dollar value of transport aircraft, the only category that showed a numerical increase, boosted overall civil aircraft sales to $29 billion (up from $24.5 billion in 1990). Commercial transports accounted for $26.9 billion, or more than 92 percent of total civil aircraft sales.

Shipments of general aviation aircraft were valued at $2 billion (down $40 million) and sales of civil helicopters fell to $211 million from 1990's $254 million.

The 2,181 civil aircraft delivered included 944 delivered to U.S. customers and 1,237 sold abroad.

The backlog for aircraft, engines and parts remained almost constant at $172.3 billion. The backlog for commercial transport aircraft was $108.8 billion, compared with $112.3 billion in 1990.

Military Aircraft Production

The industry produced 907 military aircraft in 1991, down from 1,052. Deliveries in 1991 included 544 aircraft delivered to U.S. military agencies and 363 exported under Foreign Military Sales programs or through direct sales by U.S. manufacturers to foreign governments. The comparable figures for 1990 were 664 delivered to U.S. agencies and 388 exported.

Foreign Trade

In 1991, the aerospace industry recorded its fifth consecutive trade surplus record and its seventh straight export record.

Aerospace exports increased more than 12 percent and reached $43.8 billion. Imports also continued their steady climb and set an eighth consecutive record at $13 billion, up from $11.8 billion in 1990. The resulting trade balance was $30.8 billion, which compares with $27.3 billion in 1990.

Civil aerospace exports were more than 81 percent of the total aerospace export volume. The industry exported products valued at $35.5 billion, compared with $31.5 billion in 1990. In value, well over half of the civil export volume was in commercial transport aircraft ($20.9 billion). Military exports reached a new peak of $8.2 billion, up from $7.6 billion in 1990.

Space Systems

Industry space-related sales continued their steady growth to $28.7 billion, up from $26.5 billion.

New orders for space vehicles, excluding propulsion systems, increased substantially in 1991, according to the Bureau of the Census, which reported orders totaling $11.7 billion compared with $9.6 billion in the previous year. The gain was due to a large ($2.8 billion) increase in non-military orders.

The backlog of orders for space

systems (excluding propulsion) remained steady at $12.5 billion.

Missile Systems

From a peak level of $14.2 billion, missile-related sales plunged more than 22 percent in 1991 to $10.9 billion.

Bureau of the Census data showed only a slight decline in missile systems sales from $9.1 billion in 1990 to $9 billion in 1991. Unlike AIA sales figures, Census data excludes value of propulsion systems and missile systems RDT&E. For 1991, sales of propulsion systems (including space vehicle propulsion) came to $3.9 billion, up from $3.2 billion, but the increase appeared to be in sales of civil space propulsion; military rocket propulsion sales fell from $1.9 billion in 1990 to $1.8 billion in 1991.

Net new orders for missile systems and parts (again excluding propulsion) increased slightly, to $8.1 billion from 1990's $7.9 billion. Orders for missile/space propulsion systems increased substantially to $5.7 billion from $2.7 billion in 1990; in the non-military segment, orders for propulsion units declined from $1.9 billion in 1990 to $1.1 billion.

The backlog for missile systems and parts was $12 billion, down from $13 billion. The backlog for propulsion units was $8.5 billion, up from $6.2 billion, while military propulsion order backlog fell $563 million to $2.3 billion.

Research and Development

According to the National Science Foundation total U.S. R&D funding reached $150.8 billion in calendar year 1991 and U.S. industry provided 52 percent ($78.3 billion) of it. Industry performed more than 70 percent of the work.

Office of Management and Budget (OMB) estimates show that the Department of Defense is, as usual, the largest conductor of government-funded R&D. OMB estimates put DoD outlays at $36.9 billion in Fiscal Year 1992 and $38.9 billion (52 percent of total federal R&D outlays) in FY 1993. Other estimates include the Department of Energy, with R&D outlays of $11.1 billion in FY 1992 and $11.2 billion in FY 1993; NASA, $7.3 billion and $7.7 billion; and all other agencies combined, $15.5 billion and $16.7 billion.

Employment

The aerospace employment decline that began in 1990 accelerated sharply in 1991. The aerospace labor force lost 87,000 jobs and average annual employment dropped to 1,216,000.

Aerospace employment represented 6.6 percent of employment in all U.S. manufacturing industries, down from 6.8 percent.

At $34.7 billion, the industry's 1991 payroll was down 3.1 percent from 1990's $35.9 billion. The aerospace payroll represented 6.4 percent of combined payroll outlays by all U.S. manufacturing industries; the comparable figure for 1990 was 6.6 percent.

STANDARD INDUSTRIAL CLASSIFICATIONS APPLICABLE TO THE AEROSPACE INDUSTRY

3721 **AIRCRAFT**
- 37211 Military aircraft
- 37215 Civilian aircraft
- 37217 Modification, conversion, and overhaul of previously accepted aircraft
- 37218 Aeronautical services on complete aircraft, nec

3724 **AIRCRAFT ENGINES AND ENGINE PARTS**
- 37241 Aircraft engines for military aircraft
- 37242 Aircraft engines for civilian aircraft
- 37243 Aeronautical services on aircraft engines
- 37244 Aircraft engine parts and accessories

3728 **AIRCRAFT PARTS AND AUXILIARY EQUIPMENT, NEC**
- 37281 Aircraft parts and auxiliary equipment, nec
- 37282 Aircraft propellers and helicopter rotors
- 37283 Research and development on aircraft parts

3761 **GUIDED MISSILES AND SPACE VEHICLES**
- 37611 Complete guided missiles (excluding propulsion systems)
- 37612 Complete space vehicles (excluding propulsion systems)
- 37613 Research and development on complete guided missiles
- 37614 Research and development on complete space vehicles
- 37615 All other services on complete guided missiles and space vehicles

3663 **RADIO AND TELEVISION COMMUNICATIONS EQUIPMENT**
- 36631 Communication systems and equipment, except broadcast

3764 **SPACE PROPULSION UNITS AND PARTS**
- 37645 Complete missile or space vehicle engines and/or propulsion units
- 37646 Research and development on complete missile or space vehicle engines and/or propulsion units
- 37647 Services on complete guided missile or space vehicle engines and/or propulsion units, nec
- 37648 Missile and space vehicle engine and/or propulsion unit parts and accessories

3769 **SPACE VEHICLE EQUIPMENT, NEC**
- 37692 Missile and space vehicle components, parts and subassemblies, nec
- 37694 Research and development on missile and space vehicle parts and components, nec

3669 **COMMUNICATIONS EQUIPMENT, NEC**
- 36691 Alarm systems
- 36692 Traffic control equipment
- 36693 Intercommunication equipment

3812 **SEARCH, DETECTION, NAVIGATION, GUIDANCE, AERONAUTICAL AND NAUTICAL SYSTEMS, INSTRUMENTS, AND EQUIPMENT**
- 38121 Aeronautical, nautical, and navigational instruments, not sending or receiving radio signals
- 38122 Search, detection, navigation, and guidance systems and equipment

3829 **MEASURING AND CONTROLLING DEVICES, NEC**
- 38291 Aircraft engine instruments, except flight

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.

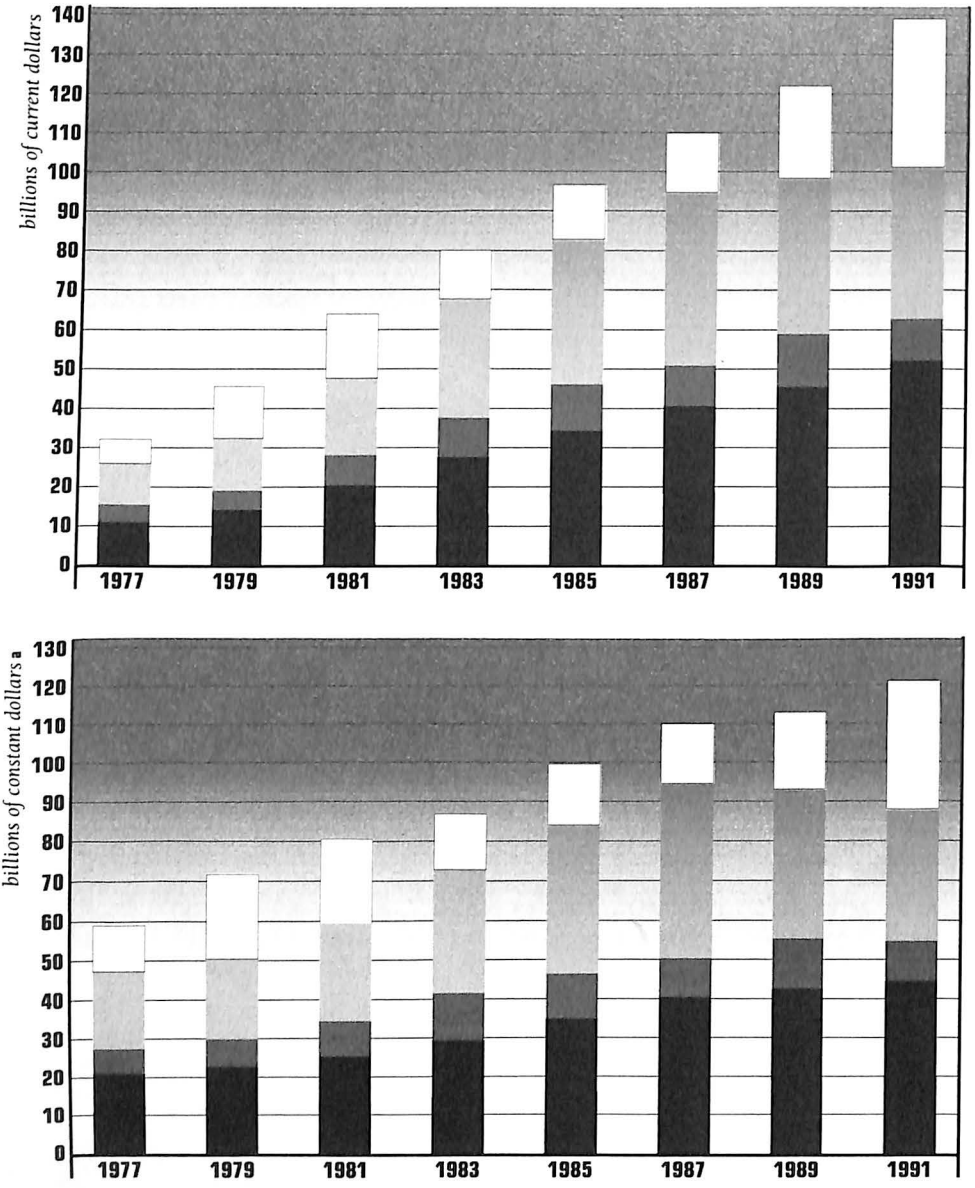
AEROSPACE INDUSTRY SALES BY CUSTOMER

Calendar Years 1977–1991
(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		
CURRENT DOLLARS						
1977	$ 32,199	$ 26,095	$14,368	$ 3,012	$ 8,715	$ 6,104
1978	37,702	30,889	15,533	3,151	12,205	6,813
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[r]	120,534	100,445	61,199	9,601	29,645	20,089
1990[r]	134,375	111,979	60,502	11,097	40,379	22,396
1991	138,885	115,737	55,867	11,682	48,189	23,147
CONSTANT DOLLARS (1987 = 100)[a]						
1977	$ 58,973	$ 47,793	$26,315	$ 5,516	$15,962	$11,179
1978	65,569	53,720	27,014	5,480	21,226	11,849
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[r]	113,604	94,670	57,680	9,049	27,941	18,934
1990[r]	121,606	101,338	54,753	10,043	36,542	20,268
1991	121,191	100,992	48,750	10,194	42,050	20,198

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 price deflator.
r Revised.

Aerospace Sales by Product Group



- Related Products and Services
- Space
- Missiles
- Military Aircraft
- Civil Aircraft

Source: Aerospace Industries Association

a *Based on AIA's aerospace composite price deflator (1987=100)*

AEROSPACE INDUSTRY SALES BY PRODUCT GROUP

Calendar Years 1977–1991
(Millions of Dollars)

Year	TOTAL SALES	Aircraft			Missiles	Space	Related Products & Services
		Total	Civil	Military			
CURRENT DOLLARS							
1977	$ 32,199	$16,988	$ 6,183	$10,805	$ 4,106	$ 5,001	$ 6,104
1978	37,702	21,074	8,222	12,852	4,098	5,717	6,813
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[r]	120,534	61,550	21,903	39,646	13,622	25,274	20,089
1990[r]	134,375	71,353	31,362	40,091	14,180	26,446	22,396
1991	138,885	76,126	37,653	38,474	10,930	28,681	23,147
CONSTANT DOLLARS (1987 = 100)[a]							
1977	$ 58,973	$31,114	$11,324	$19,789	$ 7,520	$ 9,159	$11,179
1978	65,569	36,650	14,299	22,351	7,127	9,943	11,849
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[r]	113,604	58,011	20,644	37,367	12,839	23,821	18,934
1990[r]	121,606	64,573	28,382	36,281	12,833	23,933	20,268
1991	121,191	66,428	32,856	33,572	9,538	25,027	20,198

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.
r Revised.

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

Calendar Years 1977–1991
(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	
CURRENT DOLLARS									
1977	$ 33,315	$20,704	$12,611	$ 8,848	$ 7,530	$ 5,775	$ 2,839	$2,219	$ 6,104
1978	37,968	21,888	16,080	8,724	10,581	6,380[a]	3,363	2,107[a]	6,813
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[r]	136,646	73,552	63,094	24,614	41,675	22,040	15,862	4,253	28,202
1991	134,578	66,710	67,868	21,703	46,890	23,793	13,129	4,358	24,705
CONSTANT DOLLARS (1987 = 100)[b]									
1977	$ 61,016	$37,919	$23,097	$16,205	$13,791	$10,577	$ 5,200	$4,064	$11,179
1978	66,031	38,066	27,965	15,172	18,402	11,096	5,849	3,664	11,849
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	12,756	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	17,570	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	117,433	58,211	59,222	18,938	40,916	20,762	11,456	3,803	21,558

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).
a AIA estimate based on M37D data.
b Based on AIA's aerospace composite price deflator.
r Revised.

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

Calendar Years 1977–1991
(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	
NET NEW ORDERS									
1977	$ 38,922	$ 22,682	$ 16,240	$ 9,369	$ 11,193	$ 6,232	$ 3,554	$2,170	$ 6,404
1978	49,819	25,992	23,827	11,150	16,961	7,072[b]	4,631	2,450[b]	7,555
1979[a]	67,561[a]	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[a]	89,168[a]	58,849[a]	30,319[a]	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[r]	145,965	56,264	89,701	15,541	66,845	20,207	13,014	3,487	26,871
1991	132,644	66,668	65,976	22,654	43,517	25,512	10,675	5,110	25,176
BACKLOG AS OF DECEMBER 31									
1977	$ 45,309	$ 26,119	$ 19,190	$12,471	$ 12,592	$ 6,743	$ 2,761	$3,447	$ 7,295
1978	57,160	30,223	26,937	14,897	18,972	7,557	4,029	3,668	8,037
1979[a]	78,548[a]	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[a]	108,391[a]	63,201[a]	45,190[a]	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[r]	250,079	82,017	168,062	26,911	146,029	31,648	17,865	5,635	21,991
1991	247,597	84,827	162,770	30,859	141,426	32,981	15,199	6,027	21,105

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.
b AIA estimate based on M37D data.
r Revised.

AEROSPACE SALES AND THE NATIONAL ECONOMY

Calendar Years 1977–1991
(Billions of Dollars)

Year	Gross Domestic Product	Industry Sales			Aerospace Sales As Percent of		
		Manufacturing[a]	Durable Goods[a]	Aerospace	GDP	Manufacturing	Durable Goods
CURRENT DOLLARS							
1977	$1,974.1	$1,358.4	$710.0	$32.2	1.6	2.4	4.5
1978	2,232.7	1,522.9	812.8	37.7	1.7	2.5	4.6
1979	2,488.6	1,727.2	911.1	45.4	1.8	2.6	5.0
1980	2,708.0	1,852.7	929.0	54.7	2.0	3.0	5.9
1981	3,030.6	2,017.5	1,004.7	64.0	2.1	3.2	6.4
1982	3,149.6	1,960.2	950.5	67.8	2.2	3.5	7.1
1983	3,405.7	2,070.6	1,025.8	80.0	2.3	3.9	7.8
1984	3,777.2	2,288.2	1,175.3	83.5	2.2	3.6	7.1
1985	4,038.7	2,334.5	1,215.4	96.6	2.4	4.1	7.9
1986	4,268.6	2,335.9	1,238.9	106.2	2.5	4.5	8.6
1987	4,539.9	2,475.9	1,297.5	110.0	2.4	4.4	8.5
1988	4,900.4	2,682.5	1,415.9	114.6	2.3	4.3	8.1
1989	5,244.0	2,792.7	1,460.4	120.5[r]	2.3	4.3	8.3
1990	5,513.7	2,873.5	1,468.6	134.4[r]	2.4	4.7	9.1
1991	5,676.4	2,821.7	1,422.6	138.9	2.4	4.9	9.8

CONSTANT DOLLARS (1987 = 100)[b]					Real Annual Growth[c]			
					GDP	Mfg.	Durs.	Aero.
1977	$3,533.4	$2,431.4	$1,270.8	$59.0	4.5%	7.2%	9.3%	0.8%
1978	3,703.3	2,525.9	1,348.1	65.6	4.8	3.9	6.1	11.2
1979	3,796.5	2,635.0	1,390.0	71.5	2.5	4.3	3.1	9.1
1980	3,776.3	2,583.6	1,295.5	77.5	(0.5)	(2.0)	(6.8)	8.3
1981	3,843.0	2,558.4	1,274.1	80.5	1.8	(1.0)	(1.7)	3.9
1982	3,760.3	2,340.3	1,134.8	77.1	(2.2)	(8.5)	(10.9)	(4.2)
1983	3,907.4	2,375.6	1,176.9	86.7	3.9	1.5	3.7	12.5
1984	4,148.5	2,513.1	1,290.8	83.7	6.2	5.8	9.7	(3.6)
1985	4,279.6	2,473.7	1,287.9	97.8	3.2	(1.6)	(0.2)	17.0
1986	4,404.3	2,410.1	1,278.2	106.4	2.9	(2.6)	(0.7)	8.7
1987	4,539.9	2,475.9	1,297.5	110.0	3.1	2.7	1.5	3.4
1988	4,718.7	2,583.0	1,363.4	112.4	3.9	4.3	5.1	2.2
1989	4,836.7	2,575.8	1,347.0	113.6	2.5	(0.3)	(1.2)	1.0
1990	4,885.0	2,545.9	1,301.2	121.6	1.0	(1.2)	(3.4)	7.0
1991	4,847.5	2,409.6	1,214.8	121.2	(0.8)	(5.3)	(6.6)	(0.3)

Source: Bureau of Economic Analysis, "Business Statistics" and "Survey of Current Business" (Monthly); and Aerospace Industries Association.

a "Manufacturing" and "Durable Goods" reflect revisions to National Income and Product Accounts (NIPA).

b Aerospace industry constant dollar sales based on AIA's aerospace composite price deflator. Others based on GDP implicit price deflator.

c Parentheses indicate negative real annual growth.

r Revised.

GROSS DOMESTIC PRODUCT, FEDERAL BUDGET, AND DEFENSE BUDGET

Fiscal Years 1962–1993
(Billions of Dollars)

Year	Fiscal Year GDP[r]	Federal Budget Outlays		Defense Outlays as percent of	
		Net Total[a]	National Defense[b]	GDP	Federal Budget
1962	$ 554.3	$ 106.8	$ 52.3	9.4%	49.0%
1963	585.0	111.3	53.4	9.1	48.0
1964	626.5	118.5	54.8	8.7	46.2
1965	671.4	118.2	50.6	7.5	42.8
1966	738.6	134.5	58.1	7.9	43.2
1967	791.3	157.5	71.4	9.0	45.4
1968	849.8	178.1	81.9	9.6	46.0
1969	926.6	183.6	82.5	8.9	44.9
1970	985.6	195.6	81.7	8.3	41.8
1971	1,051.6	210.2	78.9	7.5	37.5
1972	1,145.8	230.7	79.2	6.9	34.3
1973	1,278.0	245.7	76.7	6.0	31.2
1974	1,403.3	269.4	79.3	5.7[r]	29.5
1975	1,511.0	332.3	86.5	5.7	26.0
1976	1,685.1	371.8	89.6	5.3	24.1
Tr.Qtr.	444.9	96.0	22.3	5.0	23.2
1977	1,919.7	409.2	97.2	5.1[r]	23.8
1978	2,156.4	458.7	104.5	4.8	22.8
1979	2,431.9	503.5	116.3	4.8	23.1
1980	2,644.5	590.9	134.0	5.1[r]	22.7
1981	2,964.7	678.2	157.5	5.3	23.2
1982	3,124.9	745.8[r]	185.3	5.9	24.8[r]
1983	3,317.0	808.4[r]	209.9	6.3	26.0
1984	3,696.7	851.8	227.4	6.2	26.7
1985	3,970.9	946.4[r]	252.7	6.4	26.7
1986	4,219.6	990.3	273.4	6.5	27.6
1987	4,453.3	1,003.9[r]	282.0	6.3[r]	28.1
1988	4,810.0	1,064.1	290.4	6.0[r]	27.3
1989	5,170.1	1,144.2[r]	303.6	5.9	26.5
1990	5,459.5	1,251.8[r]	299.3	5.5	23.9
1991	5,626.6	1,323.0	273.3	4.9	20.7
1992[E]	5,865.0	1,475.4	307.3	5.2	20.8
1993[E]	6,231.6	1,515.3	291.4	4.7	19.2

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 FY 1985, the Federal Budget reflects establishment of a military retirement trust fund. Data for prior years adjusted for comparable treatment of military retired pay.
E Estimate.
r Revised.
Tr.Qtr. See Glossary.

FEDERAL OUTLAYS
DEFENSE, NASA, AND AEROSPACE PRODUCTS & SERVICES

Fiscal Years 1965–1993
(Millions of Dollars)

Year	TOTAL National Defense	TOTAL NASA	Federal Outlays for Aerospace Products & Services			Aerospace as Percent of Total National Defense and NASA
			TOTAL	DOD[a]	NASA	
1965	$ 50,620	$ 5,093	$11,858	$ 7,296	$ 4,562	21.3%
1966	58,111	5,933	14,065	8,704	5,361	22.0
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	39,922	8,926	16.3
1989	303,559	11,052	52,933	42,072	10,861	16.8
1990	299,331	12,429	53,202	40,992	12,210	17.1
1991	273,292	13,878	53,640	40,098	13,551	18.7
1992[E]	307,304	13,819	50,214	36,843	13,371	15.6
1993[E]	291,353	14,088	46,382	32,786	13,596	15.2

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.

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

Tr.Qtr. See Glossary.

FEDERAL OUTLAYS FOR AEROSPACE PRODUCTS AND SERVICES

Fiscal Years 1965–1993
(Millions of Dollars)

Year	TOTAL	Department of Defense[a]			NASA[b]
		TOTAL	Aircraft	Missiles[c]	
1965	$11,858	$ 7,296	$ 5,200	$ 2,096	$ 4,562
1966	14,065	8,704	6,635	2,069	5,361
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	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	53,202	40,992	26,142	14,851	12,210
1991	53,640	40,089	25,689	14,400	13,551
1992[E]	50,214	36,843	23,950	12,893	13,371
1993[E]	46,382	32,786	20,899	11,887	13,596

Source: Department of Defense, "Status of Funds" (Annual Summaries); Office of Management and Budget, "The Budget of the United States Goverment" (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 earier 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 1978 and subsequent years revised by AIA from previously published data to include Navy Weapons Procurement in Missiles Procurement. Beginning 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.

Tr.Qtr. See Glossary.

DEPARTMENT OF DEFENSE
TOTAL MILITARY OUTLAYS BY FUNCTIONAL TITLE[a]

Fiscal Years 1984–1993
(Millions of Dollars)

	1984	1985	1986
TOTAL[d]	$220,928	$245,154	$265,480
Procurement—TOTAL	$ 61,879	$ 70,381	$ 76,517
Aircraft	23,196	26,586	30,828
Missiles[b]	9,527	10,749	11,730
Ships	8,487	9,145	9,501
Weapons[b]	3,691	3,801	4,343
Ammunition	1,826	2,080	1,933
Other[c]	15,152	18,020	18,182
Military Personnel—TOTAL	64,158	67,842	71,511
Active Forces	42,732	60,344	63,139
Reserve Forces	4,923	7,498	8,373
Retired Pay	16,503	(d)	(d)
Adjustment: Retirement Trust Fund Accrual[d]	(2)	—	—
Research, Development, Test, & Evaluation	23,117	27,103	32,283
Operations & Maintenance	67,388	72,371	75,288
Military Construction	3,706	4,260	5,067
Family Housing	2,413	2,642	2,819
Other	(1,732)	553	1,995

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 activites.

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 Beginning in FY 1985, the Federal Budget reflects establishment of a military retirement trust fund. Data for previous years have been adjusted on a comparable basis.

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

r Revised.

DEPARTMENT OF DEFENSE
TOTAL MILITARY OUTLAYS BY FUNCTIONAL TITLE[a] (Continued)

Fiscal Years 1984–1993
(Millions of Dollars)

1987	1988	1989	1990	1991	1992[E]	1993[E]
$273,966	$281,935	$294,880	$289,755	$306,806	$300,621	$279,077
$ 80,744	$ 77,166	$ 81,620	$ 80,972	$ 82,028	$ 73,952	$ 67,263
32,956	28,246	27,569	26,142	25,689	23,950	20,899
11,473	11,676	14,503	14,851	14,400	12,893	11,887
9,316	8,878	10,587	11,016	11,512	10,275	9,355
4,962	4,727	4,384	3,873	3,716	3,689	2,632
2,111	2,250	1,993	2,003	2,103	1,545	1,465
19,926	21,389	22,585	23,088	24,609	21,600	21,025
72,020	76,337	80,676	75,622	83,439	79,289	76,952
63,810	67,642	71,571	66,541	74,571	69,735	67,831
8,210	8,694	9,104	9,081	8,868	9,554	9,122
(d)	(d)	(d)	(d)	(d)	(d)	(d)
—	—	—	—	—	—	—
33,596	34,792	37,002	37,458	34,589	36,145	37,914
76,205	84,475	87,001	88,340	101,769	97,887	87,639
5,853	5,874	5,275	5,080	3,497	4,541	6,264
2,908	3,082	3,257	3,501	3,296	3,404	3,652
2,640	210	50	(1,218)	(1,812)	5,403	(607)

FEDERAL PRICE DEFLATORS FOR GDP, DEFENSE, PPI, AND CPI

(1964–1993)

Year	GDP		Federal Government Defense Purchases		PPI, Capital Equip-ment	CPI, (Urban) All items
	FY GDP (FY 1987 =100)	CY GDP (CY 1987 =100)	Durable Goods (FY 1987 =100)	Goods & Services (CY 1987 =100)	(CY 1982 =100)	(CY 82-84 =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	31.7	NA	NA	37.0	34.8
1969	32.79	33.3	NA	NA	38.3	36.7
1970	34.57	35.1	NA	NA	40.1	38.8
1971	36.34	37.0	NA	NA	41.7	40.5
1972	38.23	38.8	46.7	36.9	42.8	41.8
1973	40.22	41.3	47.5	40.5	44.2	44.4
1974	43.27	44.9	49.7	44.5	50.5	49.3
1975	47.58	49.2	53.9	48.5	58.2	53.8
1976	51.22	52.3	57.4	51.9	62.1	56.9
1977	55.38	55.9	61.5	55.6	66.1	60.6
1978	59.57	60.3	64.8	59.8	71.3	65.2
1979	64.74	65.5	70.5	65.8	77.5	72.6
1980	70.58	71.7	78.1	73.5	85.8	82.4
1981	77.76	78.9	87.4	81.1	94.6	90.9
1982	83.55	83.8	96.3	87.6	100.0	96.5
1983	87.02	87.2	100.4	91.6	102.8	99.6
1984	90.85	91.0	104.3	94.8	105.2	103.9
1985	94.32	94.4	103.9	97.3	107.5	107.6
1986	97.12	96.9	104.7	98.6	109.7	109.6
1987	100.00	100.0	100.0	100.0	111.7	113.6
1988	103.63	103.9	101.4	103.0	114.3	118.3
1989	108.23	108.4	104.9	106.6	118.8	124.0
1990	112.67	112.9	108.9	110.8	122.9	130.7
1991	117.09	117.1	111.6	114.5	126.7	136.2
1992[E]	120.72	120.8	NA	NA	NA	NA
1993[E]	124.74	124.8	NA	NA	NA	NA

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).

E Estimate.

NA Not Available.

Key: CY = Calendar Year.
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.

PRICE DEFLATORS FOR AEROSPACE INDUSTRY

Calendar Years 1972–1991

Year	Aerospace Deflators (1987 = 100)					
	Composite	SIC 3721	SIC 3724	SIC 3728	SIC 3761	SIC 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[a]	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	121.2	117.0	113.6	94.4	94.6

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.

a 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.

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.

Despite a sharp drop in sales to the U.S. government, industry sales of aircraft, engines and parts in 1991 continued their upward climb. Sales totaled $68.6 billion, compared with $66.3 billion in the previous year. However, adjusted for inflation, the sales level was almost exactly the same in 1991 and 1990.

In current dollars, 1991 non-government sales (principally commercial aircraft) increased by 13 percent, from 1990's $41.7 billion to $46.9 billion, an all-time high. Government sales (military aircraft) fell from $24.6 billion in 1990 to $21.7 billion in 1991.

The industry delivered 3,088 aircraft, down from 3,320 in 1990. The 1991 figure was compounded of 2,181 civil aircraft produced and 907 military aircraft; the comparable figures for the prior year were 2,268 civil and 1,052 military.

Orders for new aircraft, engines and parts fell in 1991 by 20 percent, from $82.4 billion in 1990 to $66.2 billion. This was due largely to the global recession and the continuing financial difficulties of the world's airlines, which sharply slowed orders for civil transport aircraft. Non-government orders decreased from $66.8 billion in 1990 to $43.5 billion in 1991. Orders from the U.S. Government, which might have been expected to continue in decline due to defense downsizing, actually increased from $15.5 billion to $22.7 billion. This was due to the award of contracts for new aircraft programs such as the F-22 Air Force fighter, Comanche helicopter, and B-2 bomber. Government orders in 1990 were negatively influenced by the cancellation of

the A-12 Navy attack plane.

The backlog of orders remained almost constant at $172.3 billion (down from $172.9 billion). It included non-U.S. government orders totaling $141.4 billion (down from $146 billion) and U.S. government orders amounting to $30.9 billion (up from $26.9 billion).

Among other 1991 aircraft production highlights:

- Civil aircraft production included 944 aircraft delivered to U.S. domestic customers and 1,237 sold abroad.
- The 2,181 civil aircraft delivered included 1,021 general aviation aircraft, 571 helicopters and 589 transports.
- In terms of dollar value, commercial transport sales increased for the seventh straight year, to $26.9 billion from 1990's $22.2 billion. The yearend backlog stood at $108.8 billion, compared with $112.3 billion (the all-time peak) at the end of the previous year. Foreign orders amounted to $72.7 billion, or two-thirds of the total commercial transport backlog.
- Sales of civil helicopters declined 17 percent to $211 million, down from $254 million in 1990.
- General aviation sales dipped slightly—2 percent—to $1.97 billion (down $40 million).
- The 907 military aircraft produced included 544 delivered to U.S. military agencies and 363 exported under Foreign Military Sales (FMS) programs or through direct sales by U.S. manufacturers to foreign governments. The comparable figures for 1990 were 664 delivered to U.S. agencies and 388 exported.

