

AEROSPACE  
FACTS AND  
FIGURES

1976/77

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AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.



# 1976/77 AEROSPACE FACTS AND FIGURES

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# **1976/77 Aerospace Facts and Figures**

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Inc.

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## CONTENTS

Page

4	FOREWORD
6	AEROSPACE SUMMARY
29	AIRCRAFT PRODUCTION
46	MISSILE PROGRAMS
56	SPACE PROGRAMS
71	AIR TRANSPORTATION
92	RESEARCH AND DEVELOPMENT
102	FOREIGN TRADE
116	EMPLOYMENT
126	FINANCE
135	GLOSSARY
140	INDEX



## FOREWORD

This volume, which details the statistical performance of the aerospace industry in 1975, is something of a paradox. In each of the chapters covering the various aspects of the industry's activity, the statistics show record or near-record sales. Yet the accompanying text analysis talks of declining or approximately equal levels of activity in the same categories of measurement.

The paradox is resolved when the inflation factor is applied. In 1975, the U.S. experienced a heartening reduction of the inflation rate, which dropped well below the double-digit percentages of the previous year. Nonetheless, it remained at a relatively high level, thereby distorting the statistics herein. The statistics are completely accurate and they are useful as guidelines, but if they are to be valid yardsticks of activity measurement they must be adjusted for inflation.

Let me amplify that statement. In 1975, the aerospace industry recorded total sales of \$28 billion. It was the second highest sales volume in the industry's history, just \$1 billion below the all-time peak of 1968, seemingly a very impressive performance. A different story emerges, however, if we convert 1975 sales to *constant* dollars, using 1968 as the base year. We find that sales are \$13 billion below those of 1968. Similarly, this volume reports a statistically substantial increase when 1975 sales are compared with those of 1974, but the gain was not sufficient to offset the year's inflation. Thus, an apparent increase in dollar volume translates to another year of declining activity, the seventh straight.

Inflation has a number of erosive effects on the industry's financial posture. One is its impact on capital formation, a pressing problem in a high-technology industry which requires very large amounts of capital to finance its programs. Ideally, such capital would be generated internally, from profits and from allowances for depreciation of equipment.

Inflation has a particularly adverse impact on depreciation for this reason: U.S. procurement regulations and tax laws do not consider the effect of inflation

on depreciation allowances; the government allows depreciation only to the extent of the original cost of the equipment. But, just as one cannot replace an automobile for the same price paid years earlier, industry firms cannot replace tools and equipment at the original cost in periods of high inflation. The higher cost of replacement equipment represents a deficit in capital formation. The enormity of the problem is underscored in a 1976 study which found that the industry's capital formation potential was eroded by more than \$1.6 billion in the 10-year span from 1965 through 1974.

This puts the capital formation burden on profits, which, to say the least, are similarly inadequate. In 1975, the industry recorded a net profit after taxes of 2.9 percent on sales, a figure which compares with the average for all U.S. manufacturing industries of 4.5 percent. It marked the sixth consecutive year in which the aerospace industry's profit level remained below three percent. Clearly, the combination of inadequate depreciation and inadequate profits poses extreme difficulty for a high-technology, capital-intensive industry.

Despite declining activity and a heavy problem load, the industry can regard 1975 as a year of solid accomplishment. Aerospace companies continued to produce, for the airlines, the military services and the national space program, equipment of the highest quality. In research and development, the industry maintained its long-held status as the spearhead of American technological advance.

One of the year's accomplishments merits special note—sales of American aerospace equipment in the foreign market. The nation as a whole rebounded from a trade deficit in 1974 to a record surplus in 1975, and one of the major contributing factors was the continued wide acceptance abroad of the aerospace industry's product line. Aerospace exports amounted to \$7.8 billion, a substantial increase over 1974, even in inflation-adjusted terms, and a new all-time high. The aerospace trade balance was equivalent to more than 70 percent of the total U.S. trade balance. This achievement in foreign trade is satisfying acknowledgement of the aerospace industry's technological prowess.

Along with the statistical information, other noteworthy accomplishments of the aerospace industry are outlined in this 24th edition of *Aerospace Facts and Figures*, which we trust will prove useful, interesting and enlightening to government and industry officials, legislators, news writers and editors, analysts and students.

Karl G. Harr, Jr.  
*President*  
*Aerospace Industries Association*

# Aerospace Summary



For the nation, 1975 marked an economic turning point. At the year's outset, the United States was still in the throes of deep recession, but in the late months of the year signs of recovery were in evidence. The inflation rate dropped, employment began to pick up and many of the economic indicators pointed to an improved national outlook. This was confirmed by continuing gains in the first half of 1976.

The aerospace industry, however, is traditionally slow to respond to national economic change. The principal reason is the long lead time of much of the product line. The industry's performance in a given year is based on government budgets and commercial orders placed two, three or more years earlier. In 1975, the aerospace industry continued to feel the effects of reduced government budgets in the earlier seventies. An additional factor was the initial impact of a sharp drop in jetliner orders, occasioned by recession-induced airline problems.

Thus, in terms of real output, 1975 was another year of slight decline for the aerospace industry. Statistically, gains were recorded in most measurement categories, but analysis shows that the gains were generally of lower order than the inflation rate; inflation, though down considerably from the double-digit

levels of 1974, was still high. Inflation accounts for the apparent contradiction of declining activity amid increasing sales volume.

Here is a breakdown of 1975 industry performance by major category:

**OVERALL SALES** Total sales amounted to \$28 billion, an increase of \$1.6 billion over the previous year. The second highest volume ever recorded by the aerospace industry, the 1975 figure compares with the all-time peak of almost \$29 billion in 1968. The inflationary impact over the interim years becomes clear when sales are converted to 1972 dollars. In constant dollar terms, the 1975 volume was \$13 billion below 1968's. As a percentage of the gross national product (GNP), aerospace sales in 1975 came to 1.9 percent, a figure identical to those of the preceding three years but far below the rates of the sixties.

**CIVIL AIRCRAFT PRODUCTION** For the first time in the seventies, civil aircraft production declined in terms of numbers, although dollar volume—\$5 billion—exactly matched the preceding year. Units delivered totaled 15,236, down 89 from 1974. The anticipated decline in commercial transport deliveries reduced sales volume by \$200 million, down to \$3.8 billion compared with \$4 billion in 1974. There was a comparable decrease in terms of units, which dropped from 332 to 315.

The decline in jetliner sales was offset by record volume in both general aviation planes and civil helicopters. Sales of general aviation manufacturers topped the billion dollar mark for the first time, with deliveries—14,057 aircraft—approximately matching those of the previous year and dollar value up by more than \$100 million. Helicopter manufacturers delivered 864 units worth \$274 million, increases of 36 helicopters and \$85 million.

**MILITARY AIRCRAFT PRODUCTION** The decline in military aircraft production, which started in 1968 and continued through 1974, was reversed in 1975. The military services took delivery of 1,357 aircraft, an increase of 247 units. Fighter/attack craft—627 units—and helicopters—594—accounted for the bulk of production. Total dollar value for 1975 was \$2.9 billion, an increase of about \$700 million.

**MISSILE PROGRAMS** Industry activity in missile systems declined for the fourth straight year in real terms, although unadjusted dollar volume was above the 1974 level. Sales amounted to \$3.6 billion, up \$180 million, but the percentage of gain did not match inflation. These figures are for missiles only, not their propulsion systems, which are reported separately in this volume. The overall figure for 1975, including propulsion units was \$4.8 billion, which compares with \$5.2 billion in 1974. Heaviest-funded programs were the Air Force's Minuteman III, the Navy's Trident I and the Army's Dragon and TOW weapons.