SALES OF AIRCRAFT, ENGINES, AND PARTS

Calendar Years 1977–1991
(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
CURRENT DOLLARS							
1977	$16,378	$ 8,848	$ 7,530	$ 6,855	$ 5,670	$1,993	$ 1,860
1978	19,305	8,724	10,581	6,853	7,873	1,871	2,708
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[r]	66,289	24,614	41,675	18,970	30,925	5,644	10,750
1991	68,593	21,703	46,890	16,029	36,950	5,674	9,940
CONSTANT DOLLARS (1987 = 100)[a]							
1977	$29,996	$16,205	$13,791	$12,555	$10,385	$3,650	$ 3,407
1978	33,574	15,172	18,402	11,918	13,692	3,254	4,710
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[r]	59,990	22,275	37,715	17,167	27,986	5,108	9,729
1991	59,854	18,938	40,916	13,987	32,243	4,951	8,674

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)" Series MA37D (Annually).
a Based on AIA's aerospace composite price deflator.
r Revised.

ORDERS AND BACKLOG OF AIRCRAFT, ENGINES, AND PARTS

Calendar Years 1977–1991
(Millions of Current 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
NET NEW ORDERS							
1977	$ 20,562	$ 9,369	$ 11,193	$ 6,507	$ 8,406	$2,862	$ 2,787
1978	28,111	11,150	16,961	9,055	14,229	2,095	2,732
1979	39,457	8,762	30,695	8,762	25,084[a]	2,348	5,611[a]
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[r]	82,386	15,541	66,845	10,572	54,565	4,969	12,280
1991	66,171	22,654	43,517	18,119	33,474	4,535	10,043
BACKLOG AS OF DECEMBER 31							
1977	$ 25,063	$12,471	$ 12,592	$ 9,557	$ 10,152	$2,914	$ 2,440
1978	33,869	14,897	18,972	11,759	16,508	3,138	2,464
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[r]	172,940	26,911	146,029	20,382	126,000	6,529	20,029
1991	172,285	30,859	141,426	24,509	123,042	6,350	18,384

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 1969–1991

Year	TOTAL	Domestic Shipments			Export Shipments		
		Transports[a]	Helicopters	General Aviation	Transports	Helicopters	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	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

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 1969–1991

Year	TOTAL	U.S. Military Agencies	Exports		
			Total	FMS[a]	Direct[b]
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	1,052[r]	664[r]	388	99	289
1991	907	544	363	93	270

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.

NA Not available.

r Revised.

CIVIL AIRCRAFT SHIPMENTS

Calendar Years 1977–1991

Year	TOTAL	Transport Aircraft[a]	Helicopters	General Aviation
NUMBER OF AIRCRAFT SHIPPED				
1977	17,913	155	848	16,910
1978	18,962	241	904	17,817
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[b]
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
VALUE—Millions of Dollars				
1977	$ 4,451	$ 2,649	$251	$1,551
1978	6,458	4,308	328	1,822
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[b]
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

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[a]

As of December 31, 1987–1991

Company and Model	1987	1988	1989	1990	1991
TOTAL AIRCRAFT ON ORDER					
(Domestic and Foreign Orders)	824	1,373	1,989	2,138	1,829
Value (Millions of Dollars)	$32,401	$58,474	$89,069	$112,339	$108,833
Boeing—TOTAL	573	937	1,440	1,563	1,456
B-737	342	488	739	754	615
B-747	120	153	165	250	234
B-757	67	205	344	333	333
B-767	44	91	192	192	188
B-777	—	—	—	34	86
Lockheed—TOTAL	2	1	—	—	—
L-100	2	1	—	—	—
McDonnell Douglas—TOTAL	249	435	549	575	373
DC-10	7	1	—	—	—
MD-11	29	88	126	175	138
MD-80	213	346	423	400	235
TOTAL FOREIGN ORDERS	420	840	1,092	1,205	1,073
Value (Millions of Dollars)	$20,196	$39,504	$54,956	$ 71,213	$ 72,733
Boeing—TOTAL	293	547	750	872	844
B-737	137	263	359	412	329
B-747	95	124	141	211	205
B-757	28	91	119	125	144
B-767	33	69	131	124	114
B-777	—	—	—	—	52
Lockheed—TOTAL	2	—	—	—	—
L-100	2	—	—	—	—
McDonnell Douglas—TOTAL	125	293	342	333	229
DC-10	3	1	—	—	—
MD-11	27	75	96	131	101
MD-80	95	217	246	202	128

Source: Aerospace Industries Association, based on company reports.

a Unfilled firm orders for U.S.-manufactured transport aircraft over 33,000 pounds (including the turboprop-powered Lockheed L-100) excluding options, but including new transports contracted for lease from the manufacturer.

SHIPMENTS OF CIVIL TRANSPORT AIRCRAFT[a]

Calendar Years 1987–1991

Company and Model	1987	1988	1989	1990	1991
TOTAL					
Number of Aircraft Shipped	357	423	398	521	589
Value (Millions of Dollars)	$10,507	$13,690	$15,074	$22,215	$26,856
Boeing—TOTAL	257	289	279	379	420
B-737	161	165	146	174	214
B-747	23	24	45	68	64
B-757	40	48	51	77	80
B-767	33	52	37	60	62
Lockheed—TOTAL	2	5	—	—	—
L-100	2	5	—	—	—
McDonnell Douglas—TOTAL	98	129	119	142	169
DC-10	3	8	1	—	—
MD-11	—	—	—	3	31
MD-80/90	95	121	118	139	138

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[a]

On Order or in Production as of 1991

Number of Engines and Crew, and Model Designation[b]	Initial Service	Standard Mixed Class	Operating Empty Weight (000's lbs)	Maximum Takeoff Gross Weight (000's lbs)	Range (Nautical Miles)[c]	Engine Manufacturer[d] and Model
FOUR ENGINES/CREW OF 3						
747-400*	1988	412-509	390	870	8,380	GE CF6-80C2
THREE ENGINES/CREW OF 3						
MD-11*	1989	293-410	288	618	7,980	GE CF6-80C2-DF1, RR Trent-685, or P&W PW4360
MD-11ER*	1989	277	265	603	8,525	GE CF6-80C2-DF1 or P&W PW4360
TWO ENGINES/CREW OF 2						
737-300	1984	141	70-71	125-139	1,840 -2,950	CFMI CFM56-3-B1 or B2
737-400	1988	159	73-74	139-151	2,250 -2,800	CFMI CFM56-3-B2 or CFM56-3C
737-500	1990	108-132	68	116	2,500	CFMI CFM56-3-B1 or CFM56-3C-1
757-200	1982	186-200	126	240	4,550	RR RB211-535E or P&W PW2037
767-200ER*	1984	174-290	180	351	5,942	P&W JT9D-7R4 or GE CF6-80A
767-300*	1986	204-290	190	351	4,650	P&W JT9D-7R4 or GE CF6-80A
767-300ER*	1987	204-290	196	400	6,650	P&W PW4000 or GE CF6-80C2
777*	1995	360-390	295	506	4,200	RR Trent-871, GE GE90-B1, or P&W PW4073
MD-80 series:						
MD-81	1980	155	78	140	1,630	P&W JT8D-209 or P&W JT8D-217A
MD-82	1981	155	79	150	2,176	P&W JT8D-217C
MD-83	1985	155	80	160	2,618	P&W JT8D-219
MD-87	1987	130	74	140	2,405	P&W JT8D-217C
MD-88	1987	155	79	150	2,176	P&W JT8D-217C
MD-90	1994	172	87	156	2,260	IAE V2500-D5

Source: Aerospace Industries Association, based on company reports and Aviation Week & Space Technology, "Aerospace Forecast & Inventory" (Annually).

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

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

c Full passenger load and baggage.

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

* Wide-body aircraft.

SPECIFICATIONS OF U.S. CIVIL HELICOPTERS

In Production as of 1991

Company	Commercial Model	Number of Places	Useful Load (Lbs.)	Range with Useful Load (N.Miles)	External Cargo Payload (Lbs.)
Bell Helicopter Textron	212	15	5,228	231	5,000
	214 Series	20[r]	7,889	457	7,900
	412	15	5,305[r]	402	11,900
Enstrom Helicopter	F-28 Series	3	1,030	228	1,000
	280 Series	3	1,015	260	1,000
McDonnell Douglas Helicopter	500 Series	5	1,559	367	2,000
	520 Series	5	1,806	239	2,306
	530 Series	5	1,536	275	2,000
Robinson Helicopter	R22	2	546	209	—
Schweizer Aircraft	300C	3	950	201[r]	1,050
Sikorsky Aircraft	S-76B	14	5,091[r]	357	3,300

Source: Helicopter Association International, "1991 Helicopter Annual" (Annually).
r Revised.

CIVIL HELICOPTER SHIPMENTS[a]

Calendar Years 1987–1991

Company and Model	1987	1988	1989	1990	1991
CIVIL SHIPMENTS	358	383	515	603	571
Value (Millions of Dollars)	$277	$334	$251	$254	$211
Bell—TOTAL	127	62	22	16	4
206 series[b]	74	—	—	—	—
212	11	13	3	1	—
214 series	13	18	2	1	—
222	12	11	—	—	—
412	17	20	17	14	4
Enstrom—TOTAL	12	17	24	27	17
F-28 series	7	7	6	12	8
280 series	5	10	18	15	9
McDonnell Douglas—TOTAL	41	44	73	77	50
500 series	37	39	64	65	42
520N series	—	—	—	—	3
530 series	4	5	9	12	5
Robinson—TOTAL	127	204	310	384	402
R22	127	204	310	384	402
Rogerson—TOTAL	—	—	—	—	2
UH12E	—	—	—	—	2
Schweizer—TOTAL	37	45	69	83	78
300C	37	45	69	83	78
Sikorsky—TOTAL	14	11	17	16	18
S-76	13	11	17	16	18
S-70C series	1	—	—	—	—

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 Bell Helicopter moved production of its 206 series helicopters to its Canadian facility in 1987.

DIRECT EXPORT SHIPMENTS OF MILITARY HELICOPTERS[a]

Calendar Years 1987–1991

Manufacturer and Model	1987	1988	1989	1990	1991
DIRECT MILITARY EXPORT SHIPMENTS	21	66	46	48	45
Value (Millions of Dollars)	$57	$352	$278	$337	$489
Bell AH-1S	—	24	26	—	—
Boeing Vertol CH-47/414/352	4	1	—	11	9
McDonnell Douglas 500MD (TOW)/ 500 Scout	11	19	—	—	—
Schweizer 300C	6	—	—	—	—
Sikorsky S-70C	—	13	17	35	36
Sikorsky S-80M	—	—	3	2	—
Sikorsky MH53	—	9	—	—	—

Source: Aerospace Industries Association, company reports.

a 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 1987–1991

	1987	1988	1989	1990	1991
NUMBER OF AIRCRAFT SHIPPED	1,085	1,143	1,535	1,144	1,021
Single-Engine, Piston	613	628	1,023	608	564
Multi-Engine, Piston	87	67	87	87	49
Turboprop	263	291	268	281	222
Turbojet	122	157	157	168	186
VALUE OF SHIPMENTS[a] (Millions of Dollars)	$1,364	$1,918	$1,804	$2,008	$1,968
Single-Engine, Piston	$ 80	$ 66	$ 104	$ 68	$ 93[b]
Multi-Engine, Piston	18	12	24	24	(b)
Turboprop	477	596	524	644	527
Turbojet	789	1,242	1,149	1,272	1,348
Number of Aircraft By Selected Manufacturer					
American General	NA	NA	NA	10	82
Aviat	NA	NA	NA	NA	71
Beech	314	372	371	433	402
Bellanca	NA	NA	7	4	1
Cessna	187	161	183	171	176
Christen	NA	NA	75	68	—
Classic	NA	NA	NA	8	8
Fairchild	36	29	12	14	10
Gates Learjet	16	23	25	25	25
Gulfstream	30	51	40	34	29
Lake	23	28	23	17	11
Maule	54	55	35	28	66
Mooney	143	142	143	147	88
Piper	282	282	621	178	41
Taylorcraft	NA	NA	NA	7	11

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 1977–1991

Year	TOTAL	Bomber/ Patrol/ Command/ Control	Fighter/ Attack	Trans- port/ Tanker	Trainer	Heli- copter	Other
NUMBER							
1977	862	44	488	25	12	273	20
1978	723	30	478	28	—	166	21
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[r]	24	454[r]	25[r]	—	260	—
1991	637	18	394	23	—	202	—
FLYAWAY VALUE—Millions of Dollars							
1977	$ 4,364	$ 499	$3,190	$ 331	$14	$ 316	$14
1978	4,664	689	3,496	237	—	225	17
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[r]	1,499[r]	8,731[r]	605[r]	—	2,201	—
1991	12,177	1,447	8,579	437	—	1,714	—

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.
r Revised.

MILITARY AIRCRAFT ACCEPTANCES BY UNITED STATES AIR FORCE[a]

Calendar Years 1990–1991
(Costs in Millions of Dollars)

Type and Model	Number		Flyaway Cost[b]		Weapon System Cost[c]	
	1990[r]	1991	1990[r]	1991	1990[r]	1991
AIR FORCE—TOTAL	285	198	$5,150	$4,426	NA	NA
Fighter/Attack—TOTAL	239	171	$4,000	$3,597	NA	$4,907
F-15	39	30	1,240	1,504	$1,492	2,210
F-16	200	141	2,760	2,093	NA	2,697
Bombers—TOTAL	1	1	424	424	NA	NA
B-2A	1	1	424	424	NA	NA
Transports/Tankers—TOTAL	23	19	561	349	NA	NA
C-27A	–	4	—	62	—	62
C-130H	21	11	433	232	NA	NA
MC-130H	–	4	—	55	—	74
VC-25A	2	—	128	—	152	—
Helicopters—TOTAL	22	7	165	56	NA	NA
MH-60G	22	7	165	56	NA	NA

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[a]

Calendar Years 1990–1991
(Costs in Millions of Dollars)

Type and Model	Number		Flyaway Cost[b]		Weapon System Cost[c]	
	1990	1991	1990	1991	1990	1991
ARMY—TOTAL	168	137	$1,283	$1,000	$1,468	NA
Helicopters—TOTAL	168	137	$1,283	$1,000	$1,468	NA
UH-60A	72	72	372	353	427	NA
AH-64	96	65	911	647	1,041	NA

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.
NA Not available.

MILITARY AIRCRAFT ACCEPTANCES BY UNITED STATES NAVY[a]

Calendar Years 1990–1991
(Costs in Millions of Dollars)

Type and Model	Number		Flyaway Cost[b]		Weapon System Cost[c]	
	1990	1991	1990[r]	1991	1990[r]	1991
NAVY—TOTAL	209	209	$5,249	$5,289	$6,708	$6,548
Patrol—TOTAL	23	17	$1,075	$1,023	$1,448	$1,221
E-2C	7	6	340	317	427	380
E-6A	4	5	372	465	455	569
EA-6B	12	6	363	241	566	272
Fighter/Attack—TOTAL	134	130	3,482	3,520	4,361	4,391
F-14A	15	16	683	768	1,172	1,116
F/A-18	89	80	2,282	2,092	2,397	2,175
AV-8B	24	22	378	382	520	556
A-6E	6	12	139	278	272	544
Transports/Tankers—TOTAL	2[r]	4	44	88	45	98
C-130T	—	2	—	41	—	48
KC-130	2[r]	2	44	47	45	50
Helicopters—TOTAL	52	58	648	658	854	838
AH-1W	7	22	40	127	50	158
CH/MH-53E	14	6	209	128	238	152
HH-60H	3	6	32	64[E]	35	70[E]
SH-60B	9	6	121	110	176	177
SH-60F	19	18	241	229	355	281

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 includes flyaway cost, initial spares, ground equipment, training equipment, and other support items.
E Estimate.
r Revised.

MILITARY AIRCRAFT ACCEPTANCES FOR REIMBURSABLE PROGRAMS[a]

Calendar Years 1990–1991
(Millions of Dollars)

Accepting Agency, Type, and Model	Number of Aircraft Accepted		Flyaway Cost[b]	
	1990	1991	1990	1991
TOTAL ACCEPTANCES FOR REIMBURSABLE PROGRAMS	99	93	$1,354	$1,462
AIR FORCE—TOTAL	69	87	$ 973	$1,329
Fighter Attack—TOTAL	69	87	973	1,329
F-15	—	7	—	258
F-16 C/D	69	80	973	1,071
NAVY—TOTAL	17	6	$ 314	$ 133
Fighter/Attack—TOTAL	12	6	276	133
F/A-18	12	6	276	133
Helicopters—TOTAL	5	—	38	—
AH-1	5	—	38	—
ARMY—TOTAL	13	—	$ 67	$ —
Helicopters—TOTAL	13	—	67	—
UH-60	13	—	67	—

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.

MILITARY AIRCRAFT PROGRAM PROCUREMENT[a]

Fiscal Years 1991, 1992, and 1993
(Millions of Dollars)

Agency and Model	1991		1992[E]		1993[E]	
	No.	Cost	No.	Cost	No.	Cost
AIR FORCE						
B-1B	—	$ 20.8	—	$ 62.5	—	$ 214.9
B-2 Stealth Bomber	2	2,348.4	1	2,798.2	4	2,686.6
C-17	—	260.0	4	1,695.9	8	2,719.5
C-27A	5	79.5	—	—	—	—
C-130H Hercules	—	—	9	289.8	8	300.4
Civil Air Patrol Aircraft	38	1.9	27	2.0	27	2.0
E-8A JSTARS	—	—	—	125	1	361.2
EFS	—	—	38	14.0	42	12.3
F-15E Eagle	42	2,158.0	3	773.5	—	11.5
F-16 Falcon	108	2,062.3	48	1,150.6	24	683.2
KC-135 Re-engining	30	612.8	26	541.3	28	375.2
MC-130H Combat Talon II	—	74.8	—	113.0	—	54.0
MH-60G Pave Hawk	4	36.9	6	23.5	10	30.1
T-1A (TTTS)	28	155.8	34	156.1	36	158.6
ARMY						
AH-64 Attack Helicopter	—	$ 88.4	—	$ 206.9	—	$ 147.8
CH-47 Modernization	—	300.0	—	283	—	15.0
OH-58D AHIP Modification	—	28.4	—	228.8	—	96.2
UH-60L Black Hawk[b]	48	152	60	507	60	406.9
NAVY						
AH-1W Sea Cobra	8	$ 79.0	20	$ 217	12	$ 123.9
AV-8B Harrier	21	490.2	6	230.0	—	—
CH/MH-53E Super Stallion	12	323.8	20	499.4	20	513.1
E-2C Hawkeye	6	392.6	6	499.5	—	96.2
EA-6B Prowler	1	349	—	115	3	530.0
F-14D Tomcat	12	996.4	—	172.5	—	143.1
F/A-18 Hornet	48	1,771.7	48	2,171.6	48	1,808.6
HH-60H[b]	—	6.0	—	—	7	117.4
SH-60B Seahawk LAMPS MK-111	6	157.9	13	260.4	12	262.8
SH-60F CV ASW	18	269.9	12	250.0	12	261.5

(Continued on next page)

MILITARY AIRCRAFT PROGRAM PROCUREMENT[a] (Continued)

Agency and Model	1991		1992[E]		1993[E]	
	No.	Cost	No.	Cost	No.	Cost
NAVY (Continued)						
T-45 Goshawk	—	157.8	12	325.9	12	303.5
SPECIAL OPERATIONS						
MH-47E	1	28.5	19	202.0	21	—
MH-60K	5	70.9	6	109.4	—	—

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

ACTIVE U.S. MILITARY AIRCRAFT IN CONTINENTAL U.S.[a]

Fiscal Years 1979–1993

Year	Total	Fixed-Wing Aircraft				Helicopter
		Total	Jet	Turboprop	Piston	
1979	18,526	11,365	8,656	1,859	850	7,161
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	21,210	12,481	9,954	2,222	305	8,529
1989	19,223	11,938	9,501	2,131	261	7,330
1990	20,037	12,817	10,360	2,199	258	7,220
1991[E]	19,966	12,587	10,221	2,119	247	7,379
1992[E]	19,222	11,945	9,678	2,033	234	7,277
1993[E]	19,310	11,503	9,325	2,006	172	7,807

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.

DEPARTMENT OF DEFENSE
OUTLAYS FOR AIRCRAFT PROCUREMENT

By Agency
Fiscal Years 1962–1993
(Millions of Dollars)

Year	TOTAL AIRCRAFT 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	9,055	2,840
1992[E]	23,950	13,675	8,151	2,124
1993[E]	20,899	11,451	7,576	1,872

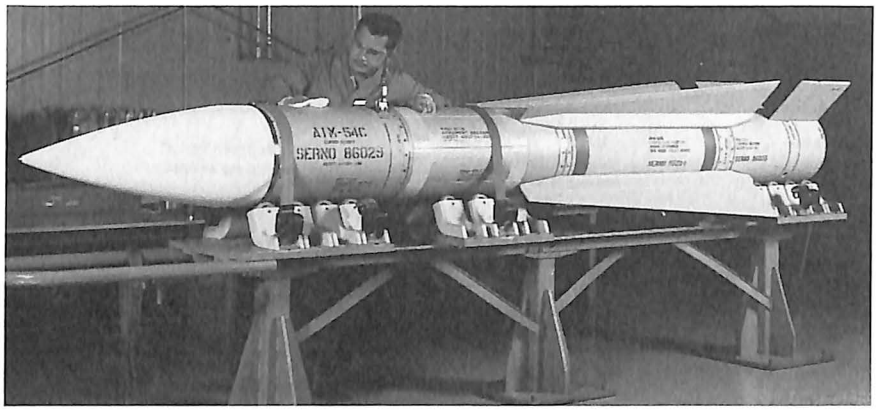
Source: Office of Management and Budget, "Budget of the United States Government" (Annually).
NOTE: Detail may not add to totals because of rounding.
E Estimate. Latest year reflects Administration's budget proposal.
Tr.Qtr. See Glossary.

SPECIFICATIONS OF U.S. MILITARY AIRCRAFT

On Order or in Production as of 1991

Primary Mission, DOD Designation, & Popular Name	Manufacturer	U.S. Military Service	Crew	Empty Weight (000's lbs)	Engines	Performance Typical for Primary Mission	Remarks
ATTACK							
A-6E Intruder	Grumman	USN/USMC	2	30	2xP&W J52	Mach 0.8 at sea level	Also EA-6A/B & KA-6D
AV-8B Harrier 2	MDC/BAe	USMC	1	13	1xRR F402	Mach 0.91	Graphite/epoxy super-critical wing
BOMBERS							
B-2 Stealth Bomber	Northrop	USAF	2	–	4xGE F118	–	Radar eluding strategic bomber
ELECTRONIC WARFARE							
EA-6B Prowler	Grumman	USN/USMC	4	33	2xP&W J52	493 n.m. standoff radius	Tactical jamming system
FIGHTERS							
F-14A Tomcat	Grumman	USN	2	40	2xP&W TF30	Mach 2.3 class	Missile, gun fleet defense
F14A + Super Tomcat	Grumman	USN	2	42	2xGE F110	Mach 2.3 class	F-14A with upgraded engines and radar
F14D	Grumman	USN	2	42	2xGE F110	Mach 2.3 class	F14A + with improved avionics and infrared track and search system
F-15C/D Eagle	MDC	USAF	1-2	31	2xP&W F100	Mach 2.5 class	Air superiority, defense, guns, missiles; 15D=2 seat trainer
F-15E Eagle	MDC	USAF	2	37	2xP&W F100	Mach 2.5 class	Dual role fighter/long range interdiction
F-16 A/B Fighting Falcon	GD	USAF	1-2	16	1xP&W F100	Mach 2+ class	Multirole fighter; fully fly-by-wire; missiles, guns.
F-16 C/D Fighting Falcon	GD	USAF	1-2	18	1xP&W F100/ 1xGE F110	Mach 2+ class	Provisions for AMRAAM, LANTIRN, and new EW Nav. Comm. Systems
F/A-18 Hornet	MDC/Northrop	USN/USMC	1-2	23	2xGE F404	Mach 1.7 class	Missiles, guns; also export
COMMAND/CONTROL AND PATROL							
E-2C Hawkeye	Grumman	USN	5	38	2xAll T56	6 hr. mission duration	AEW command & control; passive detection
E-6A Tacamo	Boeing	USN	18	167	4xCFM56	Long endurance	AEW command & control
CARGO-TRANSPORT							
C/HC-130 Hercules	Lockheed	USAF/USN	4	74-78	4xAll T56	363 mph; 2,038 n.m.	92-128 troops or 39-43,000 lbs
C-17A	MDC	USAF	3	267	4xP&W F117	Mach 0.77; 3,000 n.m.	102 troops or 172,000 lbs.
TRAINING							
T-45A Goshawk	MDC/BAe	USN	2	9	1xRR F405	Mach 1.04 at 25,000 ft.	Next generation trainer
T-1A Jayhawk	Beech	USAF	3	10	2xP&W JT-15D	Max 538 mph	Tanker/Transport Trainer
HELICOPTERS							
AH-1W Super Cobra	Bell-Textron	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
SH-2F Seasprite	Kaman	USN	3	7	2xGE T58	Max 160 mph; 430 mi.	LAMPS Mk.1 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-60A Black Hawk	Sikorsky	Army/USAF	3	11	2xGE T700	Max 184 mph; 373 mi.	UTTAS

Source: Aviation Week & Space Technology, "Aerospace Forecast & Inventory" (Annually).
KEY: All = Allison Gas Turbine; BAe = British Aerospace; CFM = CFM International; GA = Garrett Engine; GD = General Dynamics; GE = General Electric; Lyc = Textron Lycoming; MDC = McDonnell Douglas; P&W = Pratt & Whitney; PWC = P&W of Canada; RR = Rolls Royce.



The decline in industry sales of missile systems that began in 1988 continued for the fourth consecutive year in calendar year 1991, according to data compiled by the Bureau of the Census. Sales of missile systems and parts (excluding propulsion units) amounted to $9 billion, down from $9.1 billion in 1990.

Sales of missile propulsion systems were reported by Census as part of a grouping that also includes engines and propulsion units for civil and military space vehicles. For 1991, total sales in that grouping amounted to $3.9 billion. That represented a major increase over 1990's $3.2 billion, but the increase appeared to be entirely in the civil space program. Census reported a decline in "military" sales from $1.9 billion to $1.8 billion. Non-military propulsion sales for 1991 topped $2 billion, up from $1.3 billion in the previous year.

Net new orders for missile systems, at $8.1 billion in 1991, were up slightly over 1990's $7.9 billion (again the figures do not include propulsion). Orders for missile/space propulsion systems increased substantially (to $5.7 billion from $2.7 billion in 1990), but here again the gain was in the civil space segment. Non-military orders of engines and propulsion units were $4.6 billion (up from $0.8 billion) while military orders declined (from $1.9 billion to $1.1 billion).

The yearend 1991 backlog for missile systems and parts was $12 billion, down from $13 billion in the previous year; it marked the fourth consecutive annual decline in backlog. The backlog for missile/space propulsion units, spurred by orders for space propul-

sion systems, increased significantly to $8.5 billion from 1990's $6.2 billion. Once again, the gain was in the non-military segment of business (up to $6.2 billion from $3.3 billion), while the military backlog declined from $2.9 billion to $2.3 billion.

The Fiscal Year 1993 budget plan for the Department of Defense (DoD) contemplated procurement outlays totaling $11.9 billion for missile systems, which compares with a FY 1992 estimate of $12.9 billion. The FY 1993 budget plan included $5.7 billion (down from $6.3 billion) for Air Force procurement, $4.1 billion (down from $4.3 billion) for Navy systems; and $2.1 billion (down from $2.3 billion) for Army missile procurement.

Missile programs in production or operational service during 1991/1992 and planned for funding under FY 1993 appropriations include:

Air Force

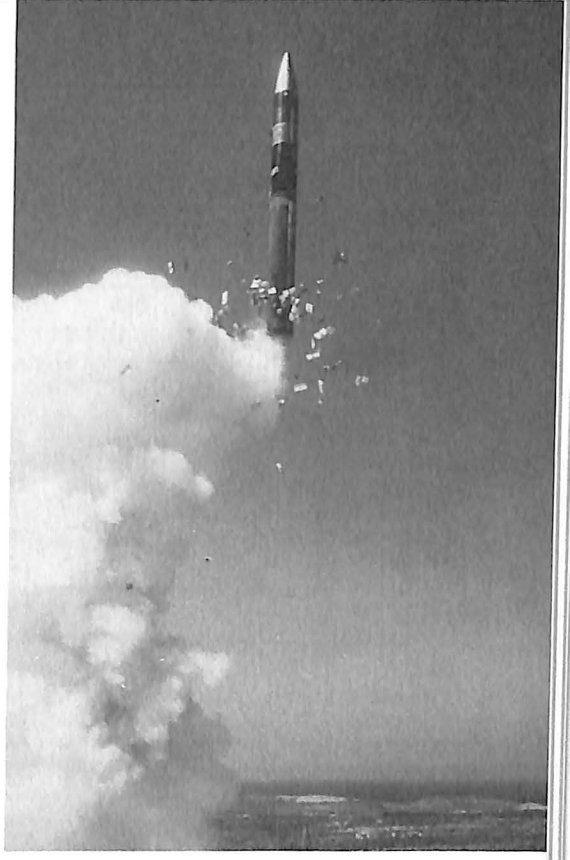
The AMRAAM (Advanced Medium Range Air-to-Air Missile), $870 million; the HARM antiradiation weapon being procured by the Air Force for both Navy and USAF use, $250 million; and the AGM-130 air-to-surface weapon, $76 million.

Navy

The Trident II Fleet Ballistic Missile, $987 million; the Tomahawk ship-launched cruise missile, $404 million; and the Standard ship defense surface-to-air missile, $257 million.

Army

The ATACMS (Army Tactical Missile System), $188 million; the TOW 2 Army/Marine Corps antitank weapon, $183 million; the Laser Hellfire helicopter-launched



antiarmor missile, $154 million; the Avenger mobile, antiaircraft weapon, $148 million; the AAWS-M (Advanced Antitank Weapon System - Medium), $47 million; the Patriot long-range air defense missile, $25 million; the Stinger short-range antiaircraft weapon used by all the services, $9.5 million; and the Multiple Launch Rocket System, a mobile rocket battery, $2.2 million.

The FY 1993 plan represents a major change in DoD missile procurement status. Five major missile programs that were in production through FY 1992 are not funded in FY 1993. They include the USAF's Peacekeeper ICBM, Advanced Cruise Missile, and HAVE NAP air-to-surface missile, along with the Navy's Harpoon and Penguin antiship missiles.

MISSILE PROGRAM PROCUREMENT

Fiscal Years 1991, 1992, and 1993
(Millions of Dollars)

Agency and Model	1991		1992[E]		1993[E]	
	No.	Cost	No.	Cost	No.	Cost
AIR FORCE						
ACM	85	$ 454.2	120	$ 500.1	—	$ —
AGM-130	48	38.4	120	70.0	149	76.1
AMRAAM[b]	810	821.7	821	737.8	1,190	868.9
HARM[b]	3,481	776.4	1,214	323.1	846	250.1
HAVE NAP	26	25.8	32	34.5	—	—
Peacekeeper	—	398.2	—	194.5	—	—
SRAM II	—	10.1	—	—	—	—
NAVY						
Harpoon	167	$ 249.0	—	$ 37.2	—	$ —
Penguin	40	45.0	42	44.2	—	—
Standard	405	287.6	330	331.1	330	256.8
Tomahawk	678	1,045.9	176	411.2	200	404.2
Trident II	52	1,511.1	28	1,195.4	21	986.8
ARMY						
AAWS-M[c]	—	$ —	5	$ 12.9	26	$ 46.5
ATACMS	373	236.9	300	170.9	340	188.2
Avenger[c]	88	117.6	144	183.6	144	148.2
Laser Hellfire[d]	6,709	234.6	112	19.7	3,158	154.0
MLRS	56,286	438.4	3,714	61.7	—	2.2
Patriot	1,100	1,002.8	97	156.1	—	25.2
Stinger[f]	6,922	252.2	—	38.2	—	9.5
TOW 2[c]	18,309	320.3	12,168	240.4	9,440	183.1

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, Marine Corps, Navy, and Air Force funding.

MAJOR MISSILE PROGRAMS
RESEARCH, DEVELOPMENT, PRODUCTION, OPERATION

Program	Agency	Status	Systems Contractor	Propulsion Manufacturer	Guidance Manufacturer
AIR-TO-AIR					
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/ Aerojet	Loral
Sidewinder-9L	USN/USAF	O	NASC	Bermite/ Hercules	Raytheon/ Loral
Sidewinder-9M	USN/USAF	P	NASC	MTI/Hercules	Ray/Loral
Sidewinder-9N	USAF	O	Loral/Ray	–	Loral
Sidewinder-9P	USAF	P,O	Loral/Ray	Hercules/ Aerojet	Loral
Sidewinder-9R	USN	P	Loral/Ray	MTI/Hercules	Ray/Loral
Sparrow-7F	USN/USAF	O	NASC	Hercules	Raytheon/GD
Sparrow-7M	USN/USAF	P	Raytheon/GD	Hercules	Raytheon/GD
Sparrow-7P	USN	D	NASC	–	Raytheon
Sparrow-7R	USN	D	NASC	–	Raytheon/GD
AIR-TO-SURFACE					
ALCM-86B	USAF	P	Boeing	WI	Honeywell/ Litton
HARM-88A/B	USN/USAF	P	TI	MTI/Hercules	TI
*Harpoon-84A/C/D	USN	P,O	MDC	Teledyne CAE	TI/IBM/LSI/ Northrop
GBU-15	USAF	P	RI	Hughes	–
Maverick-65A/B	USAF	P,O	Hughes	MTI/Aerojet	Hughes
Maverick-65D	USAF	P,O	Hughes/Ray	MTI/Aerojet	Hughes/Ray
Maverick-65E	USMC	P	Hughes	MTI/Aerojet	Hughes
Maverick-65F	USN	P	Hughes/Ray	MTI/Aerojet	Hughes/Ray
Maverick-65G	USAF	D	Hughes/Ray	MTI/Aerojet	Hughes/Ray
Shrike-45A/B	USN/USAF	O	NWC/PMTC	Aerojet/ Hercules	Texas Instruments
Sidearm 1-122A	USMC	P	Motorola	MTI/Hercules	Motorola
SLAM-84E	USN	P	MDC	Teledyne CAE	MDC/Hughes/RI
SRAM-69A	USAF	O	Boeing	Lockheed	Kearfott
Standard ARM-78D	USN/USAF	O	GD	NOSIH	GD
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 (ER/DL)-62	USN	O	NAC	–	NAC

* Also Surface-to-Surface

(Continued on next page)

MAJOR MISSILE PROGRAMS (Continued)

Program	Agency	Status	Systems Contractor	Propulsion Manufacturer	Guidance Manufacturer
AIR-TO-SURFACE (Cont'd.)					
ACM-129	USAF	P	GD/MDC	WI	Kearfott
AGM-130A	USAF	D	RI	Hercules	RI
AGM-130B	USAF	D	RI	Hercules	RI
ANTI-SUBMARINE					
VLA-44A	USN	O	Loral	MTI	Kearfott
SURFACE-TO-AIR					
ADATS LOS-F-H	Army	P	MM	–	MM
Chaparral-72A	Army	O	Loral	Hercules/ Bermite	GE/Raytheon
Chaparral-72E/H	Army	P,O	Loral	AR	Loral
Hawk-23B	Army	P,O	Raytheon	Aerojet	Raytheon
Patriot-104	Army	P	Raytheon	MTI	Raytheon
RAM-116A	USN	D	General Dynamics	Bermite/MTI/ Hercules	General Dynamics
Redeye-43A	Army/USMC	O	GD	AR	GD
Roland-115	Army	O	Hughes/ Boeing	Hercules	Hughes/ Boeing
Sea Sparrow-7M	USN	P,O	Raytheon/GD	Aerojet/ Hercules	Raytheon/GD
Standard 1 MR	USN	P,O	GD	Aerojet/NOSIH	GD
Standard 2 MR	USN	P,O	GD	AR/Aerojet/MTI	GD
Standard 1 ER	USN	O	GD	AR/NOSIH	GD
Standard 2 ER	USN	P,O	GD/Raytheon	AR/NOSIH/MTI	GD/Raytheon
Stinger-92A	Army/USMC	P,O	GD/Raytheon	AR	GD/Raytheon
SURFACE-TO-SURFACE					
*Harpoon-84A/C/D	USN	P,O	MDC	Teledyne CAE/ MTI	TI/IBM/LSI/ Northrop
Minuteman 2-30F	USAF	O	AFLC	MTI/Aerojet/ Hercules	Rockwell Autonetics
Minuteman 3-30G	USAF	O	AFLC	MTI/Aerojet	Rockwell Autonetics

* Also Air-to-Surface

(Continued on next page)

MAJOR MISSILE PROGRAMS (Continued)

Program	Agency	Status	Systems Contractor	Propulsion Manufacturer	Guidance Manufacturer
SURFACE-TO-SURFACE (Cont'd.)					
Peacekeeper (MX)-118A	USAF	P,O	BMO	MTI/Avco/RI Aerojet/GE/ Hercules	RI/Northrop/ Honeywell/ Litton
Poseidon C3-73A	USN	O	Lockheed	MTI/Hercules	GE/MIT/Ray/ Hughes
Tomahawk (SLCM)	USN	P	GD/MDC	WI/ARC/CSD	MDC/GD
Trident 1 (C-4)	USN	P,O	Lockheed	Hercules/MTI	GE/Draper/ Ray/Hughes/ Kearfott
Trident 2 (D-5)	USN	D,P	Lockheed	Hercules/MTI/ UTC	GE/Draper/ Ray/Hughes/ Kearfott/RI
BATTLEFIELD SUPPORT AND ANTIARMOR					
ATACMS	Army	P	LTV	ARC	–
Dragon-47	Army	P,O	MDC	MDC	MDC
Hellfire-114A	Army/USMC	P	RI	Hercules/MTI	MM
HOMS-114K	Army/USMC	D	MM	Hercules/MTI	–
Javelin (AAWS-M)	Army/USMC	D	TI/MM	ARC	–
Lance-52C	Army	O	LTV	RI/Rocketdyne	E-Systems/ Sys-Donner/ Arma
MLRS-26,-270	Army	P,O	LTV	AR	–
Shillelagh-51C	Army	O	Loral	Hercules	Loral
SMAW	USMC	P,O	MDC	MDC	–
TOW-71A	Army	O	Hughes	Hercules	EmersonEl.
ITOW-71C	Army	P,O	Hughes	Hercules	EmersonEl.
TOW2-71D	Army	P,O	Hughes	Hercules/MTI	EmersonEl./TI
TOW2A-71E	Army	P,O	Hughes	Hercules/MTI	EmersonEl./TI
TOW2B-71F	Army	P	Hughes	Aerojet/Thorn	EmersonEl./TI

Source: Aerospace Industries Association, based on information from "Aviation Week & Space Technology" Magazine.
Status: R-Research; D-Development; P-Production; O-Operational.

Abb:
AFLC – Air Force Logistics Cmd.
AR – Atlantic Research
BMO – Ballistic Missile Office
GD – General Dynamics
GE – General Electric
LSI – Lear Siegler
MM – Martin Marietta
MDC – McDonnell Douglas
MIT – Massachusetts Institute of Technology
MTI – Thiokol
NAC – Naval Avionics Center
NASC – Naval Air Systems Command
NOSIH – Naval Ordnance Station, Indian Head
NWC – Naval Weapons Center
PMTC – Pacific Missile Test Center
Ray – Raytheon
RI – Rockwell International
TI – Texas Instruments
USAF – United States Air Force
USMC – United States Marine Corps
USN – United States Navy
WI – Williams International

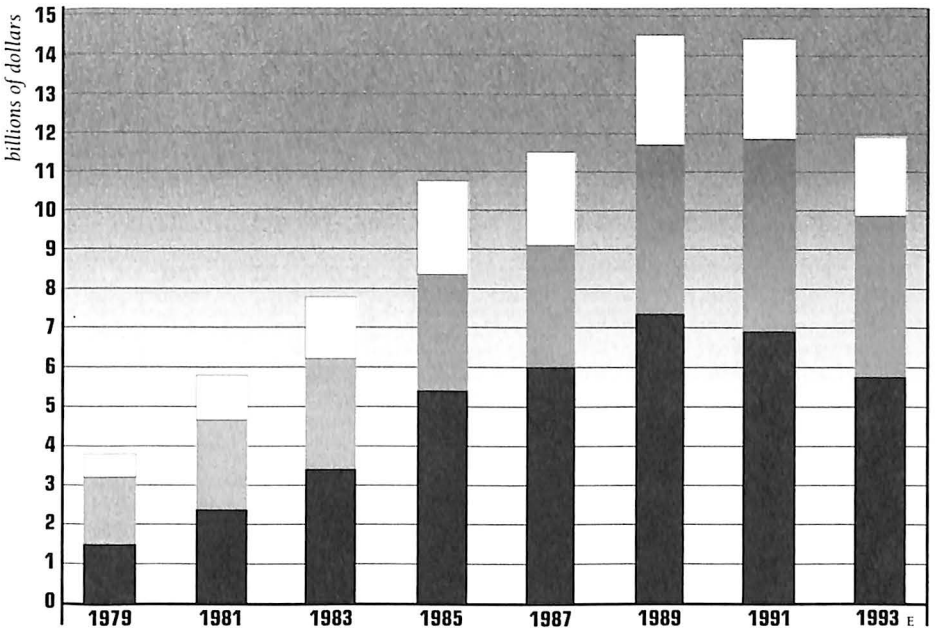
DEPARTMENT OF DEFENSE
OUTLAYS FOR MISSILE PROCUREMENT[a]

By Agency
Fiscal Years 1962–1993
(Millions of Dollars)

Year	TOTAL MISSILE PROCUREMENT[a]	Air Force	Navy[a]	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	1,376	1,302	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[E]	12,893	6,294	4,331	2,268
1993[E]	11,887	5,742	4,086	2,060

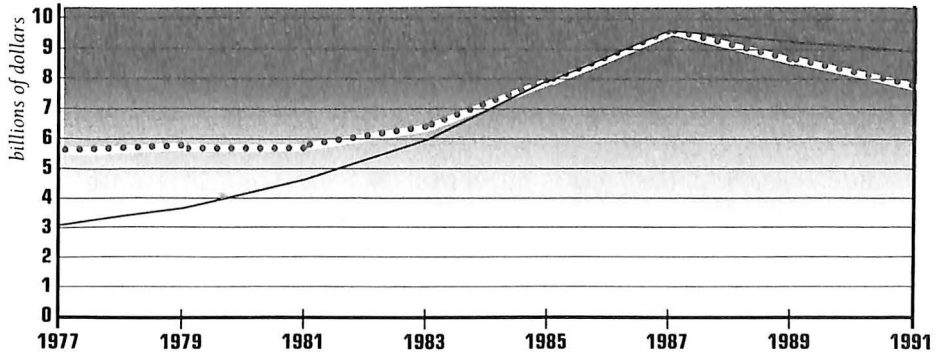
Source: Office of Management and Budget, "The Budget of the United States Government" (Annually).
NOTE: Detail may not add to totals because of rounding.
a Revised by AIA from previously published data to include Navy Weapons Procurement in Total Missile Procurement. Beginning 1978, DOD combined Navy 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.

DOD Outlays for Missile Procurement



■ Air Force ■ Navy □ Army

Sales of Missile Systems and Parts



Current Dollars

Constant Dollars **a**

a *Based on AIA's aerospace composite price deflator (1987=100)*

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

ORDERS, SALES, AND BACKLOG
MISSILE SYSTEMS AND PARTS[a]

Calendar Years 1975–1991
(Millions of Dollars)

Year	SALES—Current Dollars	SALES—Constant Dollars[c]
1975	$ 3,548	$ 6,694
1976	3,237	6,347
1977	3,118	5,711
1978	3,264[b]	5,677
1979	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

Year	NET NEW ORDERS	BACKLOG AS OF DECEMBER 31
1975	$ 3,655	$ 4,580
1976	3,036	4,379
1977	3,280	4,541
1978	2,948	4,581
1979	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[r]	7,917	12,956
1991	8,072	12,040

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).
a Prior to 1980, includes space vehicle systems and parts sold to other than U.S. Government customers.
b AIA estimate based on MQ37D.
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[a]

Calendar Years 1977–1991
(Millions of Dollars)

Year	SALES—Current Dollars			SALES—Constant Dollars[c]		
	TOTAL	Military[b]	Non-Military	TOTAL	Military[b]	Non-Military
1977	$ 787	$ 757	$ 30	$1,441	$1,386	$ 55
1978	792	760	32	1,377	1,322	56
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[r]	3,247	1,911	1,336	2,938	1,729	1,209
1991	3,851	1,843	2,008	3,360	1,608	1,752

Year	NET NEW ORDERS			BACKLOG AS OF DECEMBER 31		
	TOTAL	Military[b]	Non-Military	TOTAL	Military[b]	Non-Military
1977	$ 727	$ 693	$ 34	$ 613	$ 595	$ 18
1978	967	919	48	788	754	34
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[r]	2,692	1,891	801	6,230	2,887	3,343
1991	5,719	1,092	4,627	8,491	2,324	6,167

Source: Bureau of the Census, "Aerospace Industry (Orders, Sales, and Backlog)," Series MA37D (Annually).
a See table in Space Programs Chapter for Orders, Sales, and Backlog, Space Vehicle Systems.
b Prior to 1980 includes figures for non-military U.S. Government customers.
c Based on AIA's aerospace composite price deflator (1987=100).
r Revised.

Space-sector sales, which have become an ever more significant part of the aerospace industry's workload over the past decade, continued their steady rise in 1991. According to data compiled by the Aerospace Industries Association, space-related sales amounted to $28.7 billion, up 8 percent over the $26.4 billion recorded for the previous year.

The Bureau of the Census reported that new orders for space systems (excluding propulsion units) increased substantially in 1991, to $11.7 billion from the previous year's $9.6 billion. The gain in orders was compounded of a very large $2.8 billion increase in non-military orders and a decrease of almost $700 million in military orders. Nonetheless, at year end, the majority of orders on the books were for military systems. Military order backlog amounted to $6.5 billion; non-military unfilled orders were $5.9 billion. The industry's backlog of orders for space systems, again excluding propulsion, was $12.5 billion, nearly the same as the previous year.

The upward trend of government investment in space that began in 1974 continued in 1991 as federal outlays reached $28.2 billion, compared with $25.6 billion in 1990. The Department of Defense (DoD) again spent more on space than other agencies with outlays of $14.4 billion, compared with $13.4 billion for NASA. Department of Commerce outlays for space were $223 million; the Department of Energy invested $108 million and other agencies combined spent $56 million.

Budget authority data for FY 1992/93 provides information about the areas of greatest developmental and operational effort. For both years, the principal defense-related space program was the Strategic Defense Initiative (SDI) funded at $3.3 billion in FY 1992 and $4.3 billion in FY 1993 for RDT&E only in both years. SDI is a joint USAF/ Navy effort.

Among programs under Air Force cognizance, the largest in terms of funding in FY 1992 was the Milstar advanced communications satellite at $1 billion for RDT&E and $320 million for procurement.

Other major programs included space boosters ($141 million RDT&E, $291 million procurement); the Navstar Global Positioning System ($66 million RDT&E, $330 million procurement); the Defense Support Program ($52 million RDT&E, $71 million procurement); and the Medium Launch Vehicle ($43 million RDT&E, $221 million procurement).

The funding levels for these programs in FY 1993 was estimated at: Milstar, $1.3 billion RDT&E, $272 million procurement; space boosters, $146 million RDT&E, $382 million procurement; Navstar, $69 million RDT&E, $350 million procurement; Defense Support Program, $74 million RDT&E, $297 million procurement; Medium Launch Vehicle, $43 million RDT&E, $272 million procurement.

A major Navy-supervised space program is the Fleet Satellite Communications program with funding (for procurement only) estimated at $283 million in FY 1992 and $326 million in FY 1993.

NASA spending is estimated to fall slightly to $13.8 billion in FY 1992 from $13.9 billion. NASA funding is reported in four major categories. For FY 1992, Research and Development estimated outlays amounted to $6.3 billion; Space Flight, Control and Data Communications, $5.3 billion; Research and Program Management, $1.8 billion; and Construction of Facilities, $448 million. The estimates for FY 1993 were: R&D, $6.8 billion; Space Flight, Control and Data Communications, $5.2 billion; Research/Program Management, $1.7 billion; Construction of Facilities, $492 million.

A breakdown of the R&D category showed projected outlays for development of Space Station Freedom at $2 billion in FY 1992 and $2.3 billion in FY 1993.

Projected budget authority for other NASA R&D programs included space science and applications, $2.7 billion in FY 1992, $3 billion in FY 1993; space transport capability development, $720 million/$864 million; and commercial use of space, $148 million/$172 million. Under the space flight category, major items listed were Space Shuttle capability development, $1.3 billion/$1 billion, and Space Shuttle operations, $2.9 billion/$3.1 billion.

U.S. SPACECRAFT RECORD[a]

Calendar Years 1957–1991

Year	Earth Orbit[b]		Earth Escape[b]		Year	Earth Orbit[b]		Earth Escape[b]	
	Success	Failure	Success	Failure		Success	Failure	Success	Failure
1957	—	1	—	—	1975	30	4	4	—
1958	5	8	—	4	1976	33	—	1	—
1959	9	9	1	2	1977	27	2	2	—
1960	16	12	1	2	1978	34	2	7	—
1961	35	12	—	2	1979	18	—	—	—
1962	55	12	4	1	1980	16	4	—	—
1963	62	1	—	—	1981	20	1	—	—
1964	69	8	4	—	1982	21	—	—	—
1965	93	7	4	1	1983	31	—	—	—
1966	94	12	7	1[c]	1984	35	3	—	—
1967	78	4	10	—	1985	37	1	—	—
1968	61	15	3	—	1986	11	4	—	—
1969	58	1	8	1	1987	9	1	—	—
1970	36	1	3	—	1988	16	1	—	—
1971	45	2	8	1	1989	24	—	2	—
1972	33	2	8	—	1990	40[r]	—	1	—
1973	23	2	3	—	1991	33	—	—	—
1974	27	2	1	—	**TOTAL**	1,224	144	82	15

Source: NASA, "Aeronautics and Space Report of the President" (Annually) and TRW Space & Defense Sector, "Space Log" (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.

r Revised.

WORLDWIDE SPACE LAUNCHINGS[a] WHICH ATTAINED EARTH ORBIT OR BEYOND

Calendar Years 1957–1991

Country	Total 1957–1991	1987	1988	1989	1990	1991
TOTAL	3,397	110	116	100	116	89
U.S.S.R.	2,315	95	90	74	75	59
United States	941	8	12	17	27	18
Japan	43	3	2	2	3	2
People's Republic of China	29	2	4	—	5	1
European Space Agency	43	2	7	7	5	8
Israel	2	—	1	—	1	—
Other[b]	24	—	—	—	—	1

Source: NASA, "Aeronautics and Space Report of the President" (Annually) and TRW Space & Defense Sector, "Space Log" (Annually).

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

b Includes 10 by France, 8 by Italy (5 were U.S. spacecraft), 4 by India, 1 by Australia, and 1 by the United Kingdom.

U.S. SPACE LAUNCH VEHICLES

As of 1991

Vehicle and Initial Launch & First Launch of this Modification	Stages	Thrust (Kilo-newtons)	Maximum Payload (Kg)[a]		
			185-Km Orbit	Geo-synch.-Transfer Orbit	Circular Sun-Synch. Orbit
Scout (1960; 1979)	1. Algol IIIA* 2. Castor IIA* 3. Antares IIIA* 4. Altair IIIA*	431.1 285.2 83.1 25.6	255 205[b]	—	155[b]
Delta 3900 Series (Thor-Delta)[d] (1960; 1982)	1. Thor plus 9 TX 526-2* 2. Delta	912.0 375.0[c] 44.2	3,045 2,180[b]	1,275	2,135[b]
Delta II (1989)	1. Thor plus 9 TX 526-2* 2. Delta	920.8 432.0[c] 43.0	—	1,819	—
Atlas E (1959; 1972)	1. Atlas booster & sustainer	1,722.0	2,090[b,e]	–	1,500[b]
Atlas-Centaur (1972; 1984)	1. Atlas booster & sustainer 2. Centaur	1,913.0 146.0	6,100	2,360	—
Titan IV (1989)	1. Two 7-segment, 3.05-m. dia* 2. LR-87 3. LR-91 4. IUS 1st stage* 5. IUS 2nd stage*	12,402.0 2,452.0 472.0 185.0 76.0	17,690	2,404	—

Vehicle and Launch Date	Stages	Thrust (Kilo-newtons)	Maximum Payload (Kg)[a]		
			185-Km Orbit	24-Hour Polar Orbit	Sun-Synch. Transfer Orbit
Titan II (1962; 1988)	1. LR-87[2] 2. LR-91	2,108.4 444.8	2,200 1,905[b]	—	—

(Continued on next page)

U.S. SPACE LAUNCH VEHICLES

As of 1991 (Continued)

Vehicle and Launch Date	Stages	Thrust (Kilo-newtons)	Maximum Payload (Kg)[a]		
			185-Km Orbit	24-Hour Polar Orbit	Sun-Synch. Transfer Orbit
Titan IIIB-Agena (1966)	1. LR-87 2. LR-91 3. Agena	2,341.0 455.1 71.2	3,600[b]	—	3,060[b]
Titan III(34)D/ IUS (1982)	1. Two 5 1/2-segment, 3.05-m. dia* 2. LR-87 3. LR-91 4. IUS 1st stage* 5. IUS 2nd stage*	11,564.8 2,366.3 449.3 275.8 115.7	14,920	1,850[b]	—
Titan III(34)D/ Transtage (1984)	1. Two 5 1/2-segment, 3.05-m. dia* 2. LR-87 3. LR-91 4. Transtage	11,564.8 2,366.3 449.3 69.8	14,920	1,855[b]	—
Space Shuttle (reusable) (1981)	1. Orbiter; 3 main engines (SSMEs) fire in parallel with SRBs 2. Two solid-fueled rocket boosters (SRBs) mounted on external tank (ET) fire in parallel with SSMEs	1,670[c] 11,790[c]	24,900[f]	—	—

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 Each.

d Maximum performance based on 3920 and 3920 PAM (payload assist module) configurations.

e With dual TE 364-4.

f In full performance configuration (280–420 km orbit).

ORDERS, SALES, AND BACKLOG
SPACE VEHICLE SYSTEMS
(Excluding Engines and Propulsion Units)[a]
Calendar Years 1977–1991
(Millions of Dollars)

Year	SALES—Current Dollars			SALES—Constant Dollars[c]		
	TOTAL	Military[b]	Non-Military	TOTAL	Military[b]	Non-Military
1977	$ 1,870	$ 814	$1,056	$ 3,425	$1,491	$1,934
1978	2,324	1,006	1,318	4,042	1,750	2,292
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[r]	9,691	6,556	3,135	8,770	5,933	2,837
1991	10,953	6,898	4,055	9,558	6,019	3,538

Year	NET NEW ORDERS			BACKLOG AS OF DECEMBER 31		
	TOTAL	Military[b]	Non-Military	TOTAL	Military[b]	Non-Military
1977	$ 2,225	$1,175	$1,050	$ 1,589	$1,263	$ 326
1978	3,157	1,436	1,721[d]	2,188	1,693	495
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	13,356	9,192	4,164
1990[r]	9,598	6,256	3,342	12,462	8,130	4,332
1991	11,721	5,575	6,146	12,450	6,539	5,911

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

a See table in Missile Program Chapter for Orders, Sales, and Backlog, Engine and Propulsion Units for Missiles and Space Vehicles.

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).

d AIA estimate based on MQ37D data.

r Revised.

FEDERAL SPACE ACTIVITIES OUTLAYS

Fiscal Years 1961–1991
(Millions of Dollars)

Year	TOTAL	NASA[a]	DOD	Energy	Commerce	Other[b]
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	25,614[r]	12,292	12,962[r]	79	232	49
1991	28,170	13,351	14,432	108	223	56

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.
r Revised.
Tr.Qtr. See Glossary.

FEDERAL SPACE ACTIVITIES OUTLAYS IN CONSTANT DOLLARS[a]

Fiscal Years 1961–1991
(Millions of Constant Dollars, 1987 = 100)

Year	TOTAL	NASA[b]	DOD	Energy	Commerce	Other[c]
1961	$ 5,584	$ 2,640	$ 2,701	$243	$ —	$ —
1962	8,909	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	21,368	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.	2,525	1,612	850	14	43	7
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	22,794[r]	10,939	11,535[r]	70	206	44
1991	24,058	11,402	12,326	92	190	48

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.
b Excludes amounts for air transportation.
c Departments of Interior and Agriculture, and the National Science Foundation. NSF funding transferred to NASA after 1982.
r Revised.
Tr.Qtr. See Glossary.

FEDERAL SPACE ACTIVITIES BUDGET AUTHORITY

Fiscal Years 1961–1991
(Millions of Current Dollars)

Year	TOTAL	NASA[a]	DOD	Energy	Commerce	Other[b]
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	28,443	10,098	17,906	97	301	42
1990	28,089[r]	12,142	15,616[r]	79	202	50
1991	27,592	13,036	14,181	108	211	56

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.
r Revised.
Tr.Qtr. See Glossary.

FEDERAL SPACE ACTIVITIES BUDGET AUTHORITY IN CONSTANT DOLLARS[a]

Fiscal Years 1961–1991
(Millions of Constant Dollars, 1987 = 100)

Year	TOTAL	NASA[b]	DOD	Energy	Commerce	Other[c]
1961	$ 6,877	$ 3,522	$ 3,096	$259	$ —	$ 4
1962	12,299	6,708	4,845	552	190	4
1963	19,952	13,311	5,690	786	158	7
1964	24,714	18,148	5,785	760	11	11
1965	24,606	18,175	5,568	810	42	11
1966	23,977	17,423	5,810	643	93	10
1967	22,322	16,068	5,536	612	96	10
1968	20,926	14,199	6,160	465	90	13
1969	18,225	11,656	6,139	360	61	9
1970	15,450	10,260	4,854	298	23	12
1971	13,046	8,533	4,161	261	74	14
1972	11,967	8,033	3,680	144	81	26
1973	11,997	7,690	4,035	134	99	37
1974	10,723	6,376	4,081	97	139	32
1975	10,328	6,127	3,976	63	135	27
1976	10,387	6,296	3,872	45	141	31
Tr.Qtr.	2,488	1,575	853	9	41	7
1977	10,804	6,212	4,355	40	164	33
1978	10,942	6,082	4,596	57	173	34
1979	11,189	6,225	4,690	91	151	32
1980	12,311	6,631	5,452	57	132	40
1981	12,832	6,420	6,209	53	112	39
1982	14,890	6,616	7,994	73	174	35
1983	17,914	7,272	10,364	45	205	29
1984	18,862	7,318	11,222	37	260	24
1985	21,381	7,342	13,537	36	448	18
1986	22,301	7,377	14,545	36	318	26
1987	26,448	9,809	16,287	48	278	27
1988	25,675	8,011	17,060	233	340	32
1989	26,280	9,330	16,544	90	278	39
1990	24,997[r]	10,805	13,897[r]	70	180	44
1991	23,565	11,133	12,111	92	180	48

Source: AIA, derived from NASA, "Aeronautics and Space Report of the President" (Annually).
a Based on fiscal year GDP implicit price deflator.
b Excludes amounts for air transportation.
c Departments of Interior and Agriculture, and the National Science Foundation. NSF funding transferred to NASA after 1982.
r Revised.
Tr.Qtr. See Glossary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION BUDGET AUTHORITY

Fiscal Years 1963–1993
(Millions of Current Dollars)

Year	TOTAL	Research and Development	Space Flight Control and Data Communications[a]	Construction of Facilities	Research & Program Management
1963	$ 3,673	$2,929	$ —	$744	$ (b)
1964	5,099	3,890	—	713	496
1965	5,250	4,360	—	267	623
1966	5,175	4,502	—	61	602
1967	4,968	4,235	—	85	648
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[a]	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[E]	14,321	6,851	5,352	525	1,578
1993[E]	14,994	7,731	5,267	319	1,660

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 FY 84; funds formerly included under Research and Development.
b Included in Research and Development for one year.
E Estimate. Latest year reflects Administration's budget proposal.
Tr.Qtr. See Glossary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION BUDGET AUTHORITY IN CONSTANT DOLLARS[a]

Fiscal Years 1963–1993
(Millions of Constant Dollars, 1987 = 100)

Year	TOTAL	Research and Development	Space Flight Control and Data Communications[b]	Construction of Facilities	Research & Program Management
1963	$13,484	$10,753	$ —	$2,731	$ (c)
1964	18,448	14,074	—	2,580	1,795
1965	18,571	15,423	—	944	2,204
1966	17,802	15,487	—	210	2,071
1967	16,527	14,088	—	283	2,156
1968	14,708	12,538	—	122	2,048
1969	12,184	10,107	—	101	1,976
1970	10,845	8,658	—	153	2,034
1971	9,114	7,034	—	72	2,009
1972	8,653	6,600	—	139	1,915
1973	8,473	6,462	—	196	1,815
1974	7,026	5,070	—	233	1,722
1975	6,791	4,882	—	301	1,608
1976	6,935	5,228	—	160	1,546
Tr.Qtr.	1,728	1,298	—	20	410
1977	6,896	5,157	—	213	1,526
1978	6,822	5,056	—	272	1,494
1979	7,042	5,371	—	229	1,443
1980	7,428	5,792	—	225	1,411
1981	7,101	5,574	—	150	1,377
1982	7,205	5,712	—	136	1,357
1983	7,900	6,365	—	160	1,376
1984	8,053	2,272[b]	4,152	245	1,382
1985	8,029	2,617	3,810	189	1,412
1986	8,038	2,697	3,779	181	1,382
1987	10,923	3,154	6,100	217	1,453
1988	8,745	3,165	3,673	206	1,701
1989	10,135	3,893	4,209	254	1,780
1990	10,938	4,637	4,123	193	1,796
1991	11,970	5,145	4,502	425	1,889
1992[E]	11,863	5,675	4,433	434	1,307
1993[E]	12,020	6,198	4,222	256	1,331

Source: 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.
b Separate budget category beginning in FY 84; funds formerly included under Research and Development.
c Included in Research and Development for one year.
E Estimate. Latest year reflects Administration's budget proposal.
Tr.Qtr. See Glossary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OUTLAYS

Fiscal Years 1963–1993
(Millions of Current Dollars)