**SPACE PROGRAMS** Space systems, civil and military, accounted for \$3.3 billion of the year's total aerospace sales. This represented an increase of \$160 million in current dollars but in real productivity a slight decline. The industry's



principal effort was fabrication of equipment for the Space Shuttle, which will reach operational status in 1980. The final Apollo mission was flown in 1975, but it had little influence on industry activity since the equipment was developed and produced in prior years. Military astronautics outlays decreased slightly, but the Department of Defense continued a high level of effort in development of a variety of unmanned satellites for defense support.

**NON-AEROSPACE SALES** Activity continued to increase in this category, which embraces the industry's effort to transfer to the non-aerospace sector the high technology acquired in aerospace work. For the fifth straight year the industry recorded substantial non-aerospace sales gains. The total was \$4.7 billion, which compared with \$4.1 billion in 1974.

**RESEARCH AND DEVELOPMENT** Industry research and development activity fell off in 1975 due to reduced outlays for aerospace research by the Department of Defense, traditionally the prime source of industry R&D contracts. DOD outlays dropped from \$4.6 billion in FY 1974 to 1975's \$4.4 billion in current dollars. Adding the inflation factor, the activity decrease was of significant order. Practically all of the funding reduction came in Department of Defense research, development, test and evaluation (RDT&E) for aircraft; there was a slight drop in astronautics research and a negligible increase in missileery.

**EXPORTS** Aerospace exports again reached record highs and contributed substantially to the U.S. balance of trade in 1975. Exports for the year totaled \$7.8 billion, up from \$7.1 billion in 1974, which was itself a record year for aerospace trade in foreign markets. Civil products accounted for most of the export sales, totaling \$5.3 billion and compounded of \$2.4 billion in commercial transport deliveries and \$2.9 billion in other civil product categories. Military sales abroad totaled \$2.5 billion. Aerospace exports amounted to 7.4 percent of all U.S. exports. As in previous years, aerospace imports were minor, so the aerospace trade balance topped \$7 billion; it was equivalent to 73.4 percent of the U.S. trade surplus for the year.

**EMPLOYMENT** Declining activity in several areas of workload caused a reduction in the labor force. Average industry employment in 1975 dropped to 942,000 from the previous year's 965,000. A further decline, to about 900,000, was expected by the end of 1976.

**AIR TRANSPORTATION** The world's airlines recorded increases in traffic, but the growth rate was far below rates of the sixties and early seventies. World airlines flew 420 billion passenger-miles, up 14 billion. Cargo ton-miles at 13 billion, remained at the previous year's level. U.S. carriers flew 163 billion passenger-miles, the same as in 1974, but continually increasing operating expenses outstripped revenues and caused heavy losses among some American airlines.

## AEROSPACE INDUSTRY SALES BY PRODUCT GROUP

Calendar Years 1950 to Date  
(Millions of Dollars)

Year	TOTAL Sales	Product Group			
		Aircraft	Missiles	Space	Non- Aerospace
1950	\$ 3,116	\$ 2,731	\$ 105	\$ -	\$ 280
1951	6,264	5,067	633	-	564
1952	10,130	8,442	776	-	912
1953	12,459	10,420	918	-	1,121
1954	12,807	10,460	1,194	-	1,153
1955	12,411	9,781	1,513	-	1,117
1956	13,946	10,485	2,206	-	1,255
1957	15,858	11,398	3,033	-	1,427
1958	16,065	10,582	4,036	1	1,446
1959	16,640	9,714	5,042	386	1,498
1960	17,326	9,127	5,762	878	1,559
1961	17,997	8,847	6,266	1,264	1,620
1962	19,162	8,944	6,311	2,182	1,725
1963	20,134	8,527	6,003	3,774	1,830
1964	20,594	8,911	5,242	4,720	1,721
1965	20,670	9,747	3,626	5,329	1,968
1966	24,610	11,951	4,053	5,969	2,637
1967	27,267	14,981	4,417	5,290	2,579
1968	28,959	16,578	4,719	5,113	2,549
1969	26,126	14,097	5,058	4,272	2,699
1970	24,930	13,293	5,379	3,614	2,644
1971	22,186	11,442	5,018	3,203	2,523
1972	22,816	11,866	5,217	3,087	2,646
1973	24,808	13,338	5,177	2,950	3,343
1974	26,364	14,014	5,187	3,096	4,067
1975	28,034	15,208	4,829	3,260	4,737

Source: Aerospace Industries Association estimates, based on latest available information. The AIA estimate of Aerospace Industry Sales is arrived at by adding 1. DOD-expenditures for "procurement" of aircraft and missiles, 2. DOD expenditures for research, development, test and evaluation for aircraft, missiles, and astronautics, 3. NASA expenditures for research and development, 4. AEC expenditures for space propulsion systems and space electric power development, 5. Net sales to customers other than U.S. Government by approximately 55 aerospace companies (adjusted to eliminate duplication by subcontracting) and 6. Non-aerospace sales reported by the approximately 55 aerospace companies reporting to the Bureau of Census.

r Revised.

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Calendar Years 1950 to Date  
(Millions of Dollars)

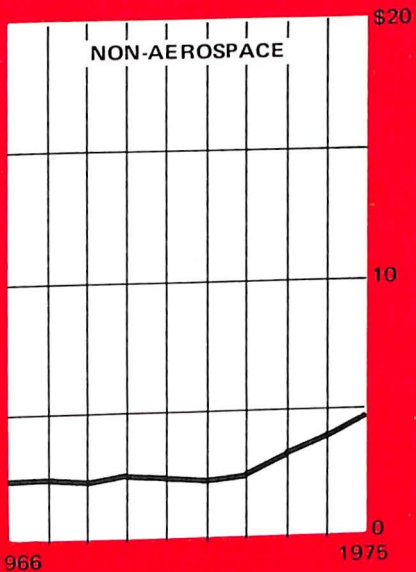
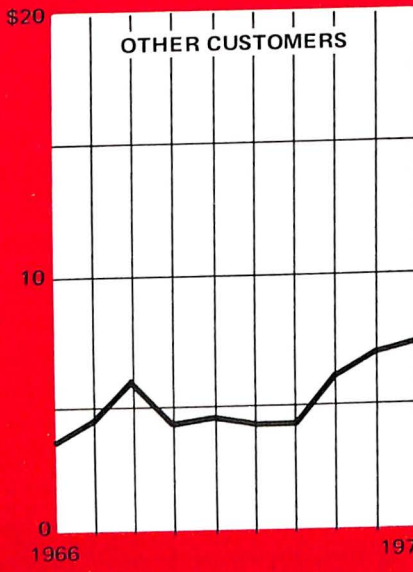
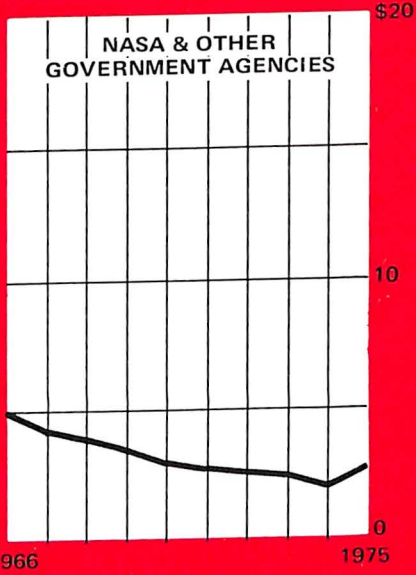
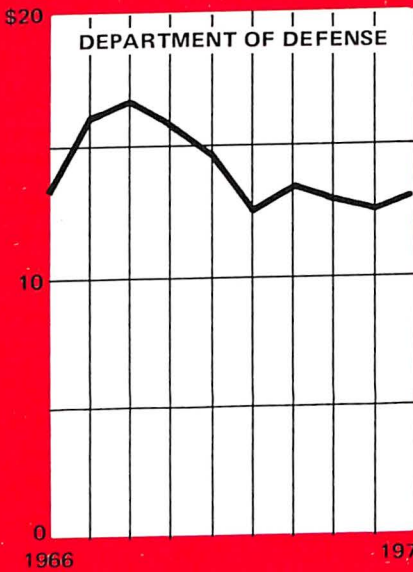
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Source: Aerospace Industries Association estimates, based on latest available information.  
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## AEROSPACE INDUSTRY SALES BY CUSTOMER

(Billions of Dollars)



Source: Aerospace Industries Association

## AEROSPACE INDUSTRY SALES BY CUSTOMER

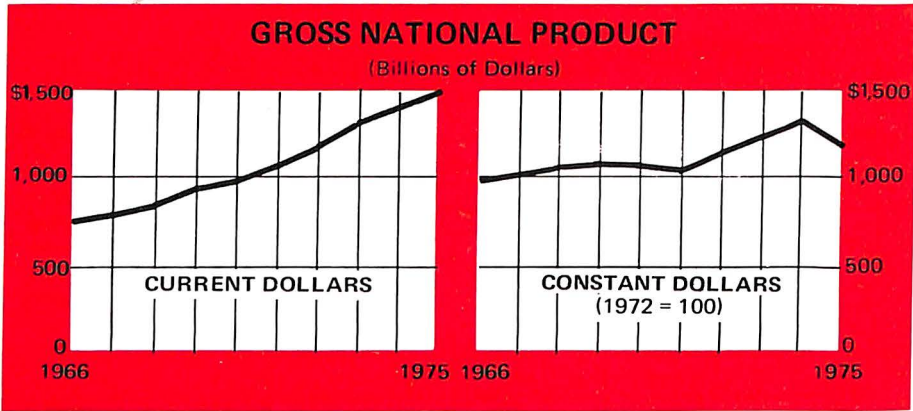
Calendar Years 1950 to Date  
(Millions of Dollars)

Year	TOTAL Sales	Aerospace Products and Services			Non- Aerospace Products and Services
		U.S. Government		Other Customers	
		Department of Defense	NASA and - Other Agencies		
1950	\$ 3,116	\$ 2,598	\$ -	\$ 238	\$ 280
1951	6,264	5,353	-	347	564
1952	10,130	8,568	-	650	912
1953	12,459	10,604	-	734	1,121
1954	12,807	10,832	-	822	1,153
1955	12,411	10,508	-	786	1,117
1956	13,946	11,525	-	1,166	1,255
1957	15,858	12,833	-	1,598	1,427
1958	16,065	13,246	1	1,372	1,446
1959	16,640	13,171	130	1,841	1,498
1960	17,326	13,196	363	2,208	1,559
1961	17,997	13,871	630	1,876	1,620
1962	19,162	14,331	1,334	1,772	1,725
1963	20,134	14,191	2,628	1,485	1,830
1964	20,594	13,218	3,635	2,020	1,721
1965	20,670	11,396	4,490	2,816	1,968
1966	24,610	13,284	5,026	3,663	2,637
1967	27,267	15,855	4,201	4,632	2,579
1968	28,959	16,573	3,920	5,917	2,549
1969	26,126	15,771	3,314	4,342	2,699
1970	24,930	14,643	3,000	4,643	2,644
1971	22,186	12,584	2,777	4,302	2,523
1972	22,816	13,295	2,606	4,269	2,646
1973	24,808	12,886	2,393	6,186	3,343
1974 <sup>r</sup>	26,364	12,650	2,001	7,046	4,067
1975	28,034	13,128	2,833	7,336	4,737

Source: Aerospace Industries Association estimates, based on latest available information.

NOTE: For explanation of "Aerospace Sales" see "NOTE" on page 9.

<sup>r</sup> Revised.



### AEROSPACE SALES AND THE NATIONAL ECONOMY

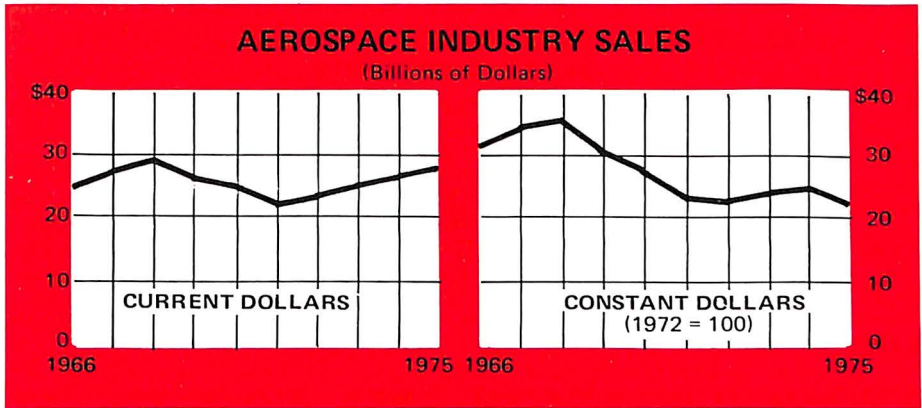
Calendar Years 1960 to Date  
(Billions of Dollars)

Year	TOTAL Gross National Product <sup>r</sup>	Sales			Aerospace Sales as Percent of		
		Manufacturing Industries <sup>r</sup>	Durable Goods Industry <sup>r</sup>	Aerospace Industry	GNP	Manufacturing Industries	Durable Goods Industry
1960	\$ 506.0	\$ 345.7	\$ 173.9	\$ 17.3	3.4%	5.0%	9.9%
1961	523.3	356.4	175.2	18.0	3.4	5.1	10.3
1962	563.8	389.9	195.5	19.2	3.4	4.9	9.8
1963	594.7	412.7	209.0	20.1	3.4	4.9	9.6
1964	635.7	443.1	226.3	20.6	3.2	4.6	9.1
1965	688.1	492.2	257.0	20.7	3.0	4.2	8.1
1966	753.0	554.2	291.7	24.6	3.3	4.4	8.4
1967	796.3	575.4	300.6	27.3	3.4	4.7	9.1
1968	868.5	631.9	335.5	29.0	3.3	4.6	8.6
1969	935.5	694.6	366.5	26.1	2.8	3.8	7.1
1970	982.4	708.8	363.1	24.9	2.5	3.5	6.9
1971	1,063.4	751.4	382.5	22.2	2.1	3.0	5.8
1972	1,171.1	849.5	435.8	22.8	1.9	2.7	5.2
1973	1,306.3	1,017.2	527.3	24.8	1.9	2.4	4.7
1974	1,406.9	1,060.7	529.0	26.4	1.9	2.5	5.0
1975	1,499.0	1,066.7	520.8	28.0	1.9	2.6	5.4

Source: Gross National Product, Manufacturing and Durable Goods Industries: Department of Commerce, "Survey of Current Business," (Monthly). Aerospace: Aerospace Industries Association estimates, based on latest available information.

NOTE: For explanation of "Aerospace Sales" see "NOTE" on page 9.

<sup>r</sup> Revised.



### AEROSPACE SALES AND THE NATIONAL ECONOMY IN CONSTANT DOLLARS

Calendar Years 1960 to Date  
(Billions of 1972 Dollars)

Year	TOTAL Gross National Product	Sales			GNP Implicit Price Deflator 1972=100
		Manu- facturing Industries	Durable Goods Industry	Aerospace Industry	
1960	\$ 736.9	\$ 503.4	\$ 253.2	\$ 25.2	68.67
1961	755.3	514.4	252.9	26.0	69.28
1962	799.1	522.6	277.1	27.2	70.55
1963	830.7	576.5	291.9	28.1	71.59
1964	874.3	609.4	311.2	28.3	72.71
1965	925.9	662.3	345.8	27.9	74.32
1966	981.0	722.0	380.0	32.0	76.76
1967	1,007.7	728.2	380.4	34.5	79.02
1968	1,051.8	765.3	406.3	35.1	82.57
1969	1,078.8	801.0	422.6	30.1	86.72
1970	1,075.3	775.8	397.4	27.3	91.36
1971	1,107.5	782.5	398.4	23.1	96.02
1972	1,171.1	849.5	435.8	22.8	100.00
1973	1,233.3	960.3	497.8	23.4	105.92
1974	1,328.3	1,001.3	499.4	24.9	116.20
1975	1,186.4	918.0	448.2	22.2	126.35

Source: Deflator Series: "Economic Report of the President," January 1976.