Year	TOTAL	Research and Development	Space Flight Control and Data Communications[a]	Construction of Facilities	Research & Program Management
1963	$ 2,552	$1,912	$ —	$225	$ 416
1964	4,171	3,317	—	438	416
1965	5,093	3,984	—	531	578
1966	5,933	4,741	—	573	619
1967	5,426	4,487	—	289	650
1968	4,724	3,946	—	126	652
1969	4,251	3,530	—	65	656
1970	3,753	2,992	—	54	707
1971	3,382	2,630	—	44	708
1972	3,422	2,623	—	50	749
1973	3,315	2,541	—	45	729
1974	3,256	2,421	—	75	760
1975	3,266	2,420	—	85	761
1976	3,669	2,749	—	121	799
Tr.Qtr.	952	731	—	26	195
1977	3,945	2,980	—	105	860
1978	3,983	2,989	—	124	870
1979	4,196	3,139	—	133	925
1980	4,852	3,702	—	140	1,010
1981	5,426	4,228	—	147	1,050
1982	6,035	4,796	—	109	1,130
1983	6,664	5,316	—	108	1,240
1984	7,048	2,792[a]	2,915	109	1,232
1985	7,251	2,118	3,707	170	1,322
1986	7,403	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	11,051	3,922	5,030	190	1,908
1990	12,429	5,094	5,117	218	1,991
1991	13,878	5,765	5,590	326	2,185
1992[E]	13,819	6,261	5,311	448	1,784
1993[E]	14,088	6,768	5,150	492	1,661

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 FY 84; funds formerly included under Research and Development.
E Estimate. Latest year reflects Administration's budget proposal.
Tr.Qtr. See Glossary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OUTLAYS IN CONSTANT DOLLARS[a]

Fiscal Years 1963–1993
(Millions of Constant Dollars, 1987 = 100)

Year	TOTAL	Research and Development	Space Flight Control and Data Communications[b]	Construction of Facilities	Research & Program Management
1963	$ 9,369	$ 7,019	$ —	$ 826	$1,527
1964	15,090	12,001	—	1,585	1,505
1965	18,016	14,093	—	1,878	2,045
1966	20,409	16,309	—	1,971	2,129
1967	18,051	14,927	—	961	2,162
1968	15,141	12,647	—	404	2,090
1969	12,964	10,765	—	198	2,001
1970	10,856	8,655	—	156	2,045
1971	9,307	7,237	—	121	1,948
1972	8,951	6,861	—	131	1,959
1973	8,242	6,318	—	112	1,813
1974	7,525	5,595	—	173	1,756
1975	6,864	5,086	—	179	1,599
1976	7,163	5,367	—	236	1,560
Tr.Qtr.	1,765	1,355	—	48	362
1977	7,124	5,381	—	190	1,553
1978	6,686	5,018	—	208	1,460
1979	6,481	4,849	—	205	1,429
1980	6,874	5,245	—	198	1,431
1981	6,978	5,437	—	189	1,350
1982	7,223	5,740	—	130	1,352
1983	7,658	6,109	—	124	1,425
1984	7,758	3,073[b]	3,209	120	1,356
1985	7,688	2,246	3,930	180	1,402
1986	7,623	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	10,211	3,624	4,648	176	1,763
1990	11,031	4,521	4,542	193	1,767
1991	11,852	4,924	4,774	278	1,866
1992[E]	11,447	5,186	4,399	371	1,478
1993[E]	11,294	5,426	4,129	394	1,332

Source: 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 GNP implicit price deflator.
b Separate budget category beginning in FY 84; funds formerly included under Research and Development.
E Estimate. Latest year reflects Administration's budget proposal.
Tr.Qtr. See Glossary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OUTLAYS

Fiscal Years 1963–1993
(Millions of Current Dollars)

Year	TOTAL	Research and Development	Space Flight Control and Data Communications[a]	Construction of Facilities	Research & Program Management
1963	$ 2,552	$1,912	$ —	$225	$ 416
1964	4,171	3,317	—	438	416
1965	5,093	3,984	—	531	578
1966	5,933	4,741	—	573	619
1967	5,426	4,487	—	289	650
1968	4,724	3,946	—	126	652
1969	4,251	3,530	—	65	656
1970	3,753	2,992	—	54	707
1971	3,382	2,630	—	44	708
1972	3,422	2,623	—	50	749
1973	3,315	2,541	—	45	729
1974	3,256	2,421	—	75	760
1975	3,266	2,420	—	85	761
1976	3,669	2,749	—	121	799
Tr.Qtr.	952	731	—	26	195
1977	3,945	2,980	—	105	860
1978	3,983	2,989	—	124	870
1979	4,196	3,139	—	133	925
1980	4,852	3,702	—	140	1,010
1981	5,426	4,228	—	147	1,050
1982	6,035	4,796	—	109	1,130
1983	6,664	5,316	—	108	1,240
1984	7,048	2,792[a]	2,915	109	1,232
1985	7,251	2,118	3,707	170	1,322
1986	7,403	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	11,051	3,922	5,030	190	1,908
1990	12,429	5,094	5,117	218	1,991
1991	13,878	5,765	5,590	326	2,185
1992[E]	13,819	6,261	5,311	448	1,784
1993[E]	14,088	6,768	5,150	492	1,661

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 FY 84; funds formerly included under Research and Development.
E Estimate. Latest year reflects Administration's budget proposal.
Tr.Qtr. See Glossary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION OUTLAYS IN CONSTANT DOLLARS[a]

Fiscal Years 1963–1993
(Millions of Constant Dollars, 1987 = 100)

Year	TOTAL	Research and Development	Space Flight Control and Data Communications[b]	Construction of Facilities	Research & Program Management
1963	$ 9,369	$ 7,019	$ —	$ 826	$1,527
1964	15,090	12,001	—	1,585	1,505
1965	18,016	14,093	—	1,878	2,045
1966	20,409	16,309	—	1,971	2,129
1967	18,051	14,927	—	961	2,162
1968	15,141	12,647	—	404	2,090
1969	12,964	10,765	—	198	2,001
1970	10,856	8,655	—	156	2,045
1971	9,307	7,237	—	121	1,948
1972	8,951	6,861	—	131	1,959
1973	8,242	6,318	—	112	1,813
1974	7,525	5,595	—	173	1,756
1975	6,864	5,086	—	179	1,599
1976	7,163	5,367	—	236	1,560
Tr.Qtr.	1,765	1,355	—	48	362
1977	7,124	5,381	—	190	1,553
1978	6,686	5,018	—	208	1,460
1979	6,481	4,849	—	205	1,429
1980	6,874	5,245	—	198	1,431
1981	6,978	5,437	—	189	1,350
1982	7,223	5,740	—	130	1,352
1983	7,658	6,109	—	124	1,425
1984	7,758	3,073[b]	3,209	120	1,356
1985	7,688	2,246	3,930	180	1,402
1986	7,623	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	10,211	3,624	4,648	176	1,763
1990	11,031	4,521	4,542	193	1,767
1991	11,852	4,924	4,774	278	1,866
1992[E]	11,447	5,186	4,399	371	1,478
1993[E]	11,294	5,426	4,129	394	1,332

Source: 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 GNP implicit price deflator.
b Separate budget category beginning in FY 84; funds formerly included under Research and Development.
E Estimate. Latest year reflects Administration's budget proposal.
Tr.Qtr. See Glossary.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION BUDGET AUTHORITY FOR RESEARCH AND DEVELOPMENT AND SPACE FLIGHT, CONTROL, & DATA COMMUNICATIONS

Fiscal Years 1992–1993
(Millions of Dollars)

	1992[E]	1993[E]
RESEARCH AND DEVELOPMENT—TOTAL	$6,851	$7,731
Space Station—Total	$2,029	$2,250
Space Transport Capability Development—Total	720	864
Space Science & Applications—Total	2,729	2,985
Physics and Astronomy	1,047	1,114
Planetary Exploration	535	487
Life Sciences	149	177
Space Applications	998	1,207
Commercial Use of Space—Total	148	172
Aeronautics & Space Technology—Total	1,103	1,302
Aeronautical Research & Technology	784	890
Space Research & Technology	314	332
Transatmospheric Research & Technology	5	80
Safety, Reliability, & Quality Assurance—Total	34	33
Academic Programs—Total	67	71
Tracking & Data Advanced Systems—Total	22	23
SPACE FLIGHT, CONTROL, AND DATA COMMUNICATIONS—TOTAL	$5,385	$5,267
Space Shuttle Production & Capability Development—Total	$1,328	$1,013
Orbiter	246	306
Launch & Mission Support	262	211
Propulsion Systems	715	358
Assured Shuttle Availability	105	139
Space Shuttle Operations—Total	2,943	3,115
Flight Operations	790	740
Flight Hardware	1,297	1,455
Launch & Landing Operations	628	640
Research Operations Support	228	280
Expendable Launch Vehicles	195	218
Space and Ground Networks, Communications, & Data Systems—Total	918	921

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[a]
PROCUREMENT (INCLUDING INITIAL SPARES) AND RDT&E

Fiscal Years 1991, 1992, and 1993
(Millions of Dollars)

Agency and Program	1991		1992[E]		1993[E]	
	Procurement	RDT&E	Procurement	RDT&E	Procurement	RDT&E
AIR FORCE						
DMSP	$ 48.7	$ 48.5	$106.8	$ 28.2	$ 32.1	$ 23.8
DSCS	63.9	16.1	55.5	13.8	25.5	15.7
Defense Support Program	337.7	270.1	71.0	51.5	297.1	74.4
LANDSAT	—	—	—	30.0	—	6.0
Medium Launch Vehicle	269.7	221.0	221.3	42.8	226.6	42.7
Milstar	193.5	760.0	320.3	1,043.0	272.0	1,261.9
National Launch System	—	25.0	—	54.3	—	125.0
Navstar GPS	222.7	59.6	330.4	66.4	350.7	69.0
Space Boosters	207.0	128.3	290.5	140.9	382.2	145.9
NAVY						
FSC	$244.4	$ —	$283.1	$ —	$326.0	$ —
JOINT PROGRAMS						
SDI	$ —	$2,692	$ —	$ 3,282	$ —	$ 4,315

Source: Department of Defense, "Program Acquisition Costs by Weapon System" (Annually).
a Total Obligational Authority.
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
LANDSAT = Land Remote Sensing Satellite System
SDI = Strategic Defense Initiative

STRATEGIC DEFENSE INITIATIVE ORGANIZATION FUNDING BY PROJECT NUMBER

Fiscal Years 1989–1993
(Millions of Dollars)

Project Number and Title		1989	1990	1991	1992[E]	1993[E]
1101	Passive Sensors	$ 70	$ 57	$ 35	$ 34	$ 56
1102	Microwave Radar	14	—	5	12	18
1103	Laser Radar Technology	80	59	30	13	13
1104	Signal Processing	80	67	45	30	45
1105	Discrimination	179	134	122	89	126
1106	Sensor Studies and Experiments	166	182	159	184	208
1109	Theater Defense Discrimination	—	—	—	10	11
1110	Sensors/Integration	—	—	—	21	54
1201	Interceptor Component Technology	93	86	100	31	63
1202	Interceptor Integration Technology	67	95	129	126	79
1203	Hypervelocity Technology	24	20	15	6	11
1204	Interceptor Studies and Analysis	48	13	54	15	18
1205	Foreign Technology Support	15	6	12	—	–
1206	Advanced TMD Weapons	61	85	31	18	14
1208	Discriminating Interceptor	—	—	—	7	50
1209	Endoatmospheric Interceptor Technology	—	—	—	57	63
1210	Navy LEAP Technology Demonstration	—	—	—	8	35
1212	D-2 Program	—	—	—	6	19
1301	Free Electron Laser	203	130	29	23	24
1302	Chemical Laser Technology	99	116	91	104	175
1303	Neutral Particle Beam Technology	108	116	105	80	76
1304	Nuclear Directed Energy Technology	21	13	10	5	—
1305	Acquisition, Tracking, Pointing and Fire Control Technology	237	274	80	67	47
1307	Directed Energy Demonstration	—	—	—	—	24
1405	Communications Engineering	–	6	6	11	24
1501	Survivability Technology	103	107	57	68	135
1502	Lethality and Target Hardening	62	39	27	51	50
1503	Power and Power Conditioning	109	84	49	6	47
1504	Materials and Structures	31	36	27	24	58
1505	Launch Planning, Development and Demonstration	57	32	16	—	—
1601	Innovative Science and Technology	114	113	66	70	83
1602,3	New Concepts Development	—	—	25	40	41
1701	Launch Services	—	—	24	71	68
1702	Special Test Activities	—	—	23	17	36
2101	Boost Surveillance and Tracking System	233	300	—	—	—
2102	Brilliant Eyes	93	78	48	116	278
2103	Ground-Based Surveillance and Tracking System	10	40	47	118	112
2104	Ground-Based Radar	71	89	39	82	212
2106	Advanced Contingency Theater Sensor	—	—	—	28	90
2201	Space-Based Interceptor	116	73	35	9	—
2202	Ground-Based Exoatmospheric Interceptor Development	163	128	85	173	160
2203	HEDI (E2I)	113	66	103	66	—
2204	DEW Concept Definition	23	8	4	2	5
2205	Brilliant Pebbles	46	129	392	390	450
2207	PATRIOT Multi-mode Missile	—	—	—	160	171
2208	Extended Range Interceptor (ERINT)	—	—	—	160	129

(Continued on next page)

STRATEGIC DEFENSE INITIATIVE ORGANIZATION FUNDING BY PROJECT NUMBER (continued)

Fiscal Years 1989–1993
(Millions of Dollars)

Project Number	Project Number and Title	1989	1990	1991	1992[E]	1993[E]
2209	Arrow Continuation Experiments	$ —	$ —	$ —	$ 60	$ 58
2210	THAAD	—	—	—	100	243
2212	CORPS SAM	—	—	—	25	25
2213	Sea-Based TMD Interceptor	—	—	—	30	26
2300	Command Center	116	88	39	74	1,204
2304	System Software Engineering	—	—	4	8	8
3100	Systems Engineering	48	69	—	—	—
3102	System Engineering	—	—	65	74	199
3104	Integrated Logistics Support	8	7	4	4	7
3105	Producibility and Manufacturing	7	10	9	9	20
3107	Environment, Siting and Facilities	6	4	14	11	16
3109	System Security Engineering	—	—	7	11	12
3111	Surveillance Engineering	—	—	7	10	11
3112	System Engineering Support	—	—	—	27	29
3113	Ground Communications	—	—	—	15	13
3201	Architecture and Analysis	10	13	7	3	5
3202	Operations Interface	3	7	7	7	6
3203	Intelligence Threat Development	5	12	10	10	10
3204	Countermeasures Integration	17	17	19	17	22
3205	Theater Missile Defense Special Studies	20	14	30	68	32
3206	System Threat	—	—	7	8	7
3207	System Architecture	—	—	20	24	—
3211	C4I and Operational Analysis	—	—	—	16	19
3301	SDIO Test Data Centers	—	—	—	11	22
3302	System Test Environment	113	125	104	83	116
3303	Independent Test and Evaluation	5	4	4	6	6
3304	Targets	15	47	65	147	217
3305	Theater Test Bed	8	27	38	55	37
3306	Computer Resources and Engineering	13	14	12	29	29
3307	Airborne Surveillance Test Bed	88	56	44	38	45
3308	System Simulating (Level 1 and Level 2)	—	—	5	9	7
3309	System Test Planning and Execution	—	—	—	24	133
3310	Test and Evaluation Facilities and Launch Support	—	—	—	49	57
3311	Mobile Test Assets	—	—	—	12	14
3312	System Test Environment Support	—	—	—	15	15
4000	Operational Support Costs	209	247	228	407	351
4305	Miniaturized Accelerators for PET	17	20	0	1	1
	Other programs[a]	15	14	7	63	35
	TOTAL DETAILED PROJECTS	$3,628	$3,572	$2,878	$4,168	$6,435

Source: Strategic Defense Initiative Organization, "1992 Report to the Congress on the Strategic Defense Initiative" (Annually).
a Projects with five year funding under $20 million herein combined.
E Estimate. Represents Administration's budget request.

Following the greatest operating loss in history in 1990, the U.S. air carrier industry suffered heavy losses again in 1991. The airlines lost an aggregate $1.7 billion in 1991, compared with $1.9 billion in 1990.

Operating expenses actually declined in 1991 by more than $1 billion, but operating revenues also declined for the first time since 1982. Operating revenues for 1991 totaled $74.9 billion; operating expenses were $76.7 billion. The comparable figures for 1990 were $76 billion (revenues) and $77.9 billion (expenses).

Domestic operations accounted for three-quarters of the revenue but only slightly more than one-quarter of the loss. Domestic operating revenues totaled $56.1 billion and expenses came to $56.6 billion for an operating loss of $477 million. In the previous year, U.S. airlines lost $989 million on domestic operations, with revenues of $58 billion and expenses of $59 billion.

In international service, operating revenues for 1991 were up some $833 million over the previous year ($18.8 billion in 1991, $18 billion in 1990) but expenses soared ($20.1 billion in 1991, $18.9 billion in 1990) to create the biggest loss ever incurred in international operations by U.S. carriers ($1.25 billion).

Much of the loss in both U.S. domestic and international operations was attributable to declining traffic. In 1991, scheduled carriers flew 56.9 billion revenue ton-miles, down from 58.3 billion in the previous year. Passenger traffic amounted to 44.8 billion revenue ton-miles, down from 45.8 billion, and

cargo traffic, at 12.1 billion revenue ton-miles, was down from 12.5 billion. The total revenue load factor was 53.9 percent in 1991, down from 54.2 percent.

In domestic service, U.S. scheduled airlines boarded 412 million passengers, compared with 424 million in the previous year, and revenue passenger miles totaled more than 332 billion, down from

340 billion. The domestic passenger load factor was 61.2 percent, up from 60.4 percent in 1990.

International passenger service by U.S. scheduled carriers failed to grow for the first time since 1982. Enplanements, at 39.9 million, were down from 42 million. Revenue passenger miles amounted to 115.4 billion, compared with 117.7 billion in 1990. The international service passenger load factor dropped to 67.3 percent from the previous year's all-time high of 69.1 percent.

Global airline revenues and expenses roughly paralleled the U.S. airline experience. In operations by airline members of the International Civil Aviation Organization, total operating revenues came to $203.4 billion and operating expenses amounted to $204.4 billion, for a net operating loss of $1 billion. In the previous year, the world's airlines lost $1.5 billion from operations and $4.3 billion including non-operating expenses.

According to Exxon International Company's annual survey, covering aircraft in service as of March 31, 1991, the world fleet of turbine engine aircraft grew by 530 units in 1990-91 (the survey excludes aircraft operated by the Russian airline Aeroflot and air taxi operators).

Exxon reported a total of 15,181 active aircraft (up from 14,651), including 9,819 turbojets (up from 9,426), 5,174 turboprops (up from 5,049) and 188 turbine-powered helicopters (up from 176).

The number of U.S.-manufactured turbine aircraft in world service grew from 9,307 in 1990 to 9,406 in 1991, and the percentage of the world fleet dropped to 62.0 per-cent (the percentage has dipped every year since 1986, when 66.2 percent of the world's airline transports were of American manufacture).

OPERATING REVENUES AND EXPENSES OF U.S. AIR CARRIERS[a] DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1964–1991
(Millions of Dollars)

Year	TOTAL OPERATIONS[b]			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	8,158	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[p]	74,942	76,669	(1,727)	56,119	56,596	(477)	18,823	20,073	(1,250)

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.

SOURCES OF OPERATING REVENUES OF U.S. AIR CARRIERS[a] DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1977–1991
(Millions of Dollars)

Year	TOTAL Operating Revenues	Passenger Service[b]	Mail[c]	Freight[b] & Air Express	Excess Baggage	Other[c]
DOMESTIC OPERATIONS						
1977	$15,822	$13,773	$355	$1,109	$21	$ 564
1978	18,189	15,753	336	1,347	23	730
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[p]	56,119	44,515	721	4,478	78	6,326
INTERNATIONAL OPERATIONS						
1977	$ 4,104	$ 3,047	$112	$ 710	$21	$ 215
1978	4,703	3,534	117	750	20	282
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[p]	18,823	14,063	222	3,069	50	1,419

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[a] DOMESTIC AND INTERNATIONAL OPERATIONS

Calendar Years 1977–1991
(Millions of Dollars)

Year	TOTAL Operating Expenses	Flying Operations	Maintenance	Passenger Service	Aircraft & Traffic Servicing	Promotion and Sales	Depreciation & Amortization	Other[b]
DOMESTIC OPERATIONS								
1977	$15,166	$ 5,288	$2,001	$1,461	$2,728	$1,713	$ 967	$1,008
1978	17,172	5,669	2,155	1,711	3,120	2,040	1,231	1,246
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[p]	56,596	16,766	6,654	5,063	9,131	8,847	3,175	6,960
INTERNATIONAL OPERATIONS								
1977	$ 3,852	$ 1,303	$ 450	$ 351	$ 668	$ 526	$ 253	$ 301
1978	4,355	1,351	498	427	768	623	323	363
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[p]	19,872	5,609	2,121	1,657	2,822	4,573	886	2,204

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.

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

Calendar Years 1969–1991
(Millions of Dollars)

Year	TOTAL Assets	Value of Flight Equipment	Value of Ground Property & Equipment, & Other[a]	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[p]	69,396	42,103	14,255	21,873	34,485	49.7

Source: Department of Transportation, Office of Aviation Statistics, "Air Carrier Financial Statistics Quarterly" (Quarterly).
a Includes land and construction in progress.
p Preliminary.

TRAFFIC STATISTICS
U.S. AIR CARRIER SCHEDULED SERVICE[a]
Calendar Years 1964–1991

Year	Revenue Ton-Miles (Millions)			Total Available Ton-Miles (Millions)	Total Revenue Load Factor	Average Aircraft Revenue Miles (Millions)	Overall Flight Stage Length (Miles)	Average Available Seats per Aircraft Mile
	Passenger	Cargo[b]	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[r]	45,793	12,549	58,342	107,559	54.2	4,491	649	170
1991	44,780	12,109	56,889	105,534	53.9	4,414	651	188

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 1977–1991

Year	Revenue Passenger Enplanements (Thousands)	Average Passenger Trip-Length (Miles)	Revenue Passenger Miles (Millions)	Available Seat Miles (Millions)	Revenue Passenger Load Factor[a]
DOMESTIC OPERATIONS					
1977	222,283	704	156,609	280,619	55.8%
1978	253,957	719	182,669	299,542	61.0
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[r]	803	340,231[r]	563,065[r]	60.4
1991	412,269	806	332,407	543,413	61.2
INTERNATIONAL OPERATIONS					
1977	18,043	2,029	36,610	64,947	56.4%
1978	20,759	2,125	44,112	69,209	63.7
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[r]	2,803[r]	117,695[r]	170,310	69.1
1991	39,941	2,889	115,389	171,561	67.3

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.

PERCENT OF CIVIL TURBOJET ENGINE MARKET BY MANUFACTURER AND AIRCRAFT MODEL

as of December 1991

Aircraft Manufacturer and Model	Total Installed Engines	Engine Manufacturers					
		P&W	GE	RR	CFM	IAE	Other
TOTAL ENGINES	32,132	15,631	3,262	2,788	2,788	108	7,555
PERCENT SHARE	100.0%	48.7%	10.1%	8.7%	8.7%	0.3%	23.5%
Airbus A300[a]	448	26%	74%	—%	—%	—%	—%
Airbus A300B4-200	254	12	88	—	—	—	—
Airbus A310	382	36	64	—	—	—	—
Airbus A320	460	—	—	—	77	23	—
Antonov AN-72	12	—	—	—	—	—	100
Antonov AN-74	2	—	—	—	—	—	100
Antonov AN-124	124	—	—	—	—	—	100
AS Corvette	16	100	—	—	—	—	—
AS Caravelle	112	71	—	29	—	—	—
AS/BAe Concorde	56	—	—	100	—	—	—
BAe 1-11	326	—	—	100	—	—	—
BAe 146	664	—	—	—	—	—	100
BAe HS Trident	96	—	—	100	—	—	—
BAe HS 125	42	—	—	43	—	—	57
Beech 400 Beechjet	2	100	—	—	—	—	—
Boeing B-707[a]	176	93	—	7	—	—	—
Boeing B-707-320C	648	100	—	—	—	—	—
Boeing B-720	48	100	—	—	—	—	—
Boeing B-727 series[a]	444	100	—	—	—	—	—
Boeing B-727[b]	564	100	—	—	—	—	—
Boeing B-727C	351	100	—	—	—	—	—
Boeing B-727-200	840	100	—	—	—	—	—
Boeing B-727-200 ADV	2,694	100	—	—	—	—	—
Boeing B-737[a]	494	48	—	—	52	—	—
Boeing B-737-200	378	100	—	—	—	—	—
Boeing B-737-200 ADV	1,440	100	—	—	—	—	—
Boeing B-737-300	1,394	—	—	—	100	—	—
Boeing B-737-400	380	—	—	—	100	—	—
Boeing B-747[a]	1,560	47	33	20	—	—	—
Boeing B-747-100	660	95	—	5	—	—	—
Boeing B-747-200B	1,140	61	26	13	—	—	—
Boeing B-757[a]	82	63	—	37	—	—	—
Boeing B-757-200	734	45	—	55	—	—	—
Boeing B-767[a]	368	32	60	8	—	—	—
Boeing B-767-200	196	34	66	—	—	—	—
Boeing B-767-200ER	228	52	48	—	—	—	—
Canadair CL 600	2	—	—	—	—	—	100
Canadair CL 601	2	—	100	—	—	—	—
Cessna 500s	96	100	—	—	—	—	—
Cessna 650	8	—	—	—	—	—	100
Convair CV 880	8	—	100	—	—	—	—
Convair CV-990	4	—	100	—	—	—	—
Dassault Falcon	106	—	85	—	—	—	15
Dassault Mercure	22	100	—	—	—	—	—

(Continued on next page)

PERCENT OF CIVIL TURBOJET ENGINE MARKET BY MANUFACTURER AND AIRCRAFT MODEL (continued)

as of December 1991

Aircraft Manufacturer and Model	Total Installed Engines	Engine Manufacturers					
		P&W	GE	RR	CFM	IAE	Other
Fokker F-28[a]	178	—%	—%	100%	—%	—%	—%
Fokker F-28-4000	220	—	—	100	—	—	—
Fokker 100	192	—	—	100	—	—	—
Learjet 23	8	—	100	—	—	—	—
Learjet 24	20	—	100	—	—	—	—
Learjet 25	14	—	100	—	—	—	—
Learjet 35	42	—	—	—	—	—	100
Learjet 36	4	—	—	—	—	—	100
Learjet 55	2	—	—	—	—	—	100
Gulfstream II	16	—	—	100	—	—	—
Gulfstream III	10	—	—	100	—	—	—
IAI 1100s	26	—	—	—	—	—	100
Ilyushin IL-62[a]	336	—	—	—	—	—	100
Ilyushin IL-62M	572	—	—	—	—	—	100
Ilyushin IL-76	1,228	—	—	—	—	—	100
Ilyushin IL-86	316	—	—	—	—	—	100
Ilyushin IL-96-300	8	—	—	—	—	—	100
Lockheed JetStar	32	88	—	—	—	—	12
Lockheed L-1011[a]	393	—	—	100	—	—	—
Lockheed L-1011-1	297	—	—	100	—	—	—
Douglas DC-8	1,200	66	—	—	34	—	—
Douglas DC-9[a]	612	100	—	—	—	—	—
Douglas DC-9-30	1,064	100	—	—	—	—	—
Douglas DC-10[a]	312	39	61	—	—	—	—
Douglas DC-10-10	348	—	100	—	—	—	—
Douglas DC-10-30	444	—	100	—	—	—	—
MDC MD-11	108	47	53	—	—	—	—
MDC MD-82	1,014	100	—	—	—	—	—
MDC MD-83	296	100	—	—	—	—	—
MDC MD-80s	586	100	—	—	—	—	—
Rockwell Sabre	6	100	—	—	—	—	—
Tupolev TU-134[a]	172	—	—	—	—	—	100
Tupolev TU-134A	894	—	—	—	—	—	100
Tupolev TU-154[a]	510	—	—	—	—	—	100
Tupolev TU-154B	339	—	—	—	—	—	100
Tupolev TU-154B2	936	—	—	—	—	—	100
Tupolev TU-154M	441	—	—	—	—	—	100
Yakolev YAK-40 series[a]	27	—	—	—	—	—	100
Yakolev YAK-40[b]	594	—	—	—	—	—	100
Yakolev YAK-42	249	—	—	—	—	—	100

Source: Aerospace Industries Association, based on data from Aviation Data Service.
a Data for major (100 or more aircraft) series excluded and reported separately.
b 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.