**SALES AND BACKLOG OF MAJOR AEROSPACE COMPANIES  
BY PRODUCT GROUP**

1961 to Date  
(Millions of Dollars)

Year	GRAND TOTAL	TOTAL		Aircraft, Engines, and Parts		Missiles & Space Incl. Propulsion	Other Aerospace		Non-Aerospace
		U.S. Gov't	Other	U.S. Gov't	Other		U.S. Gov't	Other	

**SALES**

1961	\$14,948	\$11,766	\$ 3,182	\$ 3,967	\$ 1,888	\$5,187	\$1,824	\$ 852	\$1,230
1962	15,972	12,552	3,420	4,128	1,772	6,078	1,791	762	1,441
1963	16,407	13,203	3,204	4,158	1,459	6,904	1,611	682	1,593
1964	16,686	12,815	3,871	4,568	1,863	6,381	1,418	735	1,721
1965	17,016	12,535	4,481	4,525	2,532	5,819	1,413	759	1,968
1966	20,227	14,530	5,697	5,458	3,267	6,241	1,755	869	2,637
1967	23,444	16,334	7,110	7,141	4,753	6,054	1,914	1,002	2,580
1968	25,592	16,635	8,957	7,411	6,439	6,076	2,077	1,040	2,549
1969	24,648	16,560	8,088	7,161	5,603	5,660	2,539	986	2,699
1970	24,752	16,407	8,345	7,586	5,880	5,422	2,324	896	2,644
1971	21,679	14,114	7,565	6,313	5,079	4,971	1,909	884	2,523
1972	21,499	13,492	8,007	4,954	5,199	5,598	2,067	1,035	2,646
1973	24,305	14,431	9,874	5,539	6,739	5,580	2,103	1,001	3,343
1974 <sup>r</sup>	26,849	15,196	11,653	5,982	7,560	5,854	2,101	1,285	4,067
1975	29,205	17,211	11,994	6,633	7,690	6,446	2,065	1,634	4,737

**BACKLOG - AS OF DECEMBER 31**

1961	\$13,922	\$11,018	\$ 2,904	\$ 5,056	\$ 2,136	\$3,836	\$1,391	\$ 390	\$1,113
1962	13,138	10,572	2,566	4,900	1,672	4,056	992	488	1,030
1963	13,904	10,950	2,954	4,924	1,887	4,646	837	458	1,152
1964	15,188	11,651	3,537	5,282	2,515	4,556	913	492	1,430
1965	20,385	13,731	6,654	6,107	5,281	5,480	1,294	562	1,661
1966	27,547	15,711	11,836	8,761	9,718	4,510	1,588	904	2,066
1967	29,339	16,397	12,972	20,628 <sup>a</sup>	5,704	1,712	917	1,761	
1968	30,749	16,343	14,406	8,150	12,409	5,083	1,851	983	2,273
1969	28,297	14,298	13,999	7,089	12,099	4,338	2,001	880	1,890
1970	24,705	12,882	11,823	5,913	9,800	4,522	1,986	805	1,679
1971	24,579	13,997	10,582	6,221	8,059	4,780	2,232	1,042	2,245
1972	26,922	15,322	11,600	7,027	8,605	5,272	2,018	972	3,028
1973	29,661	16,695	12,966	7,815	8,550	5,670	1,819	1,078	4,729
1974 <sup>r</sup>	35,516	20,889	14,627	9,789	9,602	6,643	1,926	1,665	5,891
1975	35,126	22,284	12,842	10,862	8,217	6,315	1,990	2,105	5,637

Source: Bureau of the Census, "Current Industrial Reports," Series MQ (Quarterly).  
NOTE: Based on reports from about 55 aerospace companies.

a Of this amount, orders of aircraft by the U.S. Government were \$7,071 million; by other customers are \$9,306 million. Total engine sales were \$4,251 million.  
r Revised.

**NET PROFIT AFTER TAXES  
AS A PERCENT OF SALES  
FOR MANUFACTURING CORPORATIONS**

Calendar Years 1960 to Date

Year	All Manufacturing Corporations <sup>a</sup>	Non-Durable Goods	Durable Goods	Aerospace
1960	4.4%	4.8%	4.0%	1.4%
1961	4.3	4.7	3.9	1.8
1962	4.5	4.7	4.4	2.4
1963	4.7	4.9	4.5	2.3
1964	5.2	5.4	5.1	2.6
1965	5.6	5.5	5.7	3.2
1966	5.6	5.5	5.6	3.0
1967	5.0	5.3	4.9	2.7
1968	5.1	5.3	4.9	3.2
1969	4.8	5.0	4.6	3.0
1970	4.0	4.5	3.6	2.0
1971	4.1	4.5	3.8	1.8
1972	4.4	4.6	4.3	2.4
1973	4.7	5.0	4.5	2.9
1974 <sup>r</sup>	5.5	6.4	4.7	2.9
1975	4.6	5.1	4.1	2.9

Source: Federal Trade Commission, "Quarterly Financial Report for Manufacturing Corporations."

<sup>a</sup> Does not include newspapers.

<sup>r</sup> Revised.

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

Calendar Years 1961 to Date  
(Thousands of Employees)

Year	All Manufacturing Industries	Durable Goods Industries	Aerospace Industry		
			TOTAL	As Percent of	
				All Manufacturing	Durable Goods
1961	16,326	9,070	1,178	7.2%	13.0%
1962	16,853	9,480	1,270	7.5	13.4
1963	16,995	9,616	1,267	7.5	13.2
1964	17,274	9,816	1,209	7.0	12.3
1965	18,062	10,406	1,175	6.5	11.3
1966	19,214	11,284	1,375	7.2	12.2
1967	19,447	11,439	1,484	7.6	13.0
1968	19,781	11,626	1,502	7.6	12.9
1969	20,167	11,895	1,402	7.0	11.8
1970	19,349	11,195	1,166	6.0	10.4
1971	18,529	10,565	951	5.1	9.0
1972	18,933	10,884	922	4.9	8.5
1973	19,820	11,633	948	4.8	8.1
1974	20,016	11,837	965	4.8	8.2
1975	18,347	10,679	942	5.1	8.8

Sources: Manufacturing and Durable Goods: Bureau of Labor Statistics, "Employment and Earnings" (Monthly); Aerospace: Aerospace Industries Association estimates based on latest available information.

NOTE: Aerospace employment as shown is the sum of the estimated monthly average employment in the aircraft and missile and space industries (SIC 372 and 1925) plus estimated aerospace employment in the communications equipment (SIC 3662) and instruments (SIC 3811 and 3821) industries and in certain other industries (SIC 28, 35, 73, 89, etc.).

# AEROSPACE INDUSTRY AND ALL MANUFACTURING INDUSTRIES

Annual Average Employment and Payroll  
Calendar Years 1961 to Date

Year	All Manufacturing Industries TOTAL	Aerospace			Aerospace as Percent of All Manufacturing
		TOTAL	Production Workers	Other <sup>b</sup>	

## EMPLOYMENT—Thousands of Employees

1961	16,326	1,178	612	566	7.2%
1962	16,853	1,270	635	635	7.5
1963	16,995	1,267	625	642	7.5
1964	17,274	1,209	600	609	7.0
1965	18,062	1,175	597	578	6.5
1966	19,214	1,375	731	644	7.2
1967	19,447	1,484	804	680	7.6
1968	19,781	1,502	807	695	7.6
1969	20,167	1,402	746	656	7.0
1970	19,349	1,166	604	562	6.0
1971	18,529	951	480	471	5.1
1972	18,933	922	453	469	4.9
1973	19,820	948	475	473	4.8
1974	20,016	965	478	487	4.8
1975	18,347	942	455	487	5.1

## PAYROLL—Millions of Dollars<sup>a</sup>

1961	\$ 89,800	\$ 9,140	\$ 4,342	\$ 4,798	10.1%
1962	96,700	10,232	4,871	5,361	10.5
1963	100,600	10,173	4,588	5,585	10.1
1964	107,200	10,067	4,563	5,504	9.4
1965	115,600	10,188	4,504	5,684	8.8
1966	128,100	12,139	5,641	6,498	9.4
1967	134,200	13,727	6,382	7,345	10.2
1968	145,900	14,397	6,582	7,815	9.9
1969	157,600	14,649	6,401	8,248	9.3
1970	158,300	12,275	5,322	6,953	7.8
1971	160,500	10,480	4,409	6,071	6.5
1972	175,800	11,197	4,565	6,632	6.4
1973	196,600	12,257	5,114	7,143	6.2
1974	211,200 <sup>r</sup>	13,250	5,454	7,796	6.3
1975	211,200	14,561	5,822	8,739	6.9

Sources: Aerospace Employment and Payroll: Aerospace Industries Association estimates, based on latest available information; Manufacturing Employment: Bureau of Labor Statistics, "Employment and Earnings" (Monthly); Manufacturing Payroll: Bureau of Economic Analysis.

a Aerospace Payroll is estimated by a method similar to that used to estimate Aerospace Employment. See "NOTE," page 16.

b "Other" employment includes salaried, clerical and maintenance employees, among others.

r Revised.

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

Calendar Years 1961 to Date  
(Thousands of Employees)

Year	All Manu- facturing Industries	Durable Goods Industries	Aerospace Industry		
			TOTAL	As Percent of	
				All Manufac- turing	Durable Goods
1961	16,326	9,070	1,178	7.2%	13.0%
1962	16,853	9,480	1,270	7.5	13.4
1963	16,995	9,616	1,267	7.5	13.2
1964	17,274	9,816	1,209	7.0	12.3
1965	18,062	10,406	1,175	6.5	11.3
1966	19,214	11,284	1,375	7.2	12.2
1967	19,447	11,439	1,484	7.6	13.0
1968	19,781	11,626	1,502	7.6	12.9
1969	20,167	11,895	1,402	7.0	11.8
1970	19,349	11,195	1,166	6.0	10.4
1971	18,529	10,565	951	5.1	9.0
1972	18,933	10,884	922	4.9	8.5
1973	19,820	11,633	948	4.8	8.1
1974	20,016	11,837	965	4.8	8.2
1975	18,347	10,679	942	5.1	8.8

Sources: Manufacturing and Durable Goods: Bureau of Labor Statistics, "Employment and Earnings" (Monthly); Aerospace: Aerospace Industries Association estimates based on latest available information.

NOTE: Aerospace employment as shown is the sum of the estimated monthly average employment in the aircraft and missile and space industries (SIC 372 and 1925) plus estimated aerospace employment in the communications equipment (SIC 3662) and instruments (SIC 3811 and 3821) industries and in certain other industries (SIC 28, 35, 73, 89, etc.).

# AEROSPACE INDUSTRY AND ALL MANUFACTURING INDUSTRIES

Annual Average Employment and Payroll  
Calendar Years 1961 to Date

Year	All Manufacturing Industries TOTAL	Aerospace			Aerospace as Percent of All Manufacturing
		TOTAL	Production Workers	Other <sup>b</sup>	
<b>EMPLOYMENT – Thousands of Employees</b>					
1961	16,326	1,178	612	566	7.2%
1962	16,853	1,270	635	635	7.5
1963	16,995	1,267	625	642	7.5
1964	17,274	1,209	600	609	7.0
1965	18,062	1,175	597	578	6.5
1966	19,214	1,375	731	644	7.2
1967	19,447	1,484	804	680	7.6
1968	19,781	1,502	807	695	7.6
1969	20,167	1,402	746	656	7.0
1970	19,349	1,166	604	562	6.0
1971	18,529	951	480	471	5.1
1972	18,933	922	453	469	4.9
1973	19,820	948	475	473	4.8
1974	20,016	965	478	487	4.8
1975	18,347	942	455	487	5.1
<b>PAYROLL – Millions of Dollars<sup>a</sup></b>					
1961	\$ 89,800	\$ 9,140	\$ 4,342	\$ 4,798	10.1%
1962	96,700	10,232	4,871	5,361	10.5
1963	100,600	10,173	4,588	5,585	10.1
1964	107,200	10,067	4,563	5,504	9.4
1965	115,600	10,188	4,504	5,684	8.8
1966	128,100	12,139	5,641	6,498	9.4
1967	134,200	13,727	6,382	7,345	10.2
1968	145,900	14,397	6,582	7,815	9.9
1969	157,600	14,649	6,401	8,248	9.3
1970	158,300	12,275	5,322	6,953	7.8
1971	160,500	10,480	4,409	6,071	6.5
1972	175,800	11,197	4,565	6,632	6.4
1973	196,600	12,257	5,114	7,143	6.2
1974	211,200 <sup>r</sup>	13,250	5,454	7,796	6.3
1975	211,200	14,561	5,822	8,739	6.9

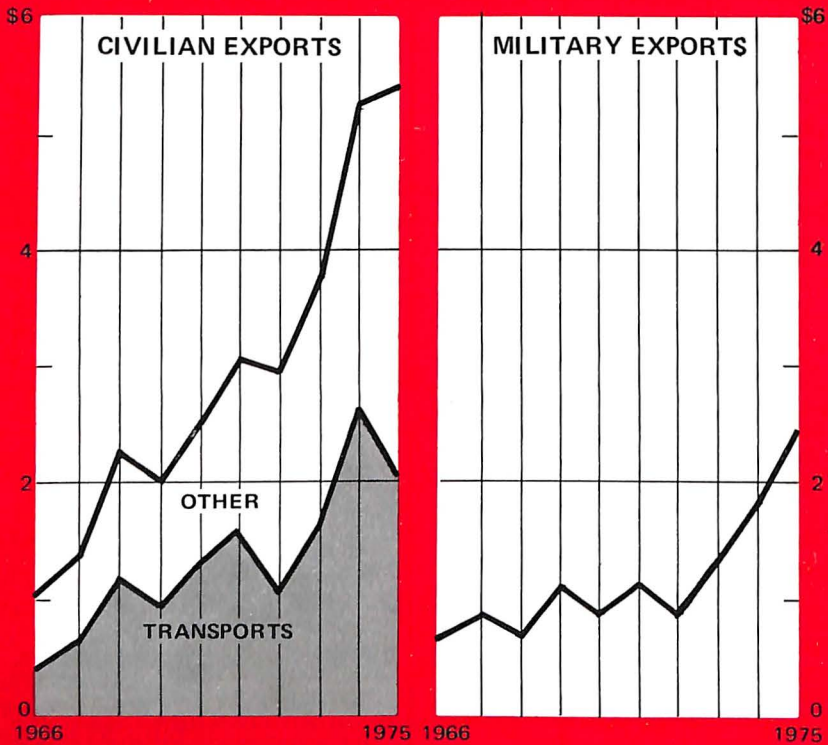
Sources: Aerospace Employment and Payroll: Aerospace Industries Association estimates, based on latest available information; Manufacturing Employment: Bureau of Labor Statistics, "Employment and Earnings" (Monthly); Manufacturing Payroll: Bureau of Economic Analysis.

<sup>a</sup> Aerospace Payroll is estimated by a method similar to that used to estimate Aerospace Employment. See "NOTE," page 16.