TURBINE-ENGINED AIRCRAFT IN THE WORLD AIRLINE FLEET

(By Model, 1987–1991)

	1987	1988	1989	1990	1991
TOTAL AIRCRAFT IN SERVICE	11,711	12,575	13,514	14,651	15,181
Turbojets—TOTAL	7,600	8,085	8,587	9,426	9,819
Aerospatiale SE-210 Caravelle	60	59	56	49	38
Aerospatiale SN-601 Corvette	11	12	12	7	2
Airbus A300	267	272	294	327	331
Airbus A310	94	116	147	180	193
Airbus A320	—	2	23	130	247
Antonov 124	—	—	—	—	7
B.Ae./Aerospatiale Concorde	14	14	14	14	14
B.Ae. 146	59	82	102	144	166
B.Ae. One-Eleven	166	167	164	132	146
B.Ae. Trident	34	27	27	25	32
B.Ae. (HS) 125	18	16	17	16	17
Beech 400 Beechjet	—	—	—	—	1
Boeing 707/720	273	245	224	210	198
Boeing 727	1,676	1,686	1,684	1,648	1,515
Boeing 737	1,284	1,426	1,585	1,836	2,019
Boeing 747	629	653	676	775	806
Boeing 757	117	167	215	324	380
Boeing 767	163	207	254	345	399
Canadair CL-601 Challenger	—	1	—	—	2
Cessna 500/550/650 Citation I/II/III	28	37	48	43	44
Convair 880/990	12	2	2	—	—
Dassault Falcon 10/20/50	30	39	44	39	43
Dassault Mercure	11	11	11	11	11
Fokker F-28 Fellowship	197	203	203	199	197
Fokker 100	—	1	14	58	93
Gates Learjet	43	56	56	37	34
Gulfstream II/III G-1159	15	14	14	15	16
Ilyushin IL-62	60	66	67	56	39
Ilyushin IL-76	44	55	58	60	61
Israel Aircraft 1121/1124	9	7	3	2	2
Lockheed L-1011 Tristar	230	229	229	228	227
Lockheed L-1329 Jetstar	12	13	13	6	5
MBB Hansa HFB-320	1	1	5	—	—
McDonnell Douglas DC-8	258	282	276	253	257
McDonnell Douglas DC-9	856	853	842	847	741
McDonnell Douglas DC-10	355	361	370	365	361
McDonnell Douglas MD-11	—	—	—	3	36
McDonnell Douglas MD-80	362	462	588	799	908
Mitsubishi MU-300 Diamond	—	1	2	—	—
Rockwell/Sabreliner 60	—	—	3	3	3
Tupolev Tu-134	98	101	97	74	54
Tupolev Tu-154	74	87	95	111	156
Yakolev Yak-40/42	42	52	53	55	48

(Continued on next page)

TURBINE-ENGINED AIRCRAFT IN THE WORLD AIRLINE FLEET

(By Model, 1987–1991, continued)

	1987	1988	1989	1990	1991
Turbine-Powered Helicopters—TOTAL	303	271	240	176	188
Aerospatiale SA-315 Lama	3	3	—	—	—
Aerospatiale SA-316 Alouette III	11	9	8	4	4
Aerospatiale SA-318 Alouette II	4	4	4	3	3
Aerospatiale SA-319 Alouette III Astazou	4	4	4	4	4
Aerospatiale SA-341 Gazelle	—	—	—	—	1
Aerospatiale (Nurtanio) SA-330 Puma	23	23	22	16	18
Aerospatiale AS-332 Super Puma	5	5	5	5	5
Aerospatiale AS-350 Ecureuil/ AStar	5	6	7	10	10
Aerospatiale AS-355 Ecureuil 2/ Twinstar	2	2	3	4	4
Aerospatiale SA-365 Dauphin II	9	9	12	10	10
Agusta A109	—	—	—	—	3
Bell (Agusta/Fuji) 204	6	6	5	6	5
Bell 205	2	2	2	2	2
Bell 206 Jetranger/Longranger	53	52	39	26	33
Bell 212	27	29	27	15	15
Bell (Fuji) 214/214ST	5	1	—	—	—
Bell 222 UT	5	4	1	—	—
Bell 412	5	5	2	3	4
Boeing-Vertol 234 Chinook	3	3	—	—	—
Hughes (Kawasaki) 500/369D	10	1	1	1	1
MBB/Kawasaki BK 117	1	1	1	—	—
MBB/Nurtanio Bo.105	34	34	34	33	33
Sikorsky S-55T	5	5	5	5	5
Sikorsky S-58T	13	7	5	5	4
Sikorsky S-61	41	34	32	10	10
Sikorsky S-76	27	19	18	11	11
Westland 30	—	3	3	3	3

(Continued on next page)

TURBINE-ENGINED AIRCRAFT IN THE WORLD AIRLINE FLEET

(By Model, 1987–1991, continued)

	1987	1988	1989	1990	1991
Turboprops—TOTAL	3,808	4,219	4,687	5,049	5,174
Aero Spacelines SuperGuppy	—	4	4	—	—
Aerospatiale N.262/Mohawk 298	28	25	23	16	14
Aerospatiale/Aeritalia ATR 42	36	76	122	178	210
Aerospatiale/Aeritalia ATR 72	—	—	—	17	48
Airtech CN-235	—	2	8	18	24
Antonov An-12	14	14	15	19	20
Antonov An-24/26/28/30/32	200	215	251	246	216
B.Ae. ATP	—	—	12	31	41
B.Ae. Vanguard	8	9	7	5	4
B.Ae. Viscount	47	45	40	33	27
B.Ae. (HP-137) Jetstream 31	114	166	201	277	205
B.Ae. (HS) Argosy	5	5	5	—	—
B.Ae. HS-748	157	154	152	139	130
Beech 18 Turbo	15	21	24	24	20
Beech 90 King Air	36	44	40	26	28
Beech 99	169	171	173	140	122
Beech 100 King Air	21	24	22	23	24
Beech 200/300 Super King Air	62	70	83	78	76
Beech 1300	—	—	5	14	7
Beech 1900C	64	73	95	171	191
Bristol 175 Britannia	8	7	7	6	6
Canadair CL-44	15	14	15	13	11
CASA/Nurtanio C-212 Aviocar	97	103	112	104	109
Cessna 208 Caravan I	74	150	229	287	312
Cessna F406 Caravan II	—	—	14	19	21
Cessna 425/441 Conquest I/II	16	9	19	8	4
Convair 580/600/640	142	131	132	108	92
DHC-2 Turbo Beaver/Otter	3	3	3	4	4
DHC-5 Buffalo	2	2	1	1	1
DHC-6 Twin Otter	450	464	465	432	428
DHC-7 Dash 7	95	100	106	94	79
DHC-8 Dash 8	55	82	120	214	254
Dornier DO-228	59	79	90	113	96
Douglas DC-3T Turbo Express	1	1	—	—	1
Embraer EMB-110 Bandeirante	232	231	222	200	174
Embraer EMB-120 Brasilia	28	64	113	201	225
Fokker/Fairchild F-27/FH-227 Friendship	436	434	432	401	389
Fokker 50	—	13	45	101	121

(Continued on next page)

TURBINE-ENGINED AIRCRAFT IN THE WORLD AIRLINE FLEET

(By Model, 1987–1991, continued)

	1987	1988	1989	1990	1991
Turboprops (continued)					
GAF Nomad	23	16	14	9	8
Grumman G-21 Turbo Goose	—	—	—	—	1
Grumman G-73 Turbo Mallard	8	11	10	9	4
Grumman G-159 Gulfstream I	31	32	37	34	33
Handley Page Herald	21	15	17	17	17
Harbin Y-12 II	—	—	—	2	5
IAI Arava	—	3	4	3	1
Ilyushin IL-18	71	69	67	48	42
LET L-410	—	—	—	3	17
Lockheed L-188 Electra	77	79	83	74	67
Lockheed L-100/L-382 Hercules	56	52	58	56	54
Mitsubishi MU-2B	12	11	5	5	8
Nihon AMC YS-11	108	107	102	97	94
Pilatus PC-6 Turbo Porter	25	—	—	—	—
Pilatus Britten-Norman BN-2T Turbo Islander	5	3	3	2	3
Piper PA-31T/42 Cheyenne	18	28	35	29	25
Piper T-1040	8	9	15	15	12
Rockwell Turbo Commander	9	11	16	14	15
Saab SF-340A/B	67	105	136	206	265
Saunders ST-27	11	9	2	—	—
Shorts SC-5 Belfast	5	5	5	5	5
Shorts SC-7 Skyliner/Skyvan	15	14	15	16	25
Shorts 330	71	76	68	64	51
Shorts 360	106	130	142	150	139
Swearingen Merlin	52	45	46	41	36
Swearingen Metro	302	356	361	249	338
Transall C-160	8	8	8	8	8
Xian (Antonov) Y-7	10	20	31	31	67
TOTAL AIRCRAFT IN SERVICE	11,711	12,575	13,514	14,651	15,181
Number Manufactured in U.S.[r]	7,638	8,133	8,617	9,307	9,406
Percent Manufactured in U.S.[r]	65.2%	64.7%	63.8%	63.5%	62.0%
Turbojet Aircraft in Service	7,600	8,085	8,587	9,426	9,819
Number Manufactured in U.S.	6,313	6,693	7,029	7,737	7,950
Percent Manufactured in U.S.	83.1%	82.8%	81.9%	82.1%	81.0%
Turboprop Aircraft in Service	3,808	4,219	4,687	5,049	5,174
Number Manufactured in U.S.	1,184	1,332	1,497	1,519	1,406
Percent Manufactured in U.S.	31.1%	31.6%	31.9%	30.1%	27.2%
Turbine-Powered Helicopters In Service	303	271	240	176	188
Number Manufactured in U.S.[r]	141	108	91	51	50
Percent Manufactured in U.S.[r]	46.5%	39.9%	37.9%	28.4%	26.6%

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, the USSR national airline, and covers aircraft in service as of March 31. Excludes air taxi operators.
r Revised.

JET FUEL COSTS AND CONSUMPTION BY U.S. AIR CARRIERS[a]

Calendar Years 1977–1991

Year	Gallons Consumed (Millions)	Total Cost (Millions)	Cost Per Gallon (Cents)	Cost Index (1982 = 100)[r]	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[r]	11,465.2	77.3[r]	78.7	17.6
1991	13,798.4	9,329.5	67.6	68.9	14.8

Source: Air Transport Association of America, "Airline Cost Index" (Quarterly).
a Majors and Nationals excluding Air Florida, Capitol, Transamerica, and World.
r Revised from previously reported data for comparability.

U.S. CIVIL AND JOINT-USE AIRCRAFT FACILITIES[a] BY TYPE AND STATE

As of December 31, 1991

State	TOTAL[a]	Public[b]	Paved	Lighted	State	TOTAL[a]	Public[b]	Paved	Lighted
Alabama	203	103	135	98	Nevada	122	61	59	34
Alaska	545	419	61	145	New Hampshire	79	27	46	19
Arizona	273	75	154	71	New Jersey	329	57	143	50
Arkansas	236	97	160	86	New Mexico	170	72	79	50
California	922	269	667	248	New York	512	171	204	132
Colorado	373	84	160	84	North Carolina	336	119	146	112
Connecticut	134	27	83	27	North Dakota	464	100	78	97
Delaware	34	10	14	12	Ohio	714	194	279	190
Dist. of Col.	16	2	14	4	Oklahoma	403	157	213	131
Florida	698	130	307	145	Oregon	378	103	154	76
Georgia	375	113	192	116	Pennsylvania	752	153	309	141
Hawaii	48	13	41	13	Rhode Island	23	8	16	7
Idaho	211	122	78	47	South Carolina	146	68	77	65
Illinois	924	126	277	166	South Dakota	160	76	63	74
Indiana	576	116	163	120	Tennessee	218	90	132	86
Iowa	290	139	157	139	Texas	1,662	401	830	414
Kansas	394	148	135	133	Utah	112	48	76	44
Kentucky	144	69	92	58	Vermont	70	17	17	11
Louisiana	413	88	240	75	Virginia	341	74	153	84
Maine	159	78	49	33	Washington	411	134	199	133
Maryland	168	39	72	49	West Virginia	94	40	56	32
Massachusetts	197	51	114	43	Wisconsin	472	144	178	140
Michigan	432	221	180	175	Wyoming	96	41	48	37
Minnesota	477	161	138	141	**50 States—Total**	17,509	5,510	7,777	4,787
Mississippi	207	86	115	79	Puerto Rico	29	11	24	11
Missouri	462	145	221	141	Virgin Islands	8	2	3	2
Montana	227	126	97	87	S. Pacific[c]	35	28	18	11
Nebraska	307	98	106	93	**TOTAL**	17,581	5,551	7,822	4,811

FACILITIES BY CLASS

Class	Total[a]	Public[b]	Private
Airports	12,904	5,245	7,659
Heliports	4,199	98	4,101
Stolports	70	6	64
Seaplane Bases	408	202	206
Total Facilities	17,581	5,551	12,030

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.

ACTIVE[a] U.S. AIR CARRIER FLEET

By Type of Aircraft, Number of Engines and Model
Active as of December 1987–1991

	1987	1988	1989	1990	1991
TOTAL	5,250[r]	5,660	5,778	6,083	6,054
Turbojets — TOTAL	3,575	3,915	3,942	4,148	4,167
Four-Engine — TOTAL	382	427	428	432	410
Boeing 707	31	31	27	25	27
Boeing 747	156	171	180	190	184
B.Ae. 146	57	57	53	44	17
McDonnell Douglas DC-8	138	168	168	173	182
Three-Engine — TOTAL	1,469	1,542	1,459	1,438	1,376
Boeing 727	1,168	1,246	1,167	1,152	1,073
Lockheed L-1011	116	112	107	101	100
McDonnell Douglas DC-10/MD-11	185	184	185	185	203
Twin-Engine — TOTAL	1,724	1,946	2,055	2,278	2,381
Airbus A-300	52	57	63	67	63
Airbus A-310	13	19	19	21	42
Airbus A-320	—	—	11	10	35
Boeing 737	633	706	756	812	835
Boeing 757	95	122	146	199	234
Boeing 767	83	126	111	120	136
B.Ae. BAC-111	39	30	—	3	1
Cessna C550	—	—	5	7	—
Dassault Falcon	—	—	—	—	2
Fokker F-28	47	47	53	68	75
Grumman G-1159	—	—	—	1	33
Learjet LR-25	—	1	2	1	2
Learjet LR-35	2	1	1	2	—
McDonnell Douglas DC-9/MD-80	760	837	888	967	953
Turboprops — TOTAL	1,241[r]	1,375	1,476	1,595	1,598
Four-Engine — TOTAL	102	95	96[r]	88	75
Canadair CL44D	6	6	5	5	—
De Havilland DHC-7	41	39	41	40	33
Lockheed 188 Electra	34	30	30	24	24
Lockheed 382/L-100 Hercules	21	20	20	19	18
Twin-Engine — TOTAL	1,139	1,280	1,380	1,507	1,523
Beech BE65	4	1	—	—	—
Beech BE90	4	1	—	—	—
Beech BE99	52	84	53	54	32
Beech BE100	—	1	1	2	1
Beech BE200	5	7	10	16	8
Beech BE1900	48	80	109	147	167
B.Ae. ATP	—	—	—	4	10

(Continued on next page)

ACTIVE[a] U.S. AIR CARRIER FLEET (Continued)

By Type of Aircraft, Number of Engines, and Model
Active as of December 1987–1991

	1987	1988	1989	1990	1991
Twin-Engine (continued)					
B.Ae. Jetstream	113	135	165	222	214
CASA C212 Aviocar	16	18	16	16	13
Cessna C441	2	3	4	2	2
Convair 580/600/640	77	72	58	33	37
DeHavilland DHC-6	71	63	69	67	69
DeHavilland DHC-8	34	44	64	74	81
Dornier DO228	18	33	34	32	31
Embraer EMB110/EMB120	133	139	164	204	190
Fairchild/Fokker F-27/FH-227	47	51	53	58	50
Fairchild Swearingen SA-226	101	90	57	22	31
Fairchild Swearingen SA-227	163	191	212	218	200
Grumman G-73	—	7	5	7	4
Grumman G-159	14	5	6	7	2
Grumman G-500	—	1	—	—	—
Mitsubishi MU-2	1	—	—	1	1
Nihon YS-11	36	22	21	21	22
Nord ND-262/STC-262	12	9	2	1	—
Piper PA31T	6	9	12	8	8
Piper 42	—	—	—	1	1
Rockwell Aero Commander 690	1	1	—	—	—
Saab-Fairchild SF340A	51	68	85	109	153
Shorts SD-3/SD-330	110	110	118	103	93
Shorts SC-7	—	—	—	2	2
Societe Nationale Industrielle Aerospatiale SNAIS ATR-42	20	35	62	77	101
Piston-Engine — TOTAL	421	362	353	329	283
Four-Engine — TOTAL	38	36	35	31	26
Douglas DC-6	37	35	34	30	25
Douglas DC-7	1	1	1	1	1
Three-Engine — TOTAL	3	3	5	6	5
Pilatus Britten-Norman BN2A-MK-3 Turbo Islander	3	3	5	6	5
Twin-Engine — TOTAL	380	323	313	292	252
Helicopters — TOTAL	13	8	7	11	6

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.
a "Active aircraft" must have a current U.S. registration and have flown during the calendar year.

ACTIVE U.S. CIVIL AIRCRAFT[a]

As of December 31, 1963–1990

Year	TOTAL	Air Carrier[b]	General Aviation Aircraft					
			TOTAL	Fixed-Wing Aircraft			Rotor-craft[c]	Other[d]
				Multi-Engine	Single-Engine			
					4-place & over	3-place & less		
1963	87,167	2,079	85,088	9,695	42,647	30,977	1,171	588
1964	90,799	2,057	88,742	10,644	45,777	30,367	1,306	648
1965	97,567	2,125	95,442	11,977	49,789	31,364	1,503	809
1966	106,978	2,272	104,706	13,548	52,972	35,687	1,622	877
1967	116,638	2,452	114,186	14,651	56,865	39,675	1,899	1,096
1968	126,823	2,586	124,237	16,760	60,977	42,830	2,350	1,320
1969	133,496	2,690	130,806	18,111	63,703	45,001	2,557	1,434
1970	134,422	2,679	131,743	18,291	64,759	44,884	2,255	1,554
1971	133,790	2,642	131,148	17,855	64,464	44,792	2,352	1,685
1972	147,593	2,583	145,010	19,849	70,998	49,448	2,787	1,928
1973	156,139	2,599	153,540	21,929	74,831	51,386	3,143	2,251
1974	163,974	2,472	161,502	23,418	78,924	53,008	3,610	2,542
1975	170,970	2,495	168,475	24,559	82,621	54,390	4,073	2,832
1976	180,796	2,492	178,304	25,684	88,211	56,730	4,505	3,174
1977	186,767	2,473	184,294	26,652	91,960	57,340	4,726	3,616
1978	201,323	2,545	198,778	28,782	101,466	59,185	5,315	4,028
1979	213,948	3,609	210,339	31,311	106,028	62,362	5,864	4,770
1980	214,853	3,808	211,045	31,664	107,930	60,505	6,001	4,945
1981	217,199	3,973	213,226	33,301	107,983	59,914	6,974	5,049
1982	213,851	4,027	209,779	34,204	106,503	57,670	6,169	6,209
1983	217,496	4,203	213,293	34,404	107,228	59,199	6,540	5,233
1984	225,313	4,370	220,943	35,649	109,933	61,989	7,096	6,275
1985	215,332	4,678	210,654	33,589	105,555	58,829	6,418	6,263
1986	224,953	4,909	220,044	34,313	109,351	62,427	6,943	7,010
1987	222,436	5,253	217,183	33,032	107,502	63,533	6,333	6,783
1988	215,926	5,660	210,266	32,243	105,207	59,553	6,406	6,857
1989	225,515	5,778	219,737	34,171	107,752[r]	62,618[r]	7,475	7,721
1990	218,312	6,083	212,229	32,727	104,566	60,507	7,397	7,032

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (Annually).
NOTE: Detail may not add to totals because of estimating procedures.

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, 1990

Primary Use[a]	TOTAL	Fixed-Wing			Rotor-craft[b]	Other[c]
		Turbojet	Turboprop	Piston		
TOTAL—ALL AIRCRAFT	218,312	8,522	7,247	188,102	7,408	7,032
Air Carrier—TOTAL	6,083	4,148	1,595	329	11	—
Large	4,665	4,145	438	82	—	—
Small	1,418	3	1,157	247	11	—
General Aviation—TOTAL	212,229	4,374	5,652	187,773	7,397	7,032
Executive	10,906	3,204	2,861	3,933	863	45
Business	35,496	340	847	33,863	393	55
Commuter[d]	1,242	—	466	643	126	7
Air Taxi[d]	6,186	374	640	3,853	1,132	190
Instructional	19,889	4	38	18,603	877	367
Personal	120,636	115	262	113,429	1,369	5,459
Aerial Application	6,687	—	220	5,402	1,065	—
Aerial Observation	5,302	17	23	4,011	995	256
Other Work	1,525	—	16	1,041	224	245
Other	4,358	321	280	2,995	355	408

Source: Federal Aviation Administration, "FAA Statistical Handbook of Aviation" (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
ACTIVE AIRCRAFT AND HOURS FLOWN
BY PRIMARY USE

Calendar Years 1986–1990

Primary Use[a]	1986	1987	1988	1989	1990
ACTIVE AIRCRAFT AS OF DECEMBER 31					
TOTAL	220,044	217,183	210,266	219,737	212,229
Executive	12,075	11,960	10,882	12,285	10,906
Business	43,780	39,943	34,918	37,507	35,496
Commuter[b]	1,721	1,014	973	1,444	1,242
Air Taxi[b]	7,568	6,228	6,518	7,115	6,186
Instructional	15,812	15,727	16,674	17,780	19,889
Personal	120,308	123,487	122,557	124,786	120,636
Aerial Application	7,068	6,516	7,042	7,093	6,687
Aerial Observation	4,716	4,858	4,759	5,784	5,302
Other Work	1,274	1,577	1,841	2,139	1,525
Other	5,707	5,873	4,081	3,802	4,358
THOUSANDS OF HOURS FLOWN					
TOTAL	34,416	33,443	33,593	35,012	34,767
Executive	3,781	3,403	3,748	3,739	3,155
Business	5,896	5,713	4,960	4,689	4,784
Commuter[b]	2,185	1,359	1,118	1,508	1,444
Air Taxi[b]	2,913	2,877	2,842	3,270	2,436
Instructional	4,677	4,904	5,309	6,489	7,847
Personal	10,097	10,787	10,813	10,328	10,048
Aerial Application	1,985	1,666	1,989	2,023	2,028
Aerial Observation	1,620	1,412	1,412	1,861	1,891
Other Work	323	379	567	560	619
Other	939	943	835	549	514

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.

U.S. GENERAL AVIATION
TYPE OF AIRCRAFT AND HOURS FLOWN

Calendar Years 1986–1990

	1986	1987	1988	1989	1990
Number of Active Aircraft by Type					
All Aircraft — TOTAL	220,044	217,183	210,266	219,737	212,229
Fixed Wing: Piston:					
Single Engine: 1-3 Seats	62,427	63,533	59,553	62,618	60,507
4 + Seats	109,351	107,502	105,207	107,752	104,566
Twin Engine: 1-6 Seats	16,166	15,741	15,143	15,927	15,186
7 + Seats	7,555	7,566	7,554	7,432	7,421
Other	148	112	99	86	94
Turboprop:					
Twin Engine: 1-12 Seats	4,809	4,337	4,231	4,888	4,320
13 + Seats	970	723	826	1,206	937
Other	185	214	202	230	395
Turbojet: Twin Engine	4,037	3,900	3,821	4,004	3,950
Other	444	438	367	398	425
Rotorcraft: Piston	2,921	2,813	2,584	3,244	3,459
Turbine	4,022	3,520	3,822	4,232	3,938
Balloons, Dirigibles, and Gliders	7,010	6,783	6,857	7,721	7,032
Thousands of Hours Flown by Type of Aircraft					
All Aircraft — TOTAL	34,416	33,443	33,593	35,012	34,767
Fixed Wing: Piston	26,861	27,039	26,226	26,971	27,973
Turboprop	2,882	2,177	2,370	3,132	2,521
Turbojet	1,654	1,528	1,678	1,654	1,512
Rotorcraft: Piston	804	652	576	749	775
Turbine	1,821	1,631	2,131	2,077	1,617
Balloons, Dirigibles, and Gliders	394	416	613	429	369
Average Hours Flown per Year per Aircraft by Type					
All Aircraft — TOTAL	149	148	154	155	159
Fixed Wing: Piston:					
Single Engine: 1-3 Seats	125	134	132	132	149
4 + Seats	130	126	134	131	141
Twin Engine: 1-6 Seats	172	165	150	169	163
7 + Seats	280	289	256	259	231
Other	111	140	225	133	623
Turboprop:					
Twin Engine: 1-12 Seats	335	337	373	341	334
13 + Seats	1,013	652	895	1,044	1,024
Other	499	839	392	569	446
Turbojet: Twin Engine	385	371	412	385	359
Other	154	229	347	275	293
Rotorcraft: Piston	273	229	228	236	216
Turbine	460	485	577	497	425
Balloons, Dirigibles, and Gliders	56	62	95	56	52

Source: General Aviation Manufacturers Association, "General Aviation Statistical Databook" (Annually), based on data from the Federal Aviation Administration, "FAA Statistical Handbook of Aviation" and the Federal Aviation Administration, Office of Management Systems.

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

ACTIVE U.S. AIRMAN CERTIFICATES HELD

As of December 31, 1987–1991

	1987	1988	1989	1990	1991
Pilots — TOTAL	699,653	694,016	700,010	702,659	692,095
Students	146,016	136,913	142,544	128,663	120,203
Private	300,949	299,786	293,179	299,111	293,306
Commercial	143,645	143,030	144,540	149,666	148,365
Airline Transport	91,287	96,968	102,087	107,732	112,167
Helicopter (only)	8,702	8,608	8,863	9,567	9,860
Glider (only)[a]	7,901	7,600	7,708	7,833	8,033
Lighter-Than-Air[a]	1,153	1,111	1,089	(b)	(b)
Recreational	—	—	—	87	161
Non-Pilots — TOTAL	427,962	448,710	468,405	492,237	517,462
Mechanics[c]	297,178	312,419	326,243	344,282	366,392
Parachute Rigger[c]	9,659	9,770	9,879	10,094	7,916
Ground Instructor[c]	60,861	62,582	64,503	66,882	70,086
Dispatcher[c]	9,491	10,020	10,455	11,002	11,607
Flight Navigator	1,445	1,400	1,357	1,290	1,225
Flight Engineer	49,328	52,519	55,968	58,687	60,236
Flight Instructor Certificates[d]	60,316	61,798	61,472	63,775	69,209
Instrument Ratings[d]	266,122	273,804	282,804	297,073	303,193

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

a Glider and lighter-than-air pilots are not required to have a medical examination; however, the totals above are the pilots who received a medical.

b Lighter-than-air type ratings are no longer being issued.

c No periodic medical examination required; therefore, no determination as to current activity can be made.

d Special ratings shown on pilot certificates represented above, not additional certificates.

HELIPORTS/HELIPADS[a] IN THE UNITED STATES

By State
As of 1991

State	Total Helipads in state	Private Use		Public Use	
		Heliports & Helistops	Helipads at Airports	Heliports & Helistops	Helipads at Airports
Alabama	54	52	—	1	1
Alaska	32	15	3	6	8
Arizona	88	86	—	—	2
Arkansas	73	70	2	—	1
California	392	368	3	—	21
Colorado	165	159	1	1	4
Connecticut	73	68	1	3	1
Delaware	12	11	—	1	—
District of Columbia	16	16	—	—	—
Florida	190	189	—	—	1
Georgia	78	77	—	—	1
Hawaii	19	15	—	1	3
Idaho	28	26	—	1	1
Illinois	237	227	3	7	—
Indiana	102	96	2	3	1
Iowa	65	64	—	—	1
Kansas	31	27	—	—	4
Kentucky	30	30	—	—	—
Louisiana	201	193	2	5	1
Maine	17	15	—	2	—
Maryland	51	48	2	1	—
Massachusetts	109	105	—	2	2
Michigan	58	56	1	1	—
Minnesota	29	26	1	—	2
Mississippi	30	30	—	—	—
Missouri	103	95	1	4	3
Montana	19	18	—	1	—
Nebraska	23	22	1	—	—
Nevada	24	24	—	—	—
New Hampshire	32	30	—	1	1

(Continued on next page)

HELIPORTS/HELIPADS[a] IN THE UNITED STATES
(Continued)
By State
As of 1991

State	Total Helipads in state	Private Use		Public Use	
		Heliports & Helistops	Helipads at Airports	Heliports & Helistops	Helipads at Airports
New Jersey	199	195	—	4	—
New Mexico	19	17	—	2	—
New York	124	115	—	9	—
North Carolina	55	52	1	2	—
North Dakota	7	7	—	—	—
Ohio	196	173	1	17	5
Oklahoma	85	81	—	4	—
Oregon	84	80	2	2	—
Pennsylvania	273	264	1	8	—
Rhode Island	12	11	—	1	—
South Carolina	24	24	—	—	—
South Dakota	9	9	—	—	—
Tennessee	64	58	2	3	1
Texas	388	374	3	9	2
Utah	34	29	—	—	5
Vermont	17	17	—	—	—
Virginia	102	100	—	1	1
Washington	102	96	2	—	4
West Virginia	23	23	—	—	—
Wisconsin	63	63	—	—	—
Wyoming	13	12	—	—	1
Total U.S.	4,239	4,058	35	103	78

Source: Helicopter Association International, "1992 Helicopter Annual" (Annually).
NOTE: 96.6 percent of all U.S. helicopter landing areas are private, while 3.4 percent are public.
a Excludes temporary heliports, offshore heliports, and infrequently used helicopter landing sites. 'Helipads at Airports' not updated since 1991/1992 edition.

Total U.S. funding for research and development from all sources reached $150.8 billion in calendar year 1991 and industry provided 52 percent ($78.3 billion) of the funding, according to the National Science Foundation's (NSF) Annual Survey of Industrial Research and Development.

Other sources of funding included the federal government ($65.2 billion, 43 percent), colleges and universities ($4.8 billion, 3 percent), and nonprofit institutions ($2.6 billion, 1.7 percent).

Industry performed more than 70.8 percent of the work (as measured by dollar value). Colleges and universities performed 11.6 percent and federal government facilities just under 10.9 percent.

In 1990, the latest year for which data are available, the aerospace industry performed 24 percent of the nation's $104.3 billion in industrial research and development (R&D). Of the $25.4 billion available to the aerospace industry for industrial R&D, the federal government provides 76 percent or $19.2 billion. According to the latest Battelle Memorial Institute annual survey showing inter-industry R&D funding, the aerospace industry was the leading performer of R&D.

NSF estimated that R&D funding would increase in 1992 to $157.4 billion and that industry funding (at $81.1 billion) would amount to 52 percent of the total.

The Office of Management and Budget (OMB) estimated Fiscal Year 1992 federal outlays for R&D at $70.9 billion, which represents a real (constant dollar) increase of 4.2 percent. For FY 1993 OMB estimated

total outlays at $74.5 billion, up 1.7 percent in real terms.

A breakdown of the FY 1992 estimate shows that the Department of Defense (DoD) is—as usual—by far the largest conductor of government-funded R&D. OMB put DoD outlays at $36.9 billion, or 52 percent of the total, up slightly in dollar value but down in percentage share compared with the previous year's 54 percent.

Among other agencies, rapidly increasing outlay levels put the Department of Energy (DoE) ahead of NASA with outlays of $11.1 billion, or 15.7 percent of the total. NASA, at $7.3 billion, accounted for more than 10 percent, and all other agencies combined had estimated outlays of $15.5 billion, or 22 percent.

Despite declining general appropriations for DoD, R&D outlays were estimated to increase again in FY 1993 in both current and constant dollars. OMB's current dollar estimate was $38.9 billion, or 52 percent of total federal R&D outlays. Other estimates included DoE, $11.2 billion, 15 percent; NASA, $7.7 billion, more than 10 percent; all other agencies, $16.7 billion, 22 percent.

In 1991, federal outlays for that portion of R&D earmarked for aeronautics declined from $10 billion in the previous year to $9.7 billion. The decline was driven by the drop in DoD aeronautical R&D outlays from $7.6 billion to $6.8 billion. NASA outlays on aeronautical R&D rose $128 million to more than $1 billion. Department of Transportation (DoT) outlays increased from $1.5 billion to $1.9 billion.

Within DoD, the Air Force continues to lead the other services in outlays for Research, Development, Test and Evaluation (RDT&E). For FY 1992, USAF outlays were estimated at $12.8 billion, down $277 million from the previous year, and the estimate for FY 1993 was $14.1 billion. Navy

figures were $8 billion in FY 1992 (up $373 million) and $8.2 billion in FY 1993. Army outlays for RDT&E were estimated at $5.8 billion in FY 1992 (up $285 million) and $5.7 billion in FY 1993.

The Pacific region, perennial leader, once again topped a geographical breakdown of FY 1991 DoD prime contract awards for RDT&E. Pacific area firms won contracts amounting to $5.6 billion, or 27.5 percent of the total. The ranking and dollar value received by contractors in other regions were: South Atlantic, $3.3 billion, 16.3 percent; Middle Atlantic, $3.2 billion, 16 percent; Mountain, $2.5 billion, 12.4 percent; New England, $1.8 billion, 8.9 percent; East North Central, $1.3 billion, 6.6 percent; West South Central, $1.3 billion, 6.3 percent; West North Central, $659 million, 3.3 percent; and East South Central, $596 million, 2.9 percent.

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

By Funding Source
Calendar Years 1976–1990
(Millions of Dollars)

Year	All Industries[a]			Aerospace Industry[b]		
	Total	Federal Funds	Company Funds[c]	Total	Federal Funds	Company Funds[c]
CURRENT DOLLARS						
1976	$ 26,997	$ 9,561	$17,436	$ 6,339	$ 4,921	$1,418
1977	29,825	10,485	19,340	7,033	5,486	1,547
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[r]	65,772[r]	25,900	19,877	6,023
1989[r]	101,854	31,292	70,562	25,638	19,633	6,005
1990	104,344	30,580	73,764	25,357	19,217	6,140
CONSTANT DOLLARS (1987 = 100)[d]						
1976	$ 51,649	$18,292	$33,358	$12,127	$ 9,415	$2,713
1977	53,383	18,767	34,616	12,588	9,819	2,769
1978	55,240	18,559	36,681	12,500	9,476	3,024
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	93,944	28,862	65,082	23,647	18,108	5,539
1990	92,446	27,093	65,353	22,466	17,026	5,440

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.

r Revised.