<sup>b</sup> "Other" employment includes salaried, clerical and maintenance employees, among others.

<sup>r</sup> Revised.

### EXPORTS OF AEROSPACE PRODUCTS (Billions of Dollars)



Source: Bureau of the Census

**U. S. EXPORTS AND EXPORTS OF AEROSPACE PRODUCTS**  
**Calendar Years 1960 to Date**  
**(Millions of Dollars)**

Year	TOTAL Exports of U.S. Merchandise	Exports of Aerospace Products				
		TOTAL	Percent of Total U.S. Exports	Civil		Military
				Trans- ports	Other	
1960	\$ 20,375	\$ 1,726	8.5%	\$ 480	\$ 609	\$ 637
1961	20,754	1,653	8.0	263	615	773
1962	20,431	1,923	9.4	259	651	1,013
1963	23,062	1,627	7.1	191	541	895
1964	26,156	1,608	6.1	211	553	844
1965	27,127	1,618	6.0	353	501	764
1966	29,884	1,673	5.6	421	614	638
1967	31,142	2,248	7.2	611	769	868
1968	34,199	2,994	8.8	1,200	1,089	705
1969	37,462	3,138	8.4	947	1,080	1,111
1970	42,590	3,405	8.0	1,283	1,233	889
1971	43,492	4,203	9.7	1,567	1,513	1,123
1972	48,959	3,795	7.8	1,119	1,835	841
1973	70,246	5,142	7.3	1,664	2,124	1,354
1974 <sup>r</sup>	97,144	7,095	7.3	2,655	2,618	1,822
1975	106,157	7,821	7.4	2,424	2,927	2,470

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country," Report FT 410 (Monthly); Bureau of the Census, "Highlights of U.S. Export and Import Trade," Report FT 990 (Monthly).

<sup>r</sup> Revised.

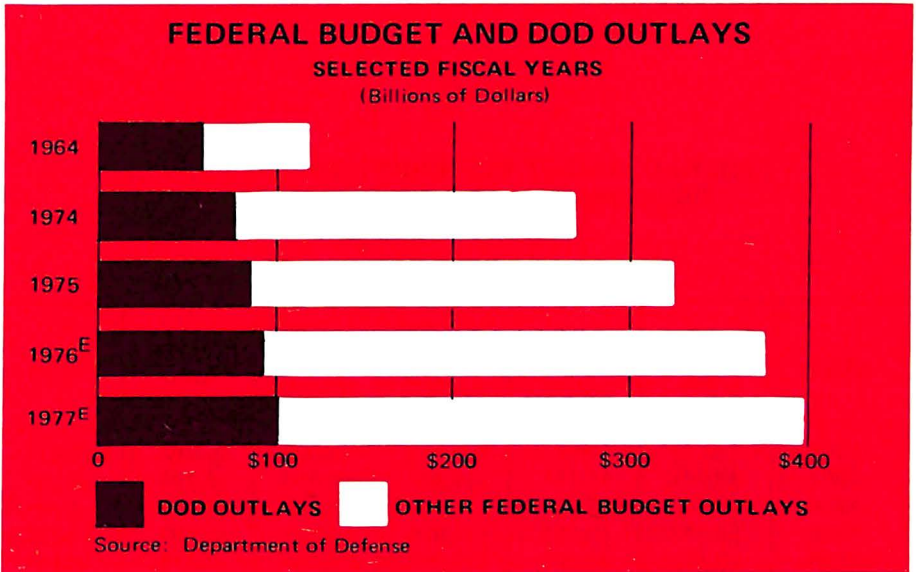


**U. S. MANUFACTURED TRANSPORT AIRCRAFT**  
**In Operation on World Civil Airlines**  
**Calendar Years 1960 to Date**

<b>Year</b>	<b>TOTAL AIRCRAFT IN OPERATION</b>	<b>Number Manufactured in the United States</b>	<b>Percent Manufactured in the United States</b>
1960	3,376	2,766	81.9%
1961	3,319	2,542	76.6
1962	3,162	2,345	74.2
1963	3,086	2,266	73.4
1964	3,137	2,317	73.9
1965	3,461	2,548	73.6
1966	3,541	2,556	72.2
1967	3,725	2,735	73.4
1968	3,903	2,890	74.0
1969	3,999	3,030	75.8
1970	3,983	3,042	76.4
1971	3,973	3,094	77.9
1972	4,097	3,247	79.3
1973	4,225	3,310	78.3
1974	4,133	3,311	80.1

Source: International Air Transport Association, "World Air Transport Statistics" (Annually).

NOTE: Excludes U.S.S.R., People's Republic of China and non-IATA members.



### GNP, FEDERAL BUDGET AND DEFENSE BUDGET

Selected Fiscal Years  
(Billions of Dollars)

Year	GNP	Federal Budget Outlays			DOD Outlays as Percent of	
		NET TOTAL <sup>a</sup>	DOD	Others	GNP	Federal Budget
1950 - Lowest defense budget since World War II peak	\$ 263.3	\$ 43.1	\$ 12.0	\$ 32.8	4.5%	26.8%
1953 - Korea peak	358.9	76.8	47.5	31.3	13.3	60.3
1964 - Last prewar year	612.2	118.6	50.8	70.7	8.3	41.8
1968 - South East Asia peak	826.1	178.8	78.0	105.3	9.4	42.5
1973 - Actual	1,220.0	246.5	73.8	181.1	6.0	29.0
1974 - Actual	1,348.9	268.4	78.4	199.9	5.8	28.2
1975 - Actual	1,440.0	324.6	86.0	238.6	6.0	26.5
1976 - Current estimate	1,593.0	373.5	91.2	282.3	5.7	24.4
1977 - Budget estimate	1,837.0	394.2	100.1	294.1	5.4	25.4

Source: Department of Defense, Budget Press Release, OASD (Comptroller) January 21, 1976.

NOTE: For an explanation of the change in Fiscal Years, see page 22.

<sup>a</sup> "Net Total" is government-wide total less intragovernmental transactions.

AEROSPACE FACTS AND FIGURES 1976/77

FEDERAL BUDGET AUTHORITY FOR AEROSPACE  
PRODUCTS AND SERVICES

Fiscal Years 1962 to Date  
(Millions of Dollars)

Year	TOTAL <sup>r</sup>	Department of Defense				NASA <sup>r</sup>
		TOTAL	Aircraft	Missiles	Astro- navics	
1962	\$ 14,576	\$ 13,077	\$ 6,591	\$ 5,604	\$ 882	\$ 1,499
1963	17,041	14,112	6,499	6,415	1,198	2,929
1964	18,399	14,013	6,649	6,107	1,257	4,386
1965	17,447	12,464	7,025	4,550	889	4,983
1966	20,197	15,083	10,463	3,541	1,079	5,114
1967	21,212	16,329	10,737	4,650	942	4,883
1968	21,132	16,581	10,641	4,897	1,043	4,551
1969	18,490	14,528	7,593	5,863	1,072	3,962
1970	17,778	14,082	8,005	5,439	638	3,696
1971	17,112	13,826	7,998	5,366	462	3,286
1972	17,261	14,006	8,414	5,203	389	3,255
1973	16,551	13,222	7,579	5,236	407	3,329
1974	15,940	13,001	7,606	4,805	590	2,939
1975	15,987	12,899	7,716	4,655	528	3,088
1976 <sup>E</sup>	18,721	15,248	9,224	5,440	584	3,473
Tr. Qtr. <sup>E</sup>	4,146	3,225	1,933	1,158	134	921
1977 <sup>E</sup>	23,071	19,498	12,207	6,691	600	3,573

Source: Department of Defense, Budget Press Briefing, January 21, 1976. NASA, "The Budget of the United States Government" (Annually).

NOTE: Until June 30, 1976 the fiscal years ran from July 1 to June 30. Beginning October 1, 1976 the fiscal years run from October 1 through September 30. A three month "Transition Quarter" from July 1 through September 1976 belongs to neither fiscal year.

Tr. Qtr. Transition Quarter.

E Estimate.

r Revised.

**FEDERAL OUTLAYS FOR  
AEROSPACE PRODUCTS AND SERVICES**

Fiscal Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL	Department of Defense				NASA
		TOTAL	Aircraft	Missiles	Astro- nautics	
1960	\$ 12,849	\$ 12,502	\$ 6,904	\$ 5,086	\$ 512	\$ 347
1961	13,606	12,960	6,445	5,997	518	646
1962	15,135	13,992	7,024	6,219	749	1,143
1963	16,186	13,857	6,853	6,058	946	2,327
1964	17,938	14,205	6,992	5,929	1,284	3,733
1965	15,697	11,135	6,217	3,997	921	4,562
1966	17,771	12,411	7,611	3,870	930	5,360
1967	20,011	14,874	9,459	4,432	983	5,137
1968	21,355	16,757	10,829	4,707	1,221	4,598
1969	20,472	16,286	10,208	4,919	1,159	4,185
1970	18,747	15,048	9,187	5,108	753	3,699
1971	17,335	13,997	8,330	5,148	519	3,338
1972	16,999	13,627	7,993	5,166	468	3,372
1973	15,945	12,675	7,102	5,061	512	3,270
1974	15,782	12,601	6,899	5,141	561	3,181
1975	15,943	12,762	7,182	5,065	515	3,181

Source: Department of Defense, Budget Press Briefing, January 21, 1976. NASA, Budget Briefing, January 21, 1976.

NOTE: Fiscal Years ending June 30.

**DEPARTMENT OF DEFENSE  
TOTAL OUTLAYS BY FUNCTIONAL TITLE**  
Fiscal Years 1969 to Date  
(Millions of Dollars)

	1969	1970	1971
<b>TOTAL</b> . . . . .	\$ 78,666	\$ 77,880	\$ 75,545
<b>PROCUREMENT — TOTAL</b> . . . . .	<u>23,988</u>	<u>21,585</u>	<u>18,858</u>
<b>AIRCRAFT</b> . . . . .	9,177	7,948	6,631
<b>MISSILES</b> . . . . .	2,509	2,912	3,140
Ships . . . . .	1,949	2,066	2,114
Combat Vehicles, Weapons & Torpedoes . . . . .	(a)	647	545
Ordnance, Vehicles & Related Equipment . . . . .	6,590	4,973	3,586
Electronics & Communications . . . . .	1,409	1,182	1,163
Other Procurement . . . . .	2,354	1,857	1,679
<b>RESEARCH, DEVELOPMENT, TEST &amp; EVALUATION — TOTAL</b> . . . . .	<u>7,459</u>	<u>7,166</u>	<u>7,303</u>
<b>AIRCRAFT</b> . . . . .	1,031	1,239	1,699
<b>MISSILES</b> . . . . .	2,410	2,196	2,008
<b>ASTRONAUTICS</b> . . . . .	1,159	753	519
Other . . . . .	2,859	2,978	3,077
<b>Military Personnel — TOTAL</b> . . . . .	<u>23,828</u>	<u>25,880</u>	<u>26,018</u>
Active Forces . . . . .	20,478	21,977	21,428
Reserve Forces . . . . .	907	1,054	1,204
Retired Pay . . . . .	2,443	2,849	3,386
<b>Military Assistance</b> . . . . .	686	609	999
<b>Military Construction</b> . . . . .	1,389	1,168	1,095
<b>Family Housing</b> . . . . .	572	614	598
<b>Civil Defense</b> . . . . .	87	80	75
<b>Operations and Maintenance</b> . . . . .	22,285	21,609	20,941
<b>Other</b> . . . . .	(1,628)	(831)	(342)

Source: Department of Defense, Budget Press Briefing, January 21, 1976.  
 NOTE: Data in parentheses are credit items.  
 The categories printed in capital letters are primarily aerospace, but others contain substantial parts attributable to aerospace activities.  
 For an explanation of the Transition Quarter and the fiscal year see page 22.  
 a Amount included in entry for "Ordnance, Vehicles & Related Equipment."  
 E Estimate.  
 N.A. Not available.

**DEPARTMENT OF DEFENSE  
TOTAL OUTLAYS BY FUNCTIONAL TITLE (Continued)**

Fiscal Years 1969 to Date  
(Millions of Dollars)

1972	1973	1974	1975	1976 <sup>E</sup>	Transition Quarter <sup>E</sup>	1977 <sup>E</sup>
\$ 75,957	\$ 73,828	\$ 78,445	\$ 86,019	\$ 91,200	\$ 24,600	\$ 100,100
<u>17,131</u>	<u>15,654</u>	<u>15,241</u>	<u>16,042</u>	<u>16,486</u>	<u>4,975</u>	<u>20,354</u>
5,927	5,066	5,006	5,484	} N.A.	} N.A.	} N.A.
3,009	3,023	2,981	2,889			
1,978	1,982	2,104	2,627			
491	354	446	395			
3,040	2,508	2,044	1,492			
946	675	854	897			
1,740	2,046	1,806	2,258			
<u>7,881</u>	<u>8,157</u>	<u>8,582</u>	<u>8,866</u>	<u>9,107</u>	<u>2,471</u>	<u>10,435</u>
2,066	2,036	1,893	1,698	} N.A.	} N.A.	} N.A.
2,157	2,038	2,160	2,176			
468	512	561	515			
3,190	3,571	3,968	4,477			
<u>26,921</u>	<u>27,635</u>	<u>28,856</u>	<u>31,210</u>	<u>32,820</u>	<u>8,670</u>	<u>33,577</u>
21,629	21,722	22,150	23,235	23,649	6,030	23,550
1,407	1,523	1,579	1,733	1,846	663	1,639
3,885	4,390	5,127	6,242	7,325	1,977	8,388
806	531	819	999	1,437	129	539
1,108	1,119	1,407	1,462	1,840	483	1,825
688	729	884	1,124	1,297	324	1,372
75	74	75	86	88	18	70
21,675	21,069	22,478	26,330	28,254	7,631	30,670
(328)	(1,140)	103	(100)	(129)	(101)	1,258

FEDERAL OUTLAYS  
 SELECTED FUNCTIONS AND AEROSPACE PRODUCTS & SERVICES

Fiscal Years<sup>a</sup> 1960 to Date  
 (Millions of Dollars)

Year	TOTAL National Defense	TOTAL NASA	Federal Outlays for AEROSPACE Products & Services			AERO-SPACE as Percent of Total National Defense and NASA
			TOTAL	DOD	NASA	
1960	\$ 45,691	\$ 401	\$ 12,849	\$ 12,502	\$ 347	27.9%
1961	47,494	744	13,606	12,960	646	28.2
1962	51,103	1,257	15,135	13,992	1,143	28.9
1963	52,755	2,552	16,186	13,857	2,327	29.3
1964	53,591	4,171	17,938	14,205	3,733	31.1
1965	49,578	5,093	15,697	11,135	4,561	28.7
1966	56,785	5,933	17,771	12,411	5,360	28.3
1967	70,081	5,426	20,011	14,874	5,137	26.5
1968	80,517	4,724	21,355	16,757	4,598	25.1
1969	81,232	4,251	20,472	16,286	4,185	23.9
1970	80,295	3,753	18,747	15,048	3,699	22.3
1971	77,661	3,382	17,335	13,997	3,338	21.4
1972	78,336	3,422	16,999	13,627	3,372	20.8
1973	76,021	3,315	15,945	12,675	3,270	20.1
1974	78,569	3,256	15,782	12,601	3,181	19.3
1975	86,585	3,266	15,943	12,762	3,181	17.7
1976 <sup>E</sup>	92,959	3,517	N.A.	N.A.	3,402	N.A.
Tr. Qtr. <sup>E</sup>	25,028	908	N.A.	N.A.	877	N.A.
1977 <sup>E</sup>	101,129	3,676	N.A.	N.A.	3,550	N.A.