TOTAL U.S. FUNDS FOR RESEARCH AND DEVELOPMENT BY SOURCE AND PERFORMER[a]

Calendar Years 1989–1992
(Millions of Current Dollars)

Source of Funds	TOTAL, All Performers	Performer				
		Federal Government	Industry	Colleges & Universities	Federally-Funded Research & Development Centers	Non-Profit Institutions
1989[r]						
All Sources — TOTAL	$140,763	$15,121	$101,854	$15,009	$4,729	$4,050
Federal Government	62,626	15,121	31,292	8,984	4,729	2,500
Industry	72,110	—	70,562	998	—	550
Colleges & Universities	3,946	—	—	3,946	—	—
Nonprofit Institutions	2,081	—	—	1,081	—	1,000
1990						
All Sources — TOTAL	$146,153	$16,003	$104,344	$16,325	$4,831	$4,650
Federal Government	63,925	16,003	30,580	9,611	4,831	2,900
Industry	75,499	—	73,764	1,135	—	600
Colleges & Universities	4,356	—	—	4,356	—	—
Nonprofit Institutions	2,373	—	—	1,223	—	1,150
1991[p]						
All Sources — TOTAL	$150,800	$16,500	$106,750	$17,450	$5,000	$5,100
Federal Government	65,200	16,500	30,400	10,100	5,000	3,200
Industry	78,250	—	76,350	1,250	—	650
Colleges & Universities	4,750	—	—	4,750	—	—
Nonprofit Institutions	2,600	—	—	1,350	—	1,250
1992[E]						
All Sources — TOTAL	$157,400	$17,600	$110,300	$19,000	$5,100	$5,400
Federal Government	68,200	17,600	31,300	10,900	5,100	3,300
Industry	81,050	—	79,000	1,350	—	700
Colleges & Universities	5,250	—	—	5,250	—	—
Nonprofit Institutions	2,900	—	—	1,500	—	1,400

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.

RESEARCH AND DEVELOPMENT FUNDS AS A PERCENT OF NET SALES ALL MANUFACTURING INDUSTRIES AND THE AEROSPACE INDUSTRY

Calendar Years 1978–1990

Year	All Manufacturing Industries[a]		Aerospace Industry[b]	
	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[r]	4.6	3.2	15.3	3.6
1990	4.6	3.2	14.3	3.5

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.

FEDERAL AERONAUTICS RESEARCH AND DEVELOPMENT

Fiscal Years 1973–1991
(Millions of Dollars)

Year	TOTAL	NASA[a]	DOD[b]	DOT[c]
BUDGET AUTHORITY				
1973	$ 2,187	$ 313	$1,799	$ 75
1974	2,030	278	1,678	74
1975	2,015	314	1,627	74
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[r]	932	7,867[r]	1,891
1991	9,416	968	6,148	2,300
OUTLAYS				
1982[d]	$ 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[r]	889	7,649[r]	1,471
1991	9,679	1,017	6,792	1,870

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.
Tr.Qtr. See Glossary.

FEDERAL AERONAUTICS RESEARCH AND DEVELOPMENT IN CONSTANT DOLLARS[a]

Fiscal Years 1973–1991
(Millions of Constant Dollars)

Year	TOTAL	NASA[b]	DOD[c]	DOT[d]
BUDGET AUTHORITY				
1973	$5,438	$778	$4,473	$ 186
1974	4,691	642	3,878	171
1975	4,235	660	3,420	156
1976	4,590	635	3,790	166
Tr.Qtr.	1,083	154	891	41
1977	4,924	682	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	3,629	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	1,429
1990	9,513[r]	829	7,001[r]	1,683
1991	8,042	827	5,251	1,964
OUTLAYS				
1982[e]	$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	8,907[r]	791	6,807[r]	1,309
1991	8,266	869	5,801	1,597

Source: 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 First year outlays data available.
r Revised.
Tr.Qtr. See Glossary.

FUNDS FOR INDUSTRIAL RESEARCH AND DEVELOPMENT IN THE AEROSPACE INDUSTRY

By Type of Research and Funding Source
Calendar Years 1963–1990
(Millions of Dollars)

Year	TOTAL AEROSPACE	Basic Research			Applied Research			Development		
		Total	Federal Funds	Company Funds	Total	Federal Funds	Company Funds	Total	Federal Funds	Company Funds
1963	$ 4,712	$ 59	$ 31	$ 28	$ 735	$ 585	$ 150	$ 3,917	$ 3,634	$ 283
1964	5,078	67	34	34	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[a]	8,041	86	44	42	880	499	381	7,076	5,314	1,762
1981[a]	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[r]	25,900	366	263	104	2,997	1,915	1,082	22,537	17,700	4,838
1989	25,638	653	537	116	3,065	2,107	957	21,921	16,989	4,932
1990	25,357	645	506	139	3,322	1,928	1,394	21,390	16,783	4,607

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.
NA Not available.
r Revised.

FEDERAL OUTLAYS FOR CONDUCT OF RESEARCH AND DEVELOPMENT[r]

Fiscal Years 1979–1993
(Millions of Dollars)

Year	TOTAL	DOD	NASA	Energy[a]	Other[b]
CURRENT DOLLARS					
1979	$26,325	$11,045	$4,064	$ 4,692	$ 6,524
1980	30,235	13,469	4,711	4,808	7,247
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[E]	70,855	36,934	7,272	11,121	15,528
1993[E]	74,457	38,912	7,710	11,179	16,656
CONSTANT DOLLARS (1987 = 100)[c]					
1979	$40,160	$16,850	$6,200	$ 7,158	$ 9,953
1980	42,163	18,783	6,570	6,705	10,106
1981	43,327	19,958	6,694	5,555	11,120
1982	41,380	21,923	3,844	6,182	9,431
1983	41,189	23,596	2,912	4,577	9,032
1984	45,015	26,194	3,887	4,346	9,242
1985	50,033	29,845	3,147	4,393	9,672
1986	53,798	34,457	3,541	4,109	10,236
1987	53,256	34,732	3,250	3,967	10,012
1988	54,020	34,285	3,690	5,134	10,911
1989	56,041	34,882	4,589	5,240	11,331
1990	56,534	33,886	5,604	5,278	11,767
1991	56,332	30,171	6,039	8,261	11,861
1992[E]	58,679	30,587	6,022	9,210	12,860
1993[E]	59,656	31,177	6,177	8,957	13,345

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.
E Estimate. Latest year reflects Administration's budget proposal.
r Revised using consistent time-series as published in Budget supplement.

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

Fiscal Years 1991–1993
(Millions of Dollars)

	1991	1992[E]	1993[E]
TOTAL—APPROPRIATIONS FOR RDT&E	$34,870	$38,340	$38,813
BY APPROPRIATION			
Army	$ 5,573	$ 6,453	$ 5,414
Navy	7,989	8,550	8,518
Air Force	11,975	13,591	14,532
Defense Agencies	9,082	9,522	10,053
Director of Test & Evaluation, Defense	237	210	282
Director of Operational Test & Evaluation, Defense	14	13	13
BY RESEARCH CATEGORIES			
Research	$ 1,157	$ 1,024	$ 1,124
Exploratory Development	2,730	2,892	2,986
Advanced Development	10,769	10,642	11,373
Engineering Development	8,702	10,302	8,994
Management and Support	2,866	2,886	2,899
Operational Systems Development	8,646	10,593	11,436
RECAP OF BUDGET ACTIVITIES			
Technology Base	$ 3,886	$ 3,914	$ 4,084
Advanced Technology Development	5,298	6,471	7,682
Strategic Programs	4,375	4,312	4,647
Tactical Programs	12,611	14,530	13,241
Intelligence and Communications	4,471	5,201	5,011
Defensewide Mission Support	4,230	3,912	4,147
RECAP OF FYDP PROGRAMS			
Strategic Force	$ 831	$ 535	$ 394
General Purpose Forces	2,050	2,635	2,925
Intelligence and Communications	5,241	7,029	7,653
Airlift/Sealift	13	11	20
Research and Development (FYDP Program 6)	26,224	27,747	27,376
Central Supply and Maintenance	306	109	172
Administration and Associated Activities	9	5	5
Support of Other Nations	6	3	4
Special Operations Forces	191	265	263

Source: Department of Defense Budget, "R,D,T&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 1972–1993
(Millions of Dollars)

Year	TOTAL, All RDT&E 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[E]	36,145	12,773	7,959	5,844	9,554
1993[E]	37,914	14,063	8,165	5,675	9,998

Source: Office of Management and Budget, "The Budget of the United States Government" (Annually).
E 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 1987–1991
(Millions of Dollars)

Program Categories	1987	1988	1989	1990	1991
TOTAL—RDT&E	$21,809	$22,543	$23,206	$22,319	$20,898
Research	1,730	1,444	1,429	994	1,063
Exploratory Development	1,524	1,623	1,581	1,813	2,288
Other Development	17,964	18,937	18,966	18,697	16,424
Management & Support	592	538	1,230	815	1,124
Aircraft—TOTAL	$ 3,561	$ 5,055	$ 4,689	$ 4,364	$ 3,143
Research	437	139	11	(191)	13
Exploratory Development	103	125	85	82	83
Other Development	3,007	4,777	4,563	4,431	3,002
Management & Support	14	14	30	42	45
Missile and Space Systems—TOTAL	7,943	7,800	6,962	6,865	6,649
Research	64	106	260	175	95
Exploratory Development	356	340	331	308	710
Other Development	7,401	7,218	6,277	6,291	5,759
Management & Support	122	135	95	91	86
Electronics & Communications Equipment—TOTAL	4,637	3,854	3,744	3,925	3,814
Research	162	137	182	188	127
Exploratory Development	280	251	289	327	299
Other Development	4,117	3,417	3,190	3,337	3,323
Management & Support	79	49	83	73	64
All Other—TOTAL[a]	5,668	5,834	7,811	7,165	7,292
Research	1,067	1,062	976	822	827
Exploratory Development	785	907	876	1,097	1,196
Other Development	3,439	3,525	4,936	4,637	4,341
Management & Support	377	340	1,022	609	928

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 1991

REGION	TOTAL	Type of Contractor		
		Educational Institutions	Other Non-Profit Institutions[a]	Business Firms
TOTAL—Millions of Dollars	$20,268	$504	$2,043	$17,721
New England	$ 1,804	$ 45	$ 676	$ 1,082
Middle Atlantic	3,233	88	104	3,041
East North Central	1,328	56	70	1,202
West North Central	659	10	5	644
South Atlantic	3,298	82	612	2,604
East South Central	596	18	3	576
West South Central	1,271	21	48	1,202
Mountain	2,509	87	2	2,420
Pacific[b]	5,570	98	522	4,950
PERCENT OF TOTAL	100.0%	100.0 %	100.0%	100.0%
New England	8.9%	9.0 %	33.1%	6.1%
Middle Atlantic	16.0	17.4	5.1	17.2
East North Central	6.6	11.0	3.4	6.8
West North Central	3.3	2.0	0.2	3.6
South Atlantic	16.3	16.2	30.0	14.7
East South Central	2.9	3.5	0.1	3.2
West South Central	6.3	4.1	2.4	6.8
Mountain	12.4	17.3	0.1	13.7
Pacific[b]	27.5	19.4	25.6	27.9

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[a]
By Agency and Model
Fiscal Years 1991, 1992, and 1993
(Millions of Dollars)

Agency and Model	1991	1992[E]	1993[E]
AIR FORCE			
ACM	$ 51.8	$ 28.6	$ 82.3
AGM-130	14.4	24.7	8.2
AMRAAM[b]	21.6	32.9	38.3
Peacekeeper (M-X)	371.7	2.9	1.0
*Small ICBM	87.8	—	—
SRAM II	144.5	—	—
*SRAM-T	26.7	—	—
NAVY			
*AAAM	$101.0	$ 88.5	$ —
HARM	—	4.0	—
Harpoon	2.1	—	—
Standard	48.0	36.5	34.9
Tomahawk	12.2	33.1	3.7
Trident II	68.7	53.3	65.9
ARMY			
AATWS-M	$ 75.9	$119.8	$ 91.4
Avenger	—	2.5	4.8
*BAT	26.8	115.7	121.5
Laser Hellfire	34.4	20.7	5.0
LOSAT	53.4	139.8	122.8
LOS-F-H	94.8	107.3	—
*NLOS/FOG-M	68.3	—	—
Patriot	45.9	37.9	38.4
Stinger	—	3.0	5.2
TOW 2	18.2	33.5	—

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 Administation's budget proposal.
NA Not Available
* Programs in R&D only.

Missile Program Acronyms:

AAAM — Advanced Air-to-Air Missile
ACM — Advanced Cruise Missile
BAT — Brilliant Anti-Tank submunition
HARM — High-speed Anti-Radiation Missile
LOSAT — Line-Of-Sight Anti-Tank
NLOS — Non-Line of Sight
SRAM-T — Short Range Attack Missile–Tactical
TOW — Tube-launched Optically-tracked Wire command link guided missile
AATWS-M — Advanced Anti-Tank Weapon System–Medium
AMRAAM — Advanced Medium Range Air-to-Air Missile
FOG-M — Fiber Optic Guided Missile
ICBM — InterContinential Ballistic Missile
LOS-F-H — Line Of Sight-Forward-Heavy
SRAM — Short Range Attack Missile

MILITARY AIRCRAFT PROGRAMS
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION[a]

By Agency and Model
Fiscal Years 1991, 1992, and 1993
(Millions of Dollars)

Agency and Model	1991	1992[E]	1993[E]
AIR FORCE			
B-1B	$ —	$ 1.4	$ 90.7
B-2 Advanced Technology Bomber	1,715.7	1,546.0	1,261.4
C-17	732.2	372.5	210.0
E-3 AWACS	125.4	205.2	130.9
E-8A JSTARS	216.1	311.3	355.9
F-15E Eagle	66.4	111.7	54.0
F-16 Falcon	26.4	158.3	183.8
*F-22 Lightning (ATF)	943.5	1,621.1	2,224.3
KC-135 Re-engining/modernization	3.5	12.8	16.7
*National Aerospace Plane	161.5	200.0	175.0
T-1A (TTTS)	2.4	4.2	4.7
NAVY			
AH-1W Sea Cobra	$ 14.3	$ 11.3	$ 5.4
AV-8B Harrier	30.2	9.2	11.1
*AX Advanced Strike	137.5	—	165.6
CH/MH-53E Super Stallion	17.7	9.2	12.5
E-2C Hawkeye	35.7	6.3	6.7
EA-6B Prowler	14.3	10.8	23.9
F-14D Tomcat	119.8	115.3	101.2
F/A-18 Hornet	84.3	416.9	1,133.6
*Medium Lift Replacement	—	—	9.7
SH-60B Seahawk (LAMPS MK-III)	16.6	30.1	31.8
SH-60F Carrier ASW	12.0	19.7	40.7
T-45 Goshawk	14.7	23.1	32.0
V-22 Osprey	234.6	790.0	—
ARMY			
*LONGBOW	$ 197.0	$ 232.2	$ 281.8
OH-58D AHIP	21.6	9.3	—
*RAH-66 Comanche	333.7	538.8	443.0
UAVs[b]	91.6	66.9	129.1
SPECIAL OPERATIONS			
MC-130H Combat Talon II	$ 3.6	$ 3.3	$ —
MH-47E	7.4	14.4	0.8
MH-60K	10.4	13.2	0.7

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 Army, Navy, and Air Force funding.
E Estimate. Latest year reflects Administration's budget proposal.
* Programs in R&D only.

The record-breaking pace of U.S. aerospace export growth continued in 1991 as the industry recorded its fifth consecutive trade balance record and its seventh straight export record.

In a year in which the U.S. reduced its merchandise trade deficit to the lowest figure since 1983 ($66.2 billion), U.S. aerospace exports made a very significant contribution by offsetting deficits in other areas of trade. Aerospace exports increased over the previous year by more than 12 percent and reached $43.8 billion, a figure that represented 10.4 percent of all U.S. exports.

On the other side of the coin, aerospace imports continued the steady climb in evidence since 1983 and set an eighth consecutive record at $13 billion, up from $11.8 billion in 1990.

In dollar terms, however, the aerospace export gain ($4.7 billion) far outstripped the import increase ($1.2 billion). The aerospace trade balance, therefore, climbed $3.5 billion to the new all-time high of $30.8 billion.

As is usual, civil aerospace exports accounted for most of the export volume — 81.2 percent of it; the 1991 civil export total of $35.5 billion compares with the previous year's $31.5 billion. In dollar value, well over half of the 1991 civil export total was in commercial transport aircraft ($20.9 billion). Military exports reached a new peak of $8.2 billion, up from $7.6 billion in 1990.

A breakdown of civil exports shows sales of complete aircraft of all types at $22.4 billion (up from

$18.2 billion); aircraft and engine parts at $10.9 billion (down from $11.3 billion); and aircraft engines at $2.1 billion (up from $1.8 billion).

In addition to the $20.9 billion in commercial transport exports, civil aerospace exports included $576 million in general aviation aircraft (up from $555 million); $738 million in used aircraft (up from $712 million); $168 million in

helicopters (up from $161 million); and $176 million (down from $360 million) in a category listed as "Other, including spacecraft."

The military export total of $8.2 billion included $1.8 billion in complete aircraft (up from $1.5 billion); $1.2 billion in guided missiles, rockets, & parts (down from $1.3 billion); $4.9 billion in aircraft and engine parts (up from $4.3 billion); and $206 million in aircraft engines (up from $203 million).

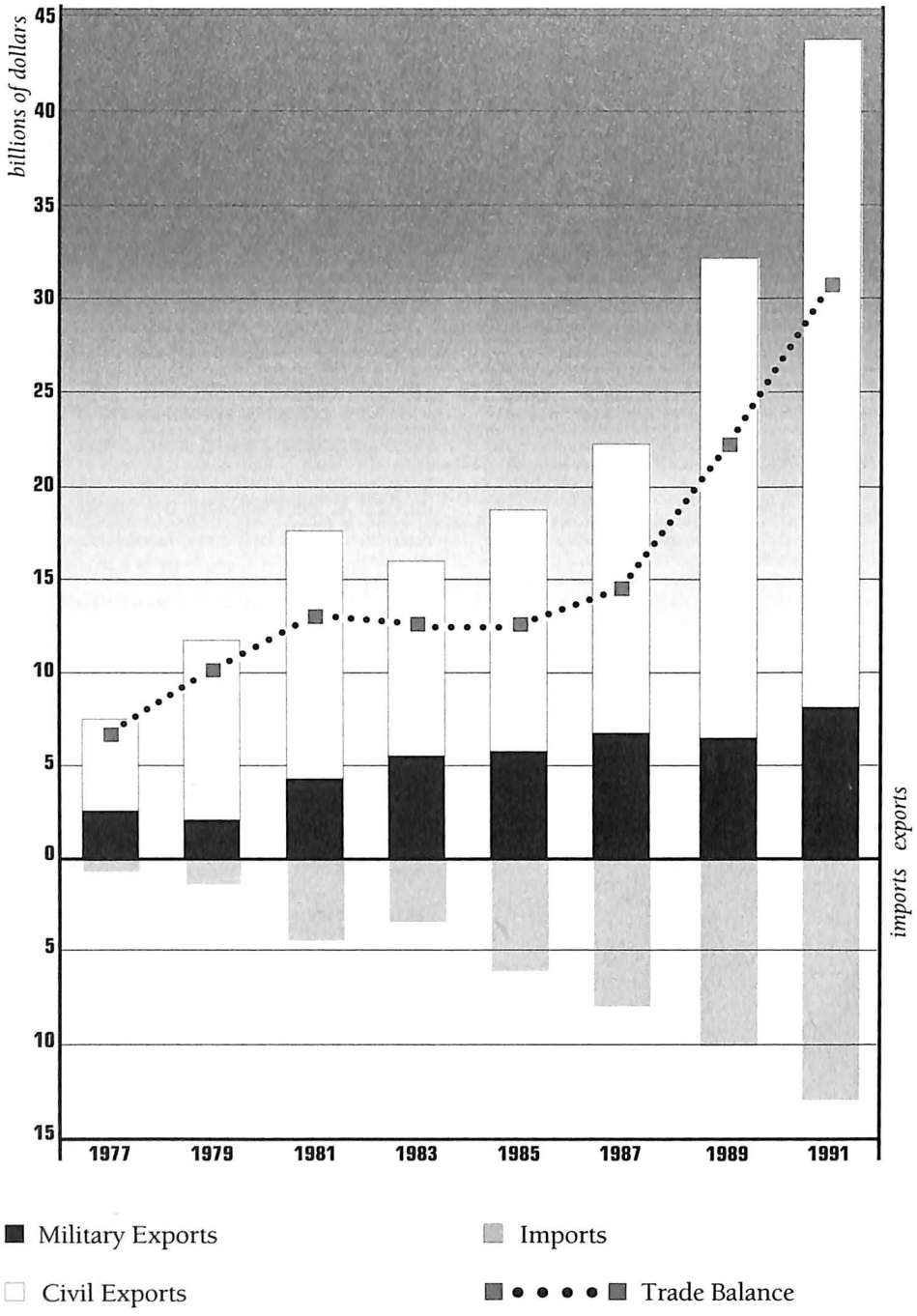
Civil products totaling $9.3 billion accounted for 71.3 percent of all aerospace imports. The breakdown: complete aircraft, $3.4 billion; aircraft and engine parts, $4.6 billion; aircraft engines, $1.2 billion. Military imports totaled $3.7 billion, up from $3.6 billion; they included $2.5 billion in aircraft and engine

parts, $1.2 billion in aircraft engines and $26 million in complete aircraft.

The principal customers for U.S. aerospace exports in 1991 were France, which bought products valued at $4.4 billion; the United Kingdom ($4 billion); Germany ($3.9 billion); Japan ($3.9 billion); Canada ($2.2 billion); South Korea ($1.7 billion); Australia ($1.6 billion); Brazil ($1.5 billion); and The Netherlands ($1.5 billion).

France ($3.6 billion), Canada ($2.7 billion) and the United Kingdom ($2.5 billion) accounted for more than two-thirds of all aerospace imports into the U.S.

Aerospace Exports, Imports, and Trade Balance



Source: Aerospace Industries Association

U.S. TOTAL AND AEROSPACE FOREIGN TRADE[a]

Calendar Years 1964–1991
(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)[b]	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	(101,010)	393,893	494,903	27,282	39,083	11,801
1991	(66,204)	421,851	488,055	30,785	43,788	13,003

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.

U.S. EXPORTS OF AEROSPACE PRODUCTS[a] BY MAJOR COUNTRIES OF DESTINATION

Calendar Years 1987–1991
(Millions of Dollars)

Major Countries of Destination	1987	1988	1989	1990	1991
Australia	$1,036	$1,208	$1,271	$1,760	$1,596
Belgium/Luxembourg	373	348	538	681	825
Brazil	912	942	813	925	1,491
Canada	1,103	1,804	2,137	2,237	2,210
China	528	425	664	861	1,244
France	1,382	2,074	2,764	3,299	4,359
Germany, West	1,274	1,415	3,134	2,798	3,936
Hong Kong	351	166	381	587	759
Israel	487	454	453	503	738
Italy	455	578	625	737	1,051
Japan	2,313	2,710	2,700	4,185	3,907
Korea, South	343	823	1,257	1,113	1,715
Netherlands	565	744	1,448	1,613	1,458
Singapore	498	505	1,133	844	1,278
Spain	447	691	1,104	1,198	972
Sweden	307	627	815	952	1,081
Switzerland	334	294	458	283	1,226
Taiwan	153	164	460	732	1,324
Thailand	381	148	210	552	865
United Kingdom	2,297	2,908	3,520	4,966	3,961

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.

U.S. IMPORTS OF AEROSPACE PRODUCTS[a] BY MAJOR COUNTRIES OF ORIGIN

Calendar Years 1987–1991
(Millions of Dollars)

Major Countries of Origin	1987	1988	1989	1990	1991
Brazil	$ 122	$ 183	$ 204	$ 360	$ 186
Canada	1,821	1,985	1,918[r]	2,529[r]	2,732
France	1,976	2,932	3,290	2,782[r]	3,557
Germany, West	347	396	419	712[r]	523
Israel	208	178	186[r]	226[r]	289
Italy	266	339	300	418	598
Japan	319	426	474	566[r]	661
Netherlands	127	141	255	368	761
Sweden	278	246	257[r]	317	332
United Kingdom	2,004	1,738	2,055[r]	2,695[r]	2,492

Source: U.S. Department of Commerce, International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
a Includes civil and military products, c.i.f. (Cost, Insurance, and Freight) basis.
r Revised.

U.S. IMPORTS OF AEROSPACE PRODUCTS

Calendar Years 1988–1991
(Millions of Dollars)

Aerospace Imports	1988	1989	1990	1991
TOTAL	$9,087	$10,028	$11,801	$13,003
TOTAL CIVIL	$7,604	$ 7,200	$ 8,251	$ 9,268
Complete Aircraft—TOTAL	$2,702	$ 2,788	$ 2,794	$ 3,413
Transports	1,125	1,282	737	1,285
General Aviation	1,369	1,113	1,581	1,567
Helicopters	104	109	162	289
Other, Including Used Aircraft, & Gliders, Balloons, & Airships	103	285[a]	314[a]	272[a]
Aircraft Engines—TOTAL	951	999	1,234	1,226
Turbine Engines	951	961[b]	1,204[b]	1,185[b]
Piston Engines	—	38	31	42
Aircraft & Engine Parts—TOTAL	3,951	3,414	4,222	4,629
Aircraft Parts and Accessories	2,585	2,305[b]	2,751[b]	3,166[b]
Turbine Engine Parts	1,323	924[b]	1,147[b]	1,279[b]
Piston Engine Parts	14	136	57	43
Spacecraft, Other Parts & Accessories[c]	29	50	267	141
TOTAL MILITARY	$1,483	$ 2,828	$ 3,550	$ 3,735
Complete Aircraft—TOTAL	$ 2	$ 17	$ 44	$ 26
Aircraft Engines—TOTAL	106	971	1,217	1,203
Turbine Engines	101	961[b]	1,204[b]	1,185[b]
Piston Engines Including Parts	5	10	13	18
Aircraft & Engine Parts—TOTAL	1,376	1,841	2,290	2,507
Aircraft Parts	869	797[b]	858[b]	1,033[b]
Turbine Engine Parts	480	881[b]	1,088[b]	1,238[b]
Spacecraft, Missiles, Rockets, Other Parts, & Accessories[c]	27	162[b]	343[b]	236[b]

Source: Aerospace Industries Association, based on data from International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
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. IMPORTS OF COMPLETE AIRCRAFT

Calendar Years 1988–1991

Aircraft Imports	1988	1989	1990	1991
TOTAL NUMBER OF AIRCRAFT ...	737	702[r]	848	1,036
Civil Aircraft—TOTAL	706	673[r]	820	955
New Complete Aircraft:				
Helicopters	114	124	167	244
General Aviation:				
Single-Engine	40	53	80	72
Multi-Engine, Under 4,400 lbs	3	1	5	1
Multi-Engine, 4,400-10,000 lbs ...	74	32	53	41
Multi-Engine, Turbojet/Turbofan, 10,000-33,000 lbs	74	39	63	45
Multi-Engine, Other, Including Turboshaft, 10,000-33,000 lbs ..	78	87	100	95
Transports, Multi-Engine, Over 33,000 lbs	18	36	30	44
Other Civil Aircraft:				
Used or Rebuilt	194	210	130	246
Aircraft Previously Exported from U.S.	NA	NA	NA	NA
Gliders	111	76[a]	184[a]	140[a]
Balloons & Airships	NA	15[a]	8[a]	27[a]
Military Aircraft—TOTAL	31	29[b]	28	81[b]
New Complete Aircraft	27	25	28	8
Gliders	4	(a)	(a)	(a)
Balloons & Airships	NA	(a)	(a)	(a)

(Continued on next page)

U.S. IMPORTS OF COMPLETE AIRCRAFT
(Continued)

Aircraft Imports	1988	1989	1990	1991
VALUE (Millions of Dollars)	$2,703.3	$2,804.5	$2,838.3	$3,438.1
Civil Aircraft—TOTAL	$2,701.5	$2,788.1	$2,794.2	$3,412.7
New Complete Aircraft:				
Helicopters	103.9	108.7	162.4	288.8
General Aviation:				
Single-Engine	4.5	6.7	9.0	23.4
Multi-Engine, Under 4,400 lbs	6.5	0.1	1.3	0.0
Multi-Engine, 4,400-10,000 lbs	163.6	119.1	217.3	176.3
Multi-Engine, Turbojet/Turbofan, 10,000-33,000 lbs	729.1	372.0	643.6	526.9
Multi-Engine, Other, Including Turboshaft, 10,000-33,000 lbs	465.3	614.9	709.9	840.3
Transports, Multi-Engine, Over 33,000 lbs	1,125.4	1,281.8	737.0	1,285.3
Other Civil Aircraft:				
Used or Rebuilt	92.0	236.7	292.4	269.5
Aircraft Previously Exported from U.S.	0.1	48.8	0.4	—
Gliders	0.5	0.3[a]	0.8[a]	0.9[a]
Balloons & Airships	10.8	0.6[ar]	2.3[a]	1.3[a]
Military Aircraft—TOTAL	$ 1.8	$ 16.5[b]	$ 44.2	$ 25.5[b]
New Aircraft	1.6	16.4	44.2	21.0
Gliders	0.1	(a)	(a)	(a)
Balloons & Airships	0.1	(a)	(a)	(a)

Source: Aerospace Industries Association, based on data from International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
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.
r Revised.

TOTAL U.S. EXPORTS AND EXPORTS OF AEROSPACE PRODUCTS

Calendar Years 1964–1991
(Millions of Dollars)

Year	TOTAL Exports of U.S. Merchandise[a]	Exports of Aerospace Products				
		TOTAL	Percent of Total U.S. Exports	Civil		Military
				Total	Trans-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	393,893	39,083	9.9	31,517	16,691	7,566
1991	421,851	43,788	10.4	35,548	20,881	8,239

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.

U.S. EXPORTS OF AEROSPACE PRODUCTS

Calendar Years 1988–1991
(Millions of Dollars)

Aerospace Exports	1988	1989	1990	1991
TOTAL	$26,947	$32,111	$39,083	$43,788
TOTAL CIVIL	$20,297	$25,619	$31,517	$35,548
Complete Aircraft—TOTAL	$10,294	$13,447	$18,150	$22,385
Transports	8,766	12,313	16,691	20,881
General Aviation[a]	348	413	555	576
Helicopters	219	156	161	168
Used Aircraft	639	533	712	738
Other, Incl. Spacecraft	323	217[b]	360[b]	176[b]
Aircraft Engines—TOTAL	1,570	1,948	1,754	2,127
Turbine Engines	1,492	1,856	1,679	2,050
Piston Engines	78	93	75	77
Aircraft and Engine Parts Incl. Spares—TOTAL	8,432	10,019	11,257	10,878
Aircraft Parts & Accessories	5,442	6,258	6,964	6,859
Aircraft Engine Parts	2,990	3,761	4,293	4,018
TOTAL MILITARY	$ 6,651	$ 6,492	$ 7,566	$ 8,239
Complete Aircraft—TOTAL[c]	$ 2,157	$ 892	$ 1,481	$ 1,788
Fighters & Fighter Bombers	1,469	368	533	323
Transports	212	234	432	633
Helicopters	198	180	381	587
Used Aircraft	59	56	75	146
Other, Incl. Spacecraft	219	246[b]	391[b]	253[b]
Aircraft Engines—TOTAL	223	236	203	206
Turbine Engines	213	198	168	171
Piston Engines	10	38	35	35
Aircraft and Engine Parts Incl. Spares—TOTAL	3,214	4,134	4,261	4,891
Aircraft Parts & Accessories	2,546	3,450	3,640	4,202
Aircraft Engine Parts	668	684	622	689
Guided Missiles, Rockets, & Parts—TOTAL	1,056	1,037	1,290	1,200
Guided Missiles & Rockets	383	375	551	298
Missile & Rocket Parts	622	656	724	899
Missile & Rocket Engines	30	6	15	3
Missile & Rocket Engine Parts	21	—	—	—

Source: Aerospace Industries Association, based on data from International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
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.
c Includes aircraft exported under Military Assistance Programs and Foreign Military Sales.

U.S. EXPORTS OF CIVIL AIRCRAFT

Calendar Years 1987–1991

Civil Aircraft Exports	1987	1988	1989	1990	1991
TOTAL NUMBER OF AIRCRAFT	1,811	2,784	3,564[b]	3,375[b]	3,071[b]
Helicopters—TOTAL	242	280	294	349	318
Under 2,200 lbs	115	161	186	266	246
Over 2,200 lbs	127	119	108	83	72
General Aviation—TOTAL	487	643	1,310	809	534
Single-Engine	295	459	1,119	561	345
Multi-Engine, Under 4,400 lbs	51	51	39	33	22
Multi-Engine, 4,400-10,000 lbs	126	109	104	136	98
Multi-Engine, 10,000-33,000 lbs	15	24	48	79	69
Transports—TOTAL	170	217	260	306	385
Passenger Aircraft, Over 33,000 lbs	160	205	256	294	371
Cargo Aircraft, Over 33,000 lbs	4	8	1	3	5
Other, Over 33,000 lbs, Incl. Pass./Cargo Combi	6	4	3	9	9
Other Aircraft—TOTAL	912	1,644	1,700[b]	1,911[b]	1,834[b]
Used or Rebuilt Aircraft	912	1,644	1,700	1,911	1,834
Other Aircraft, Including Balloons, Gliders, & Kites[a]	NA	NA	2,888	1,448	1,133
TOTAL VALUE (Millions of Dollars)	$7,518	$10,296	$13,447	$18,150	$22,385
Helicopters—TOTAL	$ 201	$ 219	$ 156	$ 161	$ 168
Under 2,200 lbs	27	30	29	39	40
Over 2,200 lbs	174	189	127	123	129
General Aviation—TOTAL	295	348	413	555	576
Single-Engine	26	47	56	44	40
Multi-Engine, Under 4,400 lbs	8	12	9	10	8
Multi-Engine, 4,400-10,000 lbs	219	239	184	256	249
Multi-Engine, 10,000-33,000 lbs	42	49	164	245	279
Transports—TOTAL	6,377	8,766	12,313	16,691	20,881
Passenger Aircraft, Over 33,000 lbs	5,635	7,770	11,859	15,307	19,349
Cargo Aircraft, Over 33,000 lbs	208	599	90	264	405
Other, Over 33,000 lbs, Incl. Pass./Cargo Combi	534	396	364	1,121	1,127
Other Aircraft—TOTAL	645	963	560	742	760
Used or Rebuilt Aircraft	503	639	533	712	738
Other Aircraft, Including Balloons, Gliders, & Kites[a]	141	323	33	30	23

Source: Aerospace Industries Association, based on data from International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
a Included spacecraft until 1989.
b Numbers of gliders, balloons, & kites excluded from civil aircraft totals.
NA Not available.

U.S. EXPORTS OF CIVIL HELICOPTERS[a]

Calendar Years 1987–1991

Region of Destination	1987	1988	1989	1990	1991
TOTAL NUMBER EXPORTED	242	280	294	349	318
Canada & Greenland	13	17	11	11	20
Latin America & Caribbean	42	25	54	46	45
Europe	97	131	170	140	125
Middle East	10	15	6	1	2
Asia	46	52	51	65	66
Oceania	27	31	33	68	38
Africa	7	9	9	18	22
TOTAL VALUE (Millions of Dollars)	$200.5	$218.6	$155.5	$161.2	$168.4
Canada & Greenland	$ 4.9	$ 5.2	$ 2.6	$ 5.1	$ 7.9
Latin America & Caribbean	47.8	24.5	39.7	20.1	19.6
Europe	37.7	36.0	37.1	46.8	56.3
Middle East	53.1	70.6	5.4	3.6	16.5
Asia	47.0	68.1	60.0	71.3	59.2
Oceania	6.1	10.3	9.2	8.7	5.7
Africa	4.0	3.9	1.6	5.6	3.1

Source: Aerospace Industries Association, based on data from the International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
a Excludes used helicopters.

U.S. IMPORTS OF CIVIL HELICOPTERS[a]

Calendar Years 1987–1991

Country of Origin	1987	1988	1989	1990	1991
TOTAL NUMBER IMPORTED	98	114	124	167	243
Canada	32	33	52	82	146
France	29	30	45	49	57
Germany	33	43	25	25	30
Italy	4	7	2	11	10
United Kingdom	—	1	—	—	—
TOTAL VALUE (Millions of Dollars)	$79.3	$103.9	$108.7	$162.4	$288.2
Canada	$18.9	$ 21.5	$ 44.5	$ 86.3	$182.1
France	24.0	21.6	32.0	29.9	53.6
Germany	31.2	50.1	28.9	34.9	35.6
Italy	5.2	10.5	3.3	11.3	16.9
United Kingdom	—	0.2	—	—	—

Source: Aerospace Industries Association, based on data from the International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
a Excludes used helicopters.

U.S. EXPORTS OF GENERAL AVIATION AIRCRAFT[a]

Calendar Years 1987–1991

Region of Destination	1987	1988	1989	1990	1991
TOTAL NUMBER EXPORTED	487	643	1,310	809	534
Canada & Greenland	25	14	35	34	9
Latin America & Caribbean	93	100	155	133	80
Europe	213	322	634	379	317
Middle East	27	2	7	15	11
Asia	67	50	154	55	54
Oceania	33	125	164	72	18
Africa	29	30	161	121	45
TOTAL VALUE (Millions of Dollars)	$295.1	$347.7	$413.1	$554.9	$576.0
Canada & Greenland	$ 12.0	$ 12.8	$ 11.7	$ 41.7	$ 31.2
Latin America & Caribbean	51.4	114.0	120.4	152.8	142.9
Europe	148.6	126.7	168.0	197.1	253.1
Middle East	1.6	0.1	4.7	18.1	21.7
Asia	49.8	38.7	43.0	47.9	95.0
Oceania	3.4	35.8	18.0	22.0	6.9
Africa	28.4	19.6	47.4	75.3	25.2

Source: Aerospace Industries Association, based on data from the International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
a All fixed-wing aircraft under 33,000 pounds.

U.S. IMPORTS OF GENERAL AVIATION AIRCRAFT[a]

Calendar Years 1987–1991

Country of Origin	1987	1988	1989	1990	1991
TOTAL NUMBER IMPORTED	278	269	212	301	254
Brazil	20	30	30	51	24
Canada	34	40	31	32	42
France	76	60	65	93	92
Israel	8	5	8	12	8
Japan	12	29	—	—	—
United Kingdom	80	64	49	77	48
Other	48	41	38	36	40
TOTAL VALUE (Millions of Dollars)	$1,337.0	$1,369.0	$1,112.8	$1,581.2	$1,566.8
Brazil	$ 97.8	$ 163.8	$ 175.6	$ 306.9	$ 152.2
Canada	209.6	268.6	275.2	354.7	469.8
France	510.5	532.7	335.0	336.2	469.9
Israel	30.7	24.6	41.5	70.6	51.7
Japan	12.6	23.9	—	—	—
United Kingdom	301.9	271.7	212.7	414.6	276.9
Other	173.9	83.7	72.8	98.1	146.3

Source: Aerospace Industries Association, based on data from the International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
a All fixed-wing aircraft under 33,000 pounds.

U.S. EXPORTS OF COMMERCIAL TRANSPORT AIRCRAFT[a]

Calendar Years 1987–1991

Region of Destination	1987	1988	1989	1990	1991
TOTAL NUMBER EXPORTED	170	217	260	306	385
Canada & Greenland	—	10	9	4	3
Latin America & Caribbean	20	15	28	25	32
Europe	88	127	151	172	228
Middle East	7	4	8	9	16
Asia	40	41	47	70	83
Oceania	8	11	8	16	14
Africa	7	9	9	10	9
TOTAL VALUE (Millions of Dollars)	$6,377	$8,766	$12,313	$16,691	$20,881
Canada & Greenland	$ —	$ 547	$ 535	$ 309	$ 221
Latin America & Caribbean	725	669	726	1,001	1,472
Europe	2,753	3,944	6,335	8,166	10,461
Middle East	185	227	631	440	648
Asia	2,263	2,404	2,951	5,010	6,382
Oceania	289	503	640	1,256	1,177
Africa	162	471	496	509	520

Source: Aerospace Industries Association, based on data from the International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
a Airframe weight exceeding 33,000 pounds.

U.S. EXPORTS OF MILITARY AIRCRAFT[a]

Calendar Years 1987–1991

	1987	1988	1989	1990	1991
TOTAL NUMBER OF AIRCRAFT	492	743	846	445	490
Fighters and Fighter Bombers	22	87	32	39	16
Transports	99	14	74	43	40
Helicopters	39	53	36	47	72
New Aircraft, NEC[b]	218	464	505	259	235
Used or Rebuilt Aircraft	14	125	199	57	127
Airships, Balloons, Gliders, etc.	NA	NA	NA	NA	NA
TOTAL VALUE (Millions of Dollars)	$2,628	$2,157	$892	$1,481	$1,783
Fighters and Fighter Bombers	$1,986	$1,469	$368	$ 533	$ 323
Transports	363	212	234	432	633
Helicopters	81	198	180	381	587
New Aircraft, NEC[b]	135	173	53	61	98
Used or Rebuilt Aircraft	4	59	56	75	142
Airships, Balloons, Gliders, etc.	59	46	—[c]	—[c]	—[c]

Source: Aerospace Industries Association, based on data from the International Trade Administration.
NOTE: International trade reported using Harmonized Tariff Schedules after 1988.
a Includes aircraft exported under Military Assistance Programs and Foreign Military Sales.
b Includes spacecraft until 1989.
c Products within this category are not designated civil or military by the Harmonized Tariff Schedules. Historically, these products have been predominantly civil.
NA Not available.
NEC Not elsewhere classified.

U.S. EXPORTS OF AIRCRAFT ENGINES

Calendar Years 1989–1991
(Values in Millions of Dollars)

	1989		1990		1991	
	Number	Value	Number	Value	Number	Value
TOTAL	12,570	$2,184	9,419	$1,957	10,651	$2,333
Turbine Engines	3,917	$2,053	3,008	$1,846	3,199	$2,221
Civil	3,031	1,856	2,277	1,679	2,114	2,050
Military	886	198	731	168	1,085	171
Piston Engines	8,653	131	6,411	110	7,452	112
Civil, New, Under 500 HP	1,964	19	1,108	15	1,168	17
Civil, New, Over 500 HP	423	13	256	10	76	4
Civil, Used	4,036	70	3,183	50	3,486	56
Military	2,230	38	1,864	35	2,722	35

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

U.S. IMPORTS OF AIRCRAFT ENGINES[a]

Calendar Years 1989–1991
(Values in Millions of Dollars)

	1989		1990		1991	
	Number	Value	Number	Value	Number	Value
Turbine Engines	2,283	$1,921	5,007	$2,408	2,032	$2,370
Piston Engines	3,562	43	3,152	36	9,379	53
Military	1,079	6	251	5	6,648	12
Civil, New, Small	1,500	3	2,070	5	2,085	3
Civil, New, Large	729	18	136	15	29	29
Civil, Used	254	17	695	11	617	9

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

EXPORT-IMPORT BANK LENDING AUTHORITY AND GROSS AUTHORIZATIONS SUMMARY

Fiscal Years 1981–1992
(Millions of Dollars)

LOANS

Year	Lending Authority	Authorizations Summary		
		Direct Loans[a]		
		TOTAL	Direct Credits	Other [b]
1981	$ 5,461	$ 5,431	$5,079[c]	$ 352
1982	4,400	3,516	3,104	412
1983	4,400	845	685	160
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	719	517	202
1990	614	614	318	296
1991	750	604	410	194
1992[E]	800	NA	NA	NA

GUARANTEES AND INSURANCE

Year	Lending Authority	Authorizations Summary		
		TOTAL	Guarantees	Insurance
1981	$ 8,059	$ 7,416	$1,506	$5,910
1982	9,220	5,832	727	5,105
1983	9,000	8,525	1,741	6,784
1984	10,000	7,151	1,333	5,818
1985	10,000	7,850	1,320	6,530
1986	11,484[d]	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	10,599	10,587	6,034	4,553
1992[E]	8,610	NA	NA	NA

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 Includes $34 million from the Cooperative Financing Facility program discontinued after 1981.
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.
E Estimate. Latest year represents Administration's budget proposal.
NA Not available.

EXPORT-IMPORT BANK
TOTAL AUTHORIZATIONS OF LOANS AND GUARANTEES AND AUTHORIZATIONS IN SUPPORT OF AIRCRAFT EXPORTS

Fiscal Years 1979–1991
(Millions of Dollars)

Year	TOTAL AUTHORIZATIONS	Authorizations in Support of Aircraft Exports			
		TOTAL	Percent of TOTAL Authorizations	Commercial Jet Aircraft[a]	Other Aircraft[b]
LOANS[c]					
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	604	—	—	—	—
GUARANTEES[d]					
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	288.9	33.5
1986	1,128	329.2	29.2	277.4	51.8
1987	1,506	808.3	53.4	808.3	—
1988	601	89.2	14.8	73.4	15.8
1989	1,292[r]	496.4	38.4	390.4	106.0
1990	3,333	1,666.3	50.0	224.7	1,441.6
1991	6,016	606.0	10.1	566.0	40.0

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 Export-Import Bank to foreign buyers of U.S. equipment and services, including Direct Credits, loans authorized under the Cooperative Financing Facilty (CFF), (until the termination of the CFF program in 1981), and Discount Loans, 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 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[a] AND GUARANTEES[b]

Fiscal Years 1957–1991
(Values in Millions of Dollars)

Year	No. of Jet Aircraft[c]		Export Value[c]		No. of New Commitments		Gross Authorizations	
	Loans	Guarantees	Loans	Guarantees	Loans	Guarantees	Loans	Guarantees
New Authorizations:								
1957[d]-1973	919	92	$ 9,374	$ 615	321	215	$ 3,961	$1,201
1974	189	—	2,195	—	79	22	895	133
1975	136	1	2,070	5	64	10	691	64
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	—	97	—	2	—	73
1989	3	5	253	459	1	2	158	390
1990	—	6	—	264	—	2	—	225
1991	—	12	—	657	—	3	—	566
Cumulative New Authorizations	1,846	282	$29,776	$8,210	654	378	$13,353	$7,376
Transfers, Reversals, & Participation	—	—	(8)	8	4	—	(140)	(20)
Cumulative Gross Authorizations (net of Adjustments)	1,846	282	$29,767	$8,875	658	378	$13,213	$7,357

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, including Direct Credits and loans authorized under the Cooperative Financing Facility (CFF) until the termination of the CFF program in 1981, but excluding Discount Loans, 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.

Tr.Qtr. See Glossary.

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

Fiscal Years 1987–1991
(Values in Millions of Dollars)

Customer (Country/Airline)	Number and Aircraft Model or Related Product	Export Value	Authorization				
			Loans (Direct Credits)				Guarantees
			Amount	Percent Coverage[a]	Interest Rate	Repayment Terms[b]	Amount
FY 1991							
TOTALS	12 aircraft	$ 657	—	—	—	—	$566
Bahrain/Gulf Air Co.	6 x 767	427	—	—	—	—	366
Greece/Olympic Airways	6 x 737	230	—	—	—	—	200
FY 1990							
TOTALS	6 aircraft	$ 264	—	—	—	—	$225
Columbia/Avianca	2 x 767	150	—	—	—	—	128
Morocco/Royal Air Maroc	4 x 737	114	—	—	—	—	97
FY 1989							
TOTALS	8 aircraft	$ 712	$293	—	—	—	$605
Algeria/Algerie Air	3 x 737	252	158	62.5	8.95%	24-S	215
Yugoslavia/Jugoslovenski Aerotransport	3 x MD-11	300	—	—	—	—	255
Zimbabwe/Government of	2 x 747	158	135	85.0	9.68%	24-S	135

(Continued on next page)

EXPORT-IMPORT BANK LOAN AND GUARANTEE AUTHORIZATIONS (Continued)

Customer (Country/Airline)	Number and Aircraft Model or Related Product	Export Value	Authorization				
			Loans (Direct Credits)				Guarantees
			Amount	Percent Coverage[a]	Interest Rate	Repayment Terms[b]	Amount
FY 1988							
TOTALS	2 aircraft	$ 94	—	—	—	—	$ 76
Bangladesh/Bangladesh Biman Corp.	1 x DC-10-30	67	—	—	—	—	50
Israel/El Al	1 x 757	27	—	—	—	—	22
Uganda/Uganda Airlines	707 Hushkit	3	—	—	—	—	3
FY 1987							
TOTALS	32 aircraft	$1,411	$ 7	—	—	—	$768
Brazil/VARIG	6 x 767	324	—	—	—	—	275
Israel/El Al	2 x 757	59	—	—	—	—	50
Japan/All Nippon	15 x 767	857	—	—	—	—	300
Mauritius/Air Mauritius	2 x 767	5	—	—	—	—	5
Mauritius/ Air Mauritius	spare parts for 2 x 767	16	7	42.5	9.10%	20-S	7
Nepal/Royal Nepal Airlines	2 x 757	76	—	—	—	—	64
Yugoslavia/Jugoslovenski Aerotransport	2 x 737	53	—	—	—	—	45
Yugoslavia/Aviogenex	2 x 737	18	—	—	—	—	14
Yugoslavia/Aviogenex	1 x 737	19	—	—	—	—	15

Source: Aerospace Industries Assocation, 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).

The aerospace employment decline that began in 1990 accelerated sharply in 1991 as continuing reductions in defense funding intensified the impact on the industry's workforce.

The aerospace labor force suffered the loss of 87,000 jobs in 1991 as average annual employment plunged from 1,303,000 to 1,216,000. This was the largest single-year drop since the aerospace recession that began in 1970.

The 1991 employment figure represented 6.6 percent of the total employment in all U.S. manufacturing industries, down from 6.8 percent in the previous year. It also represented 11.5 percent of the total employed by U.S. companies producing durable goods; the comparable figure for 1990 was 11.7 percent.

As might be expected, the largest number of reductions came from the segment of the labor force engaged in manufacture of aircraft, engines and parts, which traditionally accounts for more than half of total industry employment. Annual average employment in that category was 671,000, down 41,000 from 1990's 712,000. The aircraft category nonetheless amounted to 55.2 percent of the total, an increase from 54.6 percent in the previous year.

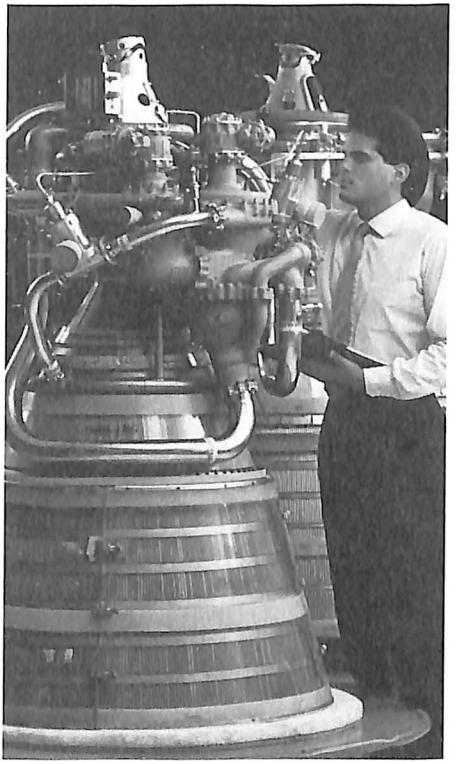
Employment averaged 167,000 (down 18,000) in the industry segment producing missiles and space vehicles. Average employment for all other categories fell from 405,000 in 1990 to 378,000 in 1991.

The number of production workers declined by slightly more than seven percent, from 432,000 in 1990 to 401,000 in 1991. In aircraft, engine and parts

manufacture, production workers numbered 324,000, roughly 80 percent of the industry total. The number was 48,000 in missiles/space fabrication and 28,000 in the "other" category.

At $34.7 billion, the industry's annual payroll was down 3.1 percent from 1990's $35.9 billion; both figures include lump sum payments made by many aerospace companies in lieu of general wage or cost of living increases. The aerospace payroll represented 6.4 percent of combined payroll outlays by all U.S.manufacturing industries; the comparable figure for 1990 was 6.6 percent.

Average weekly earnings in the industry — again including lump sum payments — came to $657, up from $637 dollars in 1990. Average hourly earnings amounted to $15.72, up from $15.04. The average work week was 41.8 hours, compared with 42.3 hours during the previous year.



As is usual, the Pacific region dominated in a yearend geographic breakdown of aerospace employment. Pacific led the eight geographic regions with 40.5 percent of the industry's employment. New England, at 10.9 percent, placed second and the West North Central region (10.2 percent) was third. Next, in order, were South Atlantic (9.2 percent), South Central (8.5 percent), East North Central (7.6 percent), Middle Atlantic (7.3 percent) and Mountain (5.8 percent).

The Pacific region also dominated in all product group breakdowns. In civil aircraft manufacture, employment at companies in the Pacific region constituted 56 percent of the total. East North Central (14.6 percent) was second and West North Central (11 percent) was third.

In military aircraft production, the Pacific region led with 27 percent of the work force, followed by New England (19 percent) and the South Central U.S. (13.7 percent). Regional breakdowns for the work force engaged in missile manufacture were: Pacific (43.6 percent), New England and Middle Atlantic combined (25.1 percent), South Atlantic (15.5 percent). In space fabrication employment the Pacific region led again with 50.7 percent, followed by the Mountain (20.6 percent) and South Atlantic regions (11.5 percent).

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

Calendar years 1979–1991
(Thousands of Employees)

Year	All Manufacturing Industries	Durable Goods Industries	Aerospace Industry[a]		
			TOTAL	As Percent of	
				All Manufacturing	Durable 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	18,781	11,014	1,038	5.5	9.4
1983	18,434	10,707	1,019	5.5	9.5
1984	19,378	11,479	1,058	5.5	9.2
1985	19,260	11,464	1,152	6.0	10.0
1986	18,965	11,203	1,242	6.5	11.1
1987	19,024	11,167	1,283	6.7	11.5
1988	19,350	11,381	1,294	6.7	11.4
1989	19,442	11,420	1,314	6.8	11.5
1990	19,111	11,115	1,303[r]	6.8	11.7
1991	18,426	10,556	1,216	6.6	11.5

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 1979–1991
(Millions of Dollars)

Year	All Manufacturing Industries[a]	Aerospace Industry[b]			Aerospace As Percent of All Manufacturing
		TOTAL	Production Workers	Other 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	19,910	8,150	11,760	5.1
1982	384,000	20,750	8,043	12,707	5.4
1983	397,400	21,643	8,074	13,569	5.4
1984	439,100	23,780	8,746	15,034	5.4
1985	460,900	26,753	9,837	16,915	5.8
1986	473,200	29,554	11,038	18,517	6.2
1987	490,300	31,108	11,703	19,405	6.3
1988	524,000	32,576	11,750	20,826	6.2
1989	541,800	34,164	12,446	21,718	6.3
1990[r]	555,800	35,598	13,023	22,574	6.6
1991	556,500	34,571	12,561	22,011	6.4

AEROSPACE — INCLUDING LUMP-SUM PAYMENTS[c]

Year	TOTAL	Production Workers	Other Workers	Aerospace As Percent of All Manufacturing
1984	$23,825	$ 8,791	$15,034	5.4%
1985	26,789	9,873	16,915	5.8
1986	29,624	11,108	18,517	6.3
1987	31,269	11,865	19,405	6.4
1988	32,767	11,941	20,826	6.3
1989	34,406	12,688	21,718	6.4
1990[r]	35,873	13,298	22,574	6.6
1991	34,745	12,734	22,011	6.4

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.

r Revised.

EMPLOYMENT IN THE AEROSPACE INDUSTRY[a]

Calendar Years 1979–1991
(Annual Average, Thousands of Employees)

Year	TOTAL	Aircraft, Engines, & Parts (SIC 372)	Missiles & Space Vehicles (SIC 376)	Other[b]
TOTAL EMPLOYMENT				
1979	1,007	593	102	313
1980	1,080	633	111	336
1981	1,087	627	123	338
1982	1,038	584	131	323
1983	1,019	562	141	317
1984	1,058	575	154	329
1985	1,152	616	177	358
1986	1,242	656	200	386
1987	1,283	678	206	399
1988	1,294	684	208	402
1989	1,314	711	194	409
1990[r]	1,303	712	185	405
1991	1,216	671	167	378
PRODUCTION WORKERS				
1979	378	322	33	24
1980	404	344	35	25
1981	395	333	37	25
1982	361	296	40	24
1983	343	274	46	24
1984	353	276	52	25
1985	384	295	62	27
1986	419	323	67	29
1987	435	339	67	30
1988	424	332	63	30
1989	434	344	60	31
1990[r]	432	345	57	30
1991	401	324	48	28

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly) and Aerospace Industries Association estimates.
a See Glossary for detailed explanation of "Aerospace Employment."
b Communications, navigation, flight control, and displays (aerospace-related portions of SICs 366, 381, & 382).
r Revised.

EMPLOYMENT IN THE AIRCRAFT, ENGINES, AND PARTS INDUSTRY[a]

Calendar Years 1979–1991
(Annual Average, Thousands of Employees)

Year	TOTAL (SIC 372)	Airframes (SIC 3721)	Engines and Parts (SIC 3724)	Other Parts & Equipment (SIC 3728)
TOTAL EMPLOYMENT				
1979	592.5	333.2	151.6	107.8
1980	633.1	349.3	162.9	120.9
1981	626.5	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	575.1	306.1	140.2	128.8
1985	616.3	325.6	147.5	143.3
1986	656.0	338.9	153.6	163.4
1987	678.2	356.4	158.2	163.6
1988	683.8	368.5	155.8	159.5
1989	711.3	382.2	153.5	175.6
1990[r]	712.5	381.0	151.7	179.7
1991	671.1	357.3	143.2	170.6
PRODUCTION WORKERS				
1979	322.1	165.9	86.4	70.2
1980	343.9	173.7	93.0	77.4
1981	332.6	167.0	92.4	73.5
1982	296.2	144.7	84.2	67.4
1983	274.0	131.5	74.7	67.1
1984	276.0	128.2	73.0	73.5
1985	294.6	135.5	74.8	82.3
1986	322.5	146.6	78.7	94.5
1987	338.6	159.1	80.5	96.4
1988	331.5	162.1	77.1	92.3
1989	343.9	167.4	76.8	99.7
1990[r]	344.7	164.1	77.2	103.4
1991	324.3	152.4	73.1	98.9

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly).
a See Glossary for detailed explanation of "Aerospace Employment."
r Revised.

AEROSPACE INDUSTRY EMPLOYMENT[a] BY OCCUPATIONAL CLASSIFICATION

As of December[b] 1982–1992
(Thousands of Employees)

Year	TOTAL	Production Workers	Scientists & Engineers	Technicians	Others
1982	765	353	134	54	224
1983[c]	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[c]	992	439	198	68	287
1990	946	422	205	68	251
1991[p]	868	381	193	63	231
1992[E]	809	NA	NA	NA	NA

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.

c Industry strike during this period.

E Estimate.

NA Not available.

p Preliminary.

GEOGRAPHIC DISTRIBUTION OF AEROSPACE EMPLOYMENT[a] BY OCCUPATIONAL CLASSIFICATION AND PRODUCT GROUP

As of December 1991

PERCENT DISTRIBUTION BY OCCUPATION

Region	TOTAL	Production Workers	Scientists & Engineers	Technicians	All Others
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
New England	10.9%	14.4%	8.1%	7.0%	10.0%
Middle Atlantic	7.3	6.3	11.6	2.6	6.3
East North Central	7.6	11.0	6.7	7.4	4.0
West North Central	10.2	13.1	7.1	9.2	9.4
South Atlantic	9.2	5.1	10.9	11.1	12.4
South Central	8.5	7.9	8.5	6.4	9.7
Mountain	5.8	4.7	5.9	6.6	6.9
Pacific	40.5	37.5	41.2	49.7	41.3

PERCENT DISTRIBUTION BY PRODUCT GROUP

Region	Total	Aircraft		Missiles	Space	Other	
		Civil	Military			Aero	Non-Aero
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0 %	100.0%
New England	10.9%	3.4%	19.0%	25.1%	6.6%	8.7 %	31.8%
Middle Atlantic	7.3	1.4	8.2			16.6	
East North Central	7.6	14.6	9.9	8.3	1.6	15.7	6.0
West North Central	10.2	11.0	12.4			2.9	
South Atlantic	9.2	8.7	8.6	15.5	11.5	12.9	48.0
South Central	8.5		13.7	2.0	9.0	5.9	
Mountain	5.8	4.9	1.2	5.5	20.6	5.6	11.3
Pacific	40.5	56.0	27.0	43.6	50.7	34.6	

Source: Aerospace Industries Association, company reports.
NOTE: Data for two regions are combined where employment for one region within product group represented three or fewer companies.
a Employment in 37 surveyed aerospace manufacturing corporations accounted for approximately two-thirds of total industry employment.

TOTAL EMPLOYMENT AND SCIENTISTS & ENGINEERS IN COMMERCIAL TRANSPORT AIRCRAFT & HELICOPTER MANUFACTURING ESTABLISHMENTS[a]

As of December 1977–1991

Year	Commercial Transport Aircraft		Helicopters	
	Total	Scientists & Engineers	Total	Scientists & Engineers
1977[b]	55,900	8,100	21,100	3,500
1978	58,700	8,700	24,200	3,300
1979	99,800	12,900	27,500	3,000
1980	106,500	13,700	29,800	3,200
1981	84,000	12,000	28,000	3,000
1982	69,000	11,100	26,500	3,100
1983[b]	49,400	8,600	27,600	3,500
1984	59,100	9,400	31,300	3,800
1985	69,200	11,000	37,900	5,000
1986	79,100	12,900	37,400	4,000
1987	88,100	14,400	39,000	4,300
1988	99,100	15,900	36,600	4,200
1989[b]	115,900[r]	13,400[r]	34,200	4,900
1990	116,800	15,500	30,600	4,500
1991[p]	120,200	16,800	30,200	4,600

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.

b Industry strike during this period.

p Preliminary.

r Revised.

AVERAGE HOURLY EARNINGS IN THE AEROSPACE INDUSTRY

Production Workers Only
Calendar Years 1974–1991

Year	TOTAL[a]	Aircraft (SIC 372)				Guided Missiles, Space Vehicles & Parts (SIC 376)	
		TOTAL[a]	Airframes (SIC 3721)	Engines & Parts (SIC 3724)	Other Parts & Equipment (SIC 3728)	TOTAL[a]	Guided Missiles & Space Vehicles (SIC 3761)
AVERAGE HOURLY EARNINGS[b]							
1974	$ 5.43	$ 5.42	$ 5.58	$ 5.41	$ 5.05	$ 5.48	$ 5.44
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[r]	14.79[r]	15.66	14.84	13.37	14.39	14.82
1991	15.52	15.61	16.72	15.38	14.07	14.90	15.21
AVERAGE HOURLY EARNINGS INCLUDING LUMP-SUM WAGE PAYMENTS[c]							
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	13.72	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	14.68	15.26
1991	15.72	15.82	17.16	15.38	14.07	15.09	15.49

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 1979–1991

Year	TOTAL[a]	Aircraft (SIC 372)				Guided Missiles, Space Vehicles & Parts (SIC 376)	
		TOTAL[a]	Airframes (SIC 3721)	Engines & Parts (SIC 3724)	Other Parts & Equipment (SIC 3728)	TOTAL[a]	Guided Missiles & Space Vehicles (SIC 3761)
AVERAGE WEEKLY EARNINGS[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	593	616	616	542	589	611
1990	624[r]	626[r]	656	637	570	612	634
1991	648	651	694	654	584	632	649
AVERAGE WEEKLY EARNINGS INCLUDING LUMP-SUM PAYMENTS[c]							
1984	$516	$519	$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	660	712	654	584	640	661

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 1977–1991

Year	TOTAL[a]	Aircraft (SIC 372)				Guided Missiles, Space Vehicles & Parts (SIC 376)	Complete Guided Missiles, & Space Vehicles (SIC 3761)
		TOTAL	Airframes (SIC 3721)	Engines & Parts (SIC 3724)	Other Parts & Equipment (SIC 3728)		
AVERAGE WEEKLY HOURS							
1977	41.8	41.9	41.9	41.4	42.5	40.9	40.5
1978	42.2	42.2	42.1	41.7	43.1	41.9	40.9
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
AVERAGE WEEKLY OVERTIME HOURS							
1977	3.5	3.5	2.8	3.9	4.5	3.2	2.8
1978	4.4	4.4	3.6	5.0	5.3	4.1	3.4
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

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly) and Aerospace Industries Association estimates.
a TOTAL columns are employment-based weighted averages.

OCCUPATIONAL INJURY AND ILLNESS INCIDENCE RATES[a] ALL MANUFACTURING AND AEROSPACE INDUSTRIES

Calendar Years 1986–1990

	1986	1987	1988	1989	1990
All Manufacturing:					
Total Cases	10.6	11.9	13.0	13.1	13.2
Lost Workday Cases	4.7	5.3	5.7	5.8	5.8
Nonfatal Cases without Lost Workdays	5.9	6.7	7.3	7.3	7.3
Lost Workdays	85.2	95.5	107.3	113.0	120.7
Aircraft and Parts (SIC 372):					
Total Cases	7.0	8.3	9.9	10.1	10.4
Lost Workday Cases	2.6	3.1	3.6	3.7	4.0
Nonfatal Cases without Lost Workdays	4.4	5.2	6.3	6.4	6.4
Lost Workdays	43.8	55.7	67.9	70.2	90.3
Aircraft (SIC 3721):					
Total Cases	6.6	7.4	10.1	10.2	10.0
Lost Workday Cases	2.1	2.6	3.3	3.5	3.9
Nonfatal Cases without Lost Workdays	4.5	4.8	6.7	6.7	6.1
Lost Workdays	38.3	48.0	66.1	70.5	95.3
Aircraft Engines and Parts (SIC 3724):					
Total Cases	5.4	7.1	8.7	7.9	9.3
Lost Workday Cases	2.8	3.4	3.7	3.7	4.2
Nonfatal Cases without Lost Workdays	2.6	3.7	5.0	4.2	5.1
Lost Workdays	48.0	67.4	81.9	72.5	89.5
Aircraft Parts (SIC 3728):					
Total Cases	9.0	10.8	10.5	12.0	11.9
Lost Workday Cases	3.3	3.9	3.9	4.1	3.9
Nonfatal Cases without Lost Workdays	5.7	6.9	6.6	7.8	8.0
Lost Workdays	50.1	60.4	59.1	67.7	80.5
Guided Missiles, Space Vehicles & Parts (SIC 376):					
Total Cases	3.1	4.4	4.6	4.8	4.0
Lost Workday Cases	1.5	2.0	2.2	2.2	1.9
Nonfatal Cases without Lost Workdays	1.6	2.4	2.4	2.6	2.1
Lost Workdays	28.3	34.0	41.3	39.7	39.5
Guided Missiles & Space Vehicles (SIC 3761):					
Total Cases	2.8	4.3	4.6	4.6	4.0
Lost Workday Cases	1.4	2.2	2.3	2.2	1.9
Nonfatal Cases without Lost Workdays	1.4	2.2	2.3	2.5	2.1
Lost Workdays	29.5	37.4	44.6	41.4	37.3
Space Propulsion Units & Parts (SIC 3764):					
Total Cases	4.8	4.5	4.5	4.6	4.4
Lost Workday Cases	1.7	1.8	1.9	2.1	2.2
Nonfatal Cases without Lost Workdays	3.1	2.7	2.6	2.5	2.2
Lost Workdays	29.2	34.3	32.6	33.5	48.7
Other Space Vehicle Equipment (SIC 3769):					
Total Cases	3.1	4.2	NA	5.6	3.8
Lost Workday Cases	1.3	1.2	NA	2.3	1.6
Nonfatal Cases without Lost Workdays	1.8	3.0	NA	3.3	2.3
Lost Workdays	21.0	16.3	NA	41.5	38.4

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.
r Revised.

FEDERAL CIVILIAN EMPLOYMENT[a] IN THE DEPARTMENT OF DEFENSE

Fiscal Years 1967–1993

Year	TOTAL	Civil Functions[b]	Military Functions[c]
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	1,009,344	31,263	978,081
1983	1,015,779	30,973	984,806
1984	1,040,213	28,681	1,011,532
1985	1,065,551	28,681	1,036,870
1986	1,069,863	28,511	1,041,352
1987	1,059,516	28,199	1,031,317
1988	1,052,848	28,267	1,024,581
1989	1,051,019	27,934	1,023,085
1990	1,049,422	28,259	1,021,163
1991	996,300	27,241	969,059
1992[E]	966,394	27,725	938,669
1993[E]	925,216	27,444	897,772

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.

EMPLOYMENT IN NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PROGRAMS

End of Fiscal Years 1961–1993

Year	TOTAL	NASA Employees	Contractor Employees[a]
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	127,952	21,652	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[E]	230,737	24,737	206,000
1993[E]	230,947	24,947	206,000

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.

AEROSPACE INDUSTRY WORK STOPPAGES[a]

Calendar Years 1979–1991

Year	Number of Strikes[b]	Number of Workers Involved	Work-Days Idle in Year
1979	12	6,600	103,400
1980	17	4,400	92,900
1981	12	6,100	188,900
1982[c]	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	—

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.

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

Calendar Years 1979–1991

Year	Employment[a]			Cost Per R&D Scientist and Engineer[d]	
	All Industries[b] (Thousands)	Aerospace[c] (Thousands)	Aerospace as a Percent of All Industries	All Industries[b]	Aerospace[c]
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	128,500
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	140,400[r]	189,400[r]
1990[r]	730.9	128.5	17.6	144,900	205,500
1991	709.7	118.3	16.7	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.

Although overall aerospace industry net sales topped the previous year's level, industry after-tax profits plunged to the lowest level in more than two decades. At least part of the sharp drop in profits is due to a government-required accounting change relative to retirement benefits. As a result, the 1991 net profit of $2.5 billion is not directly comparable to 1990's figure of $4.5 billion.

However, much of the $2 billion drop was real loss, due to huge non-operating expenses incurred by the industry's enforced downsizing in an era of sharply declining defense sales, including expenses such as severance pay for terminated employees and costs associated with reducing plant and facilities capacity.

Expressed as a percentage of sales, the profit amounted to 1.8 percent, marking only the second time in the last 30 years that the profit level dropped below two percent. The other occasion was in 1971 (1.8 percent) when the aerospace industry suffered one of its steepest recessions. The 1.8 percent figure for 1991 compares with 3.4 percent in 1990 and a five-year average (1986-90) of 3.6 percent.

The aerospace profit-to-sales ratio remained below the average for all U.S. manufacturing corporations, despite the fact that U.S. manufacturing in general lost financial ground. The all-industry average was 2.5 percent.

Aerospace ratios were similarly lower than all-manufacturing in terms of assets and equity. As a percentage of assets the aerospace profit was 1.9

percent, all-manufacturing 2.6 percent. As a percentage of equity, the aerospace profit came to 6.1 percent, the all-manufacturing profit 6.4 percent.

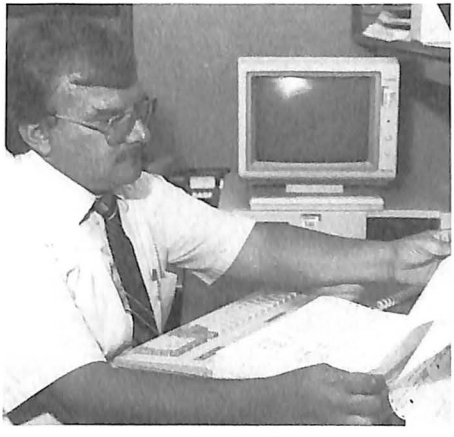
At $4 billion the industry's 1991 outlays for new plant and equipment almost exactly matched the previous year's. For 1992, the Bureau of the Census estimated a drop to $3.9 billion.

The aerospace industry's balance sheet, as reported by the Bureau of the Census, showed an increase in net working capital from $14.3 billion in 1990 to $14.5 billion in 1991. Total assets came to $130.9 billion, down from $131.8 billion in the previous year.

McDonnell Douglas Corporation once again topped the list of Department of Defense contractors in terms of awarded contract dollar value in Fiscal Year 1991 with contracts totaling $8.1 billion. In second place was General Dynamics Corporation with $7.8 billion, followed by General Electric Company ($4.9 billion), General Motors Corporation ($4.4 billion) and Raytheon Company ($4.1 billion). The same companies constituted the top five in FY 1990.

Rounding out the top 10 contractors were Northrop Corporation ($3.3 billion), United Technologies Corporation ($2.8 billion), Martin Marietta Corporation ($2.7 billion), Lockheed Corporation ($2.7 billion) and Grumman Corporation ($2.4 billion). The last time Northrop Corporation ranked in the top 10 was in FY 1976.

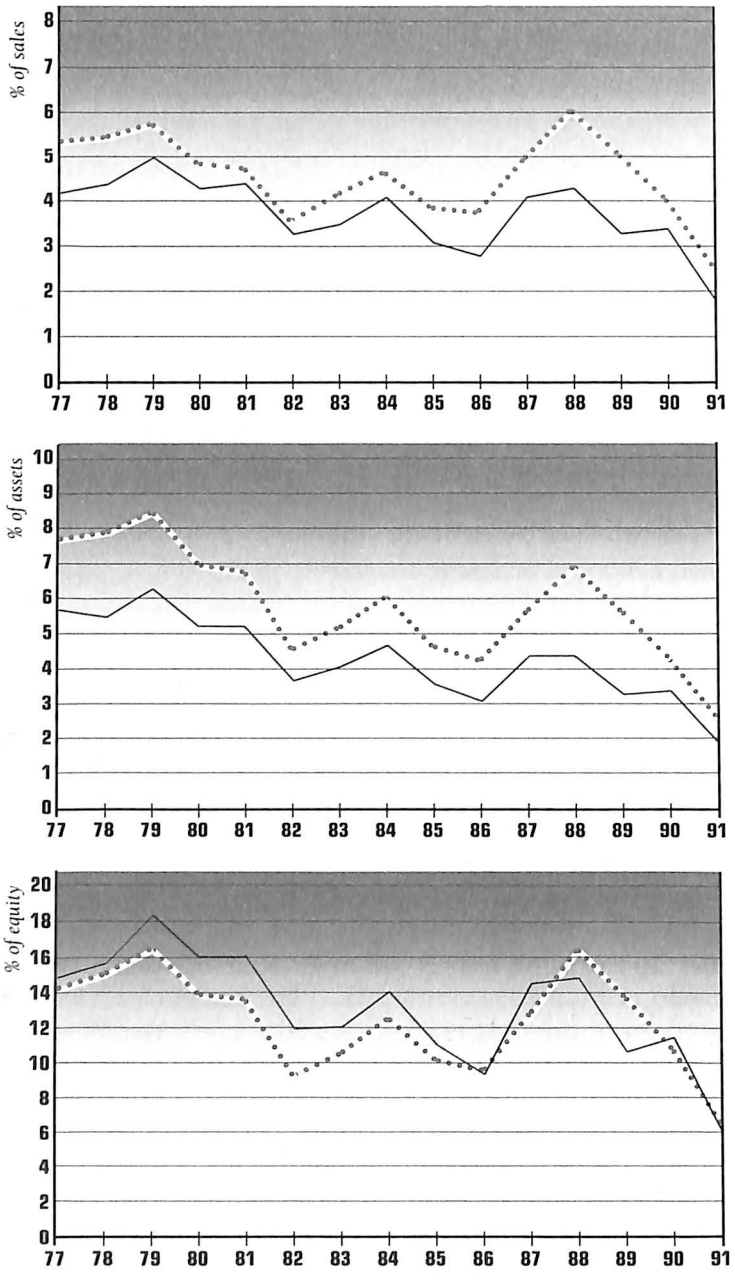
Rockwell International Corporation, perennial leader among NASA contractors, once again headed the list with contracts valued at $1.6 billion in FY 1991. McDonnell Douglas was second at $1.1 billion, followed by Lockheed Space Operations



Company ($591 million), Martin Marietta ($572 million) and The Boeing Company ($468 million).

The rest of NASA's top 10 included Lockheed Missiles & Space Company ($458 million), Thiokol Corporation ($438 million), Rockwell Space Operations Inc. ($343 million), General Electric ($308 million) and Lockheed Engineering & Science Company ($259 million). The latter company moved into the top 10 from 11th place in the previous year, displacing TRW Inc., which dropped to 14th place in FY 1991.

Net Profit After Taxes



Aerospace Industry

All Manufacturing

Source: Aerospace Industries Association

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

Calendar Years 1977–1991

PERCENT OF SALES

Year	All Manufacturing Corporations	Non-Durable Goods	Durable Goods	Aerospace Industry
1977	5.3%	5.3%	5.3%	4.2%
1978	5.4	5.4	5.5	4.4
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

PERCENT OF ASSETS[b] AND EQUITY[b]

Year	Percent of Assets		Percent of Equity	
	All Manufacturing	Aerospace Industry	All Manufacturing	Aerospace Industry
1977	7.6%	5.7%	14.2%	14.9%
1978	7.8	5.5	15.0	15.7
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	6.4	6.1

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 Average of four quarters.

INCOME STATEMENT AND OPERATING RATIOS FOR AEROSPACE COMPANIES[a]

Calendar Years 1988–1991
(Millions of Dollars)

INCOME STATEMENT	1988	1989	1990	1991
Net Sales, Receipts, Operating Revenues	$112,846	$118,297	$133,618	$135,175
Less: Depreciation, Depletion, & Amortization of Property, Plant, and Equipment	3,775	4,014	4,250	4,353
Less: All Other Operating Costs & Expenses, Including Selling Costs & General & Administrative Expenses	103,098	108,824	122,678	123,208
Income (or Loss) from Operations	$ 5,972	$ 5,460	$ 6,692	$ 7,614
Net Non-Operating Income (Expense)	739	(20)	(544)	(3,432)
Income (or Loss) Before Income Taxes (= Total Income)	$ 6,711	$ 5,439	$ 6,147	$ 4,181
Less: Provision for Current & Deferred Domestic Income Taxes	1,828	1,574	1,660	1,698
Income (or Loss) after Income Taxes (= Net Profit)	$ 4,883	$ 3,866	$ 4,487	$ 2,484
Cash Dividends Charged to Retained Earnings	1,465	1,806	1,823	1,678
Net Income Retained in Business	$ 3,417	$ 2,060	$ 2,665	$ 806
Retained Earnings at Beginning of Year[b]	24,139	27,508	28,227	30,694
Adjustments to Retained Earnings[c]	(66)	(931)	(350)	(707)
Retained Earnings at End of Year[d]	$ 27,490	$ 28,637	$ 30,541	$ 30,793
OPERATING RATIOS				
Income before Taxes as Percent of Net Sales	5.9%	4.6%	4.6%	3.1%
Provision for Current & Deferred Domestic Income Taxes as Percent of Income before Taxes (Total Income)	27.2	28.9	27.0	40.6
Income after Taxes (Net Profit) as Percent of Net Sales	4.3	3.3	3.4	1.8
Income after Taxes (Net Profit) as Percent of Stockholders' Equity[e]	14.9	10.7	11.5	6.1
Income after Taxes (Net Profit) as Percent of Total Assets[e]	4.4	3.3	3.4	1.9

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.
r Revised.

BALANCE SHEET FOR AEROSPACE COMPANIES[a]

December 31, 1988–1991
(Millions of Dollars)

	1988	1989	1990	1991
Assets:				
Current Assets				
Cash	$ 2,156	$ 1,480	$ 2,172	$ 2,950
Securities, Com'l Paper, & Other Short-term Financial Investments	3,328	1,785	2,920	3,468
Total Cash and U.S. Gov't and Other Securities	$ 5,484	$ 3,264	$ 5,092	$ 6,418
Receivables (Total)	16,102	18,732	19,620	17,812
Inventories (Gross)	45,558	49,944	50,423	49,973
Other Current Assets	1,576	2,391	2,327	2,166
Total Current Assets	$ 68,720	$ 74,332	$ 77,463	$ 76,370
Net Plant, Property, & Equipment	22,211	24,506	26,161	26,557
Other Non-Current Assets	18,614	23,053	28,199	28,012
Total Assets	$109,545	$121,892	$131,823	$130,939
Liabilities:				
Current Liabilities				
Short Term Loans	$ 1,369	$ 3,799	$ 2,677	$ 1,943
Trade Accts. & Notes Payable	10,424	10,898	12,445	12,188
Income Taxes Accrued	3,519	1,925	2,002	1,151
Installments Due on Long Term Debts	751	1,269	1,392	1,767
Other Current Liabilities	40,825	43,813	44,690	44,823
Total Current Liabilities	$ 56,888	$ 61,704	$ 63,205	$ 61,871
Long Term Debt	12,447	16,191	20,979	20,682
Other Non-Current Liabilities	6,342	7,081	7,741	8,123
Total Liabilities	$ 75,676	$ 84,976	$ 91,926	$ 90,676
Stockholders' Equity:				
Capital Stock	$ 6,379	$ 8,661	$ 9,510	$ 9,681
Retained Earnings	27,490	28,255	30,386	30,581
Total Stockholders' Equity	$ 33,869	$ 36,916	$ 39,896	$ 40,262
Total Liabilities & Stockholders' Equity	$109,545	$121,892	$131,823	$130,939
Net Working Capital	$ 11,832	$ 12,628	$ 14,257	$ 14,499

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 1964–1992
(Billions of Dollars)

Year	All Industries	All Manufacturing Industries	Durable Goods	Aerospace[a]	
				Current Dollars	Constant Dollars[b] (1982=100)
1964	$ 51.26	$ 21.23	$10.98	$0.41	$1.23
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[r]	532.61	192.61	82.58	4.02	3.27
1991	529.20	183.61	77.95	4.04	3.19
1992[E]	553.68	182.81	78.18	3.89	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 corporate entities whose principal activity falls in SIC codes 372 and 376.
b Based on the Producer Price Index, Capital Equipment.
E Estimate.
NA Not Available.
r Revised

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MAJOR CONTRACTORS

Fiscal Years 1988–1991
By rank according to net value of NASA prime contracts awarded during last fiscal year
(Millions of Dollars)

Company	1988	1989	1990	1991
TOTAL PROCUREMENTS	$9,545	$10,876	$12,565	$13,159
Awards to Business Firms	7,275	8,568	10,072	10,417
% of TOTAL PROCUREMENTS	76%	79%	80%	79%
Rockwell International Corp.	$1,714	$ 1,692	$ 1,747	$ 1,560
McDonnell Douglas Corp.	299	506	851	1,089
Lockheed Space Operations Co.	474	553	583	591
Martin Marietta Corp.	341	355	507	572
The Boeing Co.	260	236	399	468
Lockheed Missiles & Space Co.	141	145	294	458
Thiokol Corp.	423	420	498	438
Rockwell Space Operations Inc.	(a)	287	309	343
General Electric Co.[b]	211	300	402	308
Lockheed Engrg. & Science Co.	178	217	234	259
EG&G Florida Inc.	156	187	191	227
Computer Sciences Corp.	151	192	183	207
USBI Booster Production Co.	191	196	233	198
TRW Inc.	143	193	241	192
Loral Aerospace Co.[c]	137	196	174	186
Bendix Field Engineering[d]	152	156	156	176
Boeing Computer Support Services	(a)	158	165	159
United Technologies Corp.	91	133	136	133
Grumman Aerospace Corp.	74	80	86	100
Sverdrup Technology Inc.	38	65	79	97
Johnson Controls World Serv. Inc	(a)	(a)	(a)	70
IBM Corp.	87	102	102	68
Teledyne Industries Inc.	40	52	73	65
BAMSI Inc.	40	30	38	52
Contel Corp.	76	51	65	50
Cray Research Inc.	31	48	43	47
Fairchild Industries Inc.	24	38	44	46
CAE Link Corp.	(a)	16	53	45
Harris Space Systems Corp.	(a)	(a)	25	45
Bionetics Corp.	11	29	36	41

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 for RCA Corp.
c Includes awards previously reported as Ford Aerospace Corporation.
d Includes awards previously reported as Allied Signal Aerospace Co.

DEPARTMENT OF DEFENSE MAJOR CONTRACTORS

Fiscal Years 1987–1991
Listed by rank according to net value of prime contracts awarded during last fiscal year
(Millions of Dollars)

Company	1987	1988	1989	1990	1991
TOTAL CONTRACTS	$142,483	$137,049	$128,958	$130,758	$136,640
McDonnell Douglas Corp.	$ 7,715	$ 8,003	$ 8,617	$ 8,211	$ 8,057
General Dynamics Corp.	7,041	6,522	6,899	6,306	7,848
General Electric Co.	5,802	5,701	5,771	5,589	4,866
General Motors Corp.[a]	4,082	3,550	3,692	4,107	4,427
Raytheon Co.	3,820	4,055	3,761	4,071	4,090
Northrop Corp.	1,068	533	631	746	3,319
United Technologies Corp.	3,587	3,508	3,556	2,856	2,825
Martin Marietta Corp.	3,726	3,715	3,337	3,492	2,689
Lockheed Corp.	5,574	3,538	3,652	3,553	2,667
Grumman Corp.	3,393	2,848	2,373	2,697	2,363
Westinghouse Electric Corp.	1,684	2,185	1,650	2,243	1,812
Rockwell International Corp.	2,238	2,184	2,133	2,217	1,708
Litton Industries Inc.	2,035	2,561	1,437	1,576	1,601
FMC Corp.	744	862	796	634	1,467
Unisys Corp.[b]	2,268	1,380	1,245	1,376	1,379
Loral Corp.	692	494	451	618	1,283
LTV Corp.	1,308	942	757	1,183	1,255
The Boeing Co.	3,547	3,018	2,868	2,267	1,166
TRW Inc.	1,135	1,250	1,294	1,087	1,092
Textron Inc.	1,546	1,276	908	1,190	997
Texas Instruments Inc.	1,109	1,232	946	704	982
ITT Corp.	995	769	1,163	870	948
Bath Holding Corp.[c]	(d)	(d)	218	734	872
Federal Express, et al. JV[e]	(d)	(d)	(d)	253	829
Alliant Techsystems Inc.	(d)	(d)	(d)	(d)	827
GTE Corp.	1,475	423	2,342	1,294	801
IBM Corp.	1,822	1,065	1,309	1,286	773
AT&T Co.	509	791	754	769	699
Allied Signal Inc.	943	711	906	725	689
Harsco Corp.	299	496	433	178	621

Source: Department of Defense, "100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards" (Annually).
a Includes amounts previously reported for Hughes Aircraft Co.
b Includes amounts previously reported for Sperry and Burroughs Corporations.
c Includes amounts previously reported for Bath Iron Works Corporation.
d Not in top 100 companies for indicated year(s).
e Federal Express, Northwest Airlines, Pan Am World Airways, Tower Air, and United Parcel Service Joint Venture.

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

By Geographic Region
Fiscal Years 1989, 1990, and 1991

Program and Region	Millions of Dollars			Percent of Program Total		
	1989	1990	1991	1989	1990	1991
AIRCRAFT—TOTAL ...	$27,565	$27,107	$26,227	100.0%	100.0%	100.0%
New England	3,872	3,098	3,206	14.0	11.4	12.2
Middle Atlantic	2,738	3,226	2,442	9.9	11.9	9.3
East North Central	2,797	2,648	1,877	10.1	9.8	7.2
West North Central	5,082	5,227	4,513	18.4	19.3	17.2
South Atlantic	2,142	2,344	2,504	7.8	8.6	9.5
East South Central	222	324	379	0.8	1.2	1.4
West South Central	4,458	3,909	4,515	16.2	14.4	17.2
Mountain	1,175	1,909	730	4.3	7.0	2.8
Pacific[a]	5,079	4,423	6,062	18.4	16.3	23.1
MISSILE & SPACE SYSTEMS—TOTAL	$20,655	$18,630	$17,990	100.0%	100.0%	100.0%
New England	3,075	2,220	2,516	14.9	11.9	14.0
Middle Atlantic	1,263	1,252	1,489	6.1	6.7	8.3
East North Central	102	57	140	0.5	0.3	0.8
West North Central	1,034	521	1,169	5.0	2.8	6.5
South Atlantic	1,525	1,707	1,243	7.4	9.2	6.9
East South Central	921	658	748	4.5	3.5	4.2
West South Central	1,255	1,470	1,632	6.1	7.9	9.1
Mountain	3,584	3,459[r]	3,077	17.4	18.6	17.1
Pacific[a]	7,896	7,285	5,977	38.2	39.1	33.2
ELECTRONICS & COMMUNICATIONS EQUIPMENT—TOTAL ..	$19,369	$19,876	$17,470	100.0%	100.0%	100.0%
New England	3,464	3,053	1,680	17.9	15.4	9.6
Middle Atlantic	3,222	3,270	3,444	16.6	16.5	19.7
East North Central	1,345	1,002	1,292	6.9	5.0	7.4
West North Central	938	901	800	4.8	4.5	4.6
South Atlantic	4,430	5,110	4,595	22.9	25.7	26.3
East South Central	94	221	210	0.5	1.1	1.2
West South Central	1,014	989	1,013	5.2	5.0	5.8
Mountain	900	866	485	4.6	4.4	2.8
Pacific[a]	3,962	4,464	3,951	20.5	22.5	22.6

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.
r Revised.

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

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

Aerospace Industry
the industry engaged in research, development and manufacture of aerospace systems, including manned and unmanned aircraft; missiles, space launch vehicles, and spacecraft; 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 Employment
annual average calculated as one-twelfth of sum of monthly estimates of total number of persons employed during a designated pay period by the aircraft and missile and space industries (SIC 372 and 376) plus estimated aerospace-related employment in the communications equipment (SIC 3662) and instruments (SIC 381 and 382) industries and in certain other industries (SIC 28, 35, 73, 89, etc.).

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

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 in the Tokyo Round of the Multilateral Trade Negotiations, and implemented Jan. 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, aircraft propellers and parts, and aircraft parts 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 the Census
an agency of the Department of Commerce.

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

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

Constant Dollars
see *Deflator.*

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. Constant dollars are calculated by dividing current ("then-year") dollars by appropriate price deflator, and multiplying by 100.

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 *R&D.*

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.

*E*arnings
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 and late shift work, and changes in output of workers paid for an incentive plan.
Average Weekly Earnings: derived by multiplying average weekly hours by 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.*

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.

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.

*F*AA
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)
until June 30, 1976, year beginning July 1 and ending June 30, and designated by the year in which it ends. Beginning October 1, 1976, the *fiscal years* run from October 1 through September 30 and are designated by the year in which they end. A three-month *Transition Quarter* from July 1 through September 30, 1976, belongs to neither fiscal year.

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.*

General Agreement on Tariffs and Trade (GATT)
a multilateral treaty, subscribed to by 98 governments which together account for more than four-fifths of world trade; its aim is to liberalize world trade; the only multilateral instrument that lays down agreed rules for international trade.

General Aviation
all civil flying except that of air carriers.

GDP (Gross Domestic Product)
the market value of goods and services produced by labor and property located in the U.S.

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 *V/STOL.*

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 net sales (see *Sales)* less total operating costs.
Net Income (Before Income Taxes): Net Operating Income plus or minus "*Other Income and Expenses.*"
Other Income and Expenses: includes interest income, royalty income, capital gains and losses, interest expense, cash discounts, etc.
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. In September 1986, in Punta del Este, Uruguay, over 100 nations launched a new round of multilateral trade negotiations, called the "Uruguay Round." The purpose of the "Uruguay Round" is 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, and other aerospace products (including drones) and 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, 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 leadmen 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.

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.

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.
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.
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.

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 *R&D.*

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.

Total Obligational Authority
the sum of *budget authority* granted or requested from Congress in a given year, plus unused authority from prior years.

Trade Balance
see *Merchandise Trade Balance.*

Transition Quarter (Tr. Qtr.)
the three-month interval from Jul. 1, 1976 to Sept. 30, 1976. 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.

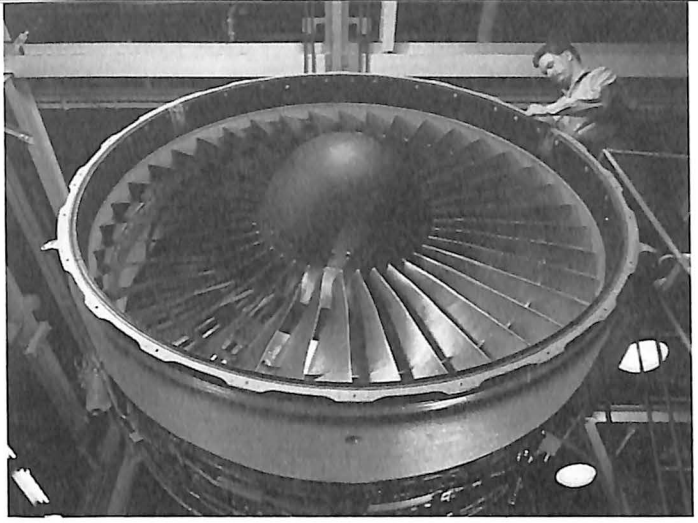
USAF
United States Air Force, an agency of the U.S. Department of Defense.

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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Allied-Signal Aerospace Company
Aluminum Company of America
American Pacific Corporation
Argo-Tech Corporation
ASTECH/MCI Manufacturing, Inc.
BASF Structural Materials, Inc.
Bechtel National, Inc.
Best Foam Fabricators, Inc.
B.H. Aircraft Company, Inc.
The Boeing Company
Chrysler Technologies Corporation
Coltec Industries Inc.
  Chandler Evans
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CTA INCORPORATED
Digital Equipment Corporation
Dowty Aerospace Los Angeles
Du Pont Company
E-Systems, Inc.
Edwards Aerospace, Inc.
FMC Corporation
GEC-Marconi Electronic Systems Corporation
General Dynamics Corporation
General Electric Company
General Motors Corporation
  General Motors Hughes Electronics
    Delco Electronics
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  Allison Gas Turbine Division
The BFGoodrich Company
  Aircraft Wheels and Brakes
  Engine and Fuel Systems
  Instruments and Avionics
  Maintenance Repair and Overhaul
  Specialty Products
Grumman Corporation
Gulfstream Aerospace Corporation
Harris Corporation
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HEICO Corporation
Hercules Incorporated
Hexcel Corporation
Honeywell Inc.
ITT Defense and Electronics Inc.
Kaman Aerospace Corporation
Lockheed Corporation
Lord Corporation
Lucas Aerospace Inc.
Martin Marietta Corporation
McDonnell Douglas Corporation
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Precision Castparts Corporation
Raytheon Company
Reflectone, Inc.
Rockwell International Corporation
Smiths Industries Aerospace & Defense Systems, Inc.
Sundstrand Corporation
Teledyne, Inc.
  Teledyne Brown Engineering
  Teledyne Controls
Texas Instruments Incorporated
  Defense Systems & Electronics Group
Textron Inc.
Thiokol Corporation
TRW Inc.
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