Source: "The Budget of the United States Government" (Annually).  
 NOTE: "National Defense" includes the military budget of the Department of Defense and atomic energy defense activities. "Total NASA" includes research and development activities, administrative operations and construction of facilities. NASA construction is not included in "Total Aerospace Products and Services."  
 a For an explanation of the change in the Federal Government's Fiscal Year and the Transition Quarter (Tr. Qtr.), see page 22.  
 E Estimate.  
 N.A. Not available.

**DEPARTMENT OF DEFENSE  
AEROSPACE OUTLAYS**

Fiscal Years 1960 to Date  
(Millions of Dollars)

Year	DOD Aerospace Outlays <sup>a</sup>		
	TOTAL	Procurement	Research, Development, Test and Evaluation
1960	\$ 12,502	\$ 9,299	\$ 3,203
1961	12,960	8,870	4,090
1962	13,992	9,842	4,150
1963	13,857	10,126	3,731
1964	14,205	9,630	4,575
1965	11,135	7,296	3,839
1966	12,411	8,704	3,707
1967	14,875	10,341	4,534
1968	16,757	11,681	5,076
1969	16,286	11,686	4,600
1970	15,048	10,860	4,188
1971	13,997	9,771	4,226
1972	13,627	8,936	4,691
1973	12,675	8,089	4,586
1974	12,601	7,987	4,614
1975	12,762	8,373	4,389

Source: Department of Defense, OASD (Comptroller), FAD 748/75, June 30, 1975, and earlier reports.

NOTE: Fiscal Years ending June 30.

a Excludes Military Assistance.



**ACTIVE MILITARY FORCES OF THE UNITED STATES**  
Selected Fiscal Years

Description	Actual		Estimated		
	1964	1975	1976	Tr. Qtr.	1977
<b>Military Personnel (in thousands):</b>					
Army . . . . .	972	784	782	790	790
Navy . . . . .	667	535	525	532	544
Marine Corps . . . . .	190	196	196	196	196
Air Force . . . . .	856	613	584	584	571
<b>TOTAL . . . . .</b>	<b>2,685</b>	<b>2,127</b>	<b>2,087</b>	<b>2,102</b>	<b>2,101</b>
<b>Selected Military Forces:</b>					
<b>Strategic Forces:</b>					
<b>Intercontinental Ballistic Missiles:</b>					
Minuteman . . . . .	600	1,000	1,000	1,000	1,000
Titan II . . . . .	108	54	54	54	54
Polaris-Poseidon Missiles . . . . .	336	656	656	656	656
Strategic Bomber Squadrons . . . . .	78	28	26	25	25
Manned Fighter Interceptor Squadrons . . . . .	40	7	6	6	6
Army Air Defense Firing Batteries . . . . .	107	—	—	—	—
<b>General Purpose Forces:</b>					
Army Divisions . . . . .	16 1/3	14	16	16	16
Marine Corps Divisions . . . . .	3	3	3	3	3
Air Force Wings . . . . .	21	26	26	26	26
Navy Attack Wings . . . . .	15	14	13	13	13
Marine Corps Wings . . . . .	3	3	3	3	3
Attack & Antisubmarine Carriers . . . . .	24	15	13	13	13
Nuclear Attack Submarines . . . . .	19	64	65	67	75
Other Warships . . . . .	370	186	180	182	188
Amphibious Assault Ships . . . . .	133	64	62	62	64
<b>Airlift &amp; Sealift Forces:</b>					
<b>Aircraft Squadrons:</b>					
C-5A . . . . .	—	4	4	4	4
C-141 . . . . .	—	13	13	13	13
Troopships, Cargo Ships and Tankers . . . . .	100	51	48	48	47

Source: Department of Defense, Budget Press Release, OASD (Comptroller), January 21, 1976.

NOTE: For an explanation of the Transition Quarter (Tr. Qtr.) and the change in the Federal Government's Fiscal Year, see page 22.

# Aircraft Production



Traditionally the principal element of the aerospace industry's production effort, aircraft manufacturing in 1975 accounted for more than half of the industry's overall sales volume.

Sales—which included engines, parts and related equipment as well as complete new aircraft—reached an all-time peak of \$14.3 billion, up \$800 million from 1974. The increase approximately compensated inflation effect, so in terms of productive activity 1975 was almost identical to the preceding year.

The total number of aircraft delivered in 1975 was 16,593, a gain of 158 units over 1974. There was, however, a marked change in the composition of the total: civil aircraft production declined for the first time in the seventies, while deliveries of military planes increased for the 2nd year in a row.

The decline in civil aircraft numbers was reflected in dollar values. Sales to non-government customers increased from \$7.6 billion in 1974 to \$7.7 billion in 1975, but the gain was small by comparison with the sharp increases of the preceding two years. The lower rate of gain was due entirely to declining sales of large commercial transports.

In contrast, sales to government users went up substantially in 1975 to \$6.6

billion, an increase of more than \$600 million and the highest level since 1970. Despite the increase, government sales continued—for the fourth straight year—to lag well behind non-government business.

The drop in jetliner sales had been anticipated, because airline financial problems originating in the fuel crisis of 1973 had caused deferrals in transport order placements. Nonetheless, civil transport sales continued at a relatively high level in 1975. At \$3.8 billion, they were down approximately \$200 million below the preceding year's level, but slightly higher than in 1973. However, backlog data shows that the full impact of airline re-equipment deferral has not yet been felt by the manufacturing industry: jetliner orders as of year-end 1975, for planes to be delivered in 1976 or later years, were down more than \$1.2 billion below orders on hand at the end of 1974.

The decline in airline sales was compensated to some degree by record 1975 volume in both general aviation aircraft and civil helicopters. In numbers, general aviation shipments approximately matched those of 1974 but dollar volume was up by more than \$100 million and the total topped the billion dollar mark for the first time. Civil helicopter deliveries mounted both numerically and in dollar value; the industry turned out 864 helicopters worth \$274 million, increases of 36 units and \$85 million.

In military aircraft production, the 1975 total of 1,357 planes compared with 1,110 in the previous year. As in previous years, helicopters and fighter/attack aircraft dominated the category breakdown. The major military programs, in dollar volume terms, were the two advanced air superiority fighters, the Navy's F-14 Tomcat and the Air Force's F-15 Eagle. Pre-production work was initiated on another large-scale program, the Air Force F-16, a lightweight fighter designed to complement the F-15.

Other major programs included:

**Air Force:** the A-7D Corsair II attack plane, the A-10 close air support aircraft, the A-37B counter-insurgency aircraft, the F-4E Phantom fighter, the F-5E/F fighter, the F-111F fighter and the UH-1H helicopter.

**Navy/Marine Corps:** the S-3A Viking and the P-3C Orion antisubmarine patrol planes, the A-4M Skyhawk II attack plane, the A-6E Intruder attack aircraft, the A-7E Corsair II attack plane, the EA-6B Prowler electronic counter-measure aircraft, the AV-8A Harrier V/STOL strike fighter, the CH-53E transport helicopter, the AH-1J fire support helicopter and the UH-1N helicopter.

**Army:** the UH-1H Iroquois utility helicopter, the CH-47C transport helicopter, the OH-6A observation helicopter, the AH-1Q Cobra/TOW missile-launching attack helicopter, and the VH-3 VIP-transport helicopter. Decisions are expected late in 1976 on two important Army competitions involving planned large-scale production. The programs are UTTAS (Utility Tactical Transport Aircraft System) and AAH (Advanced Attack Helicopter).

## U.S. AIRCRAFT PRODUCTION

Calendar Years 1961 to Date  
(Number of Aircraft)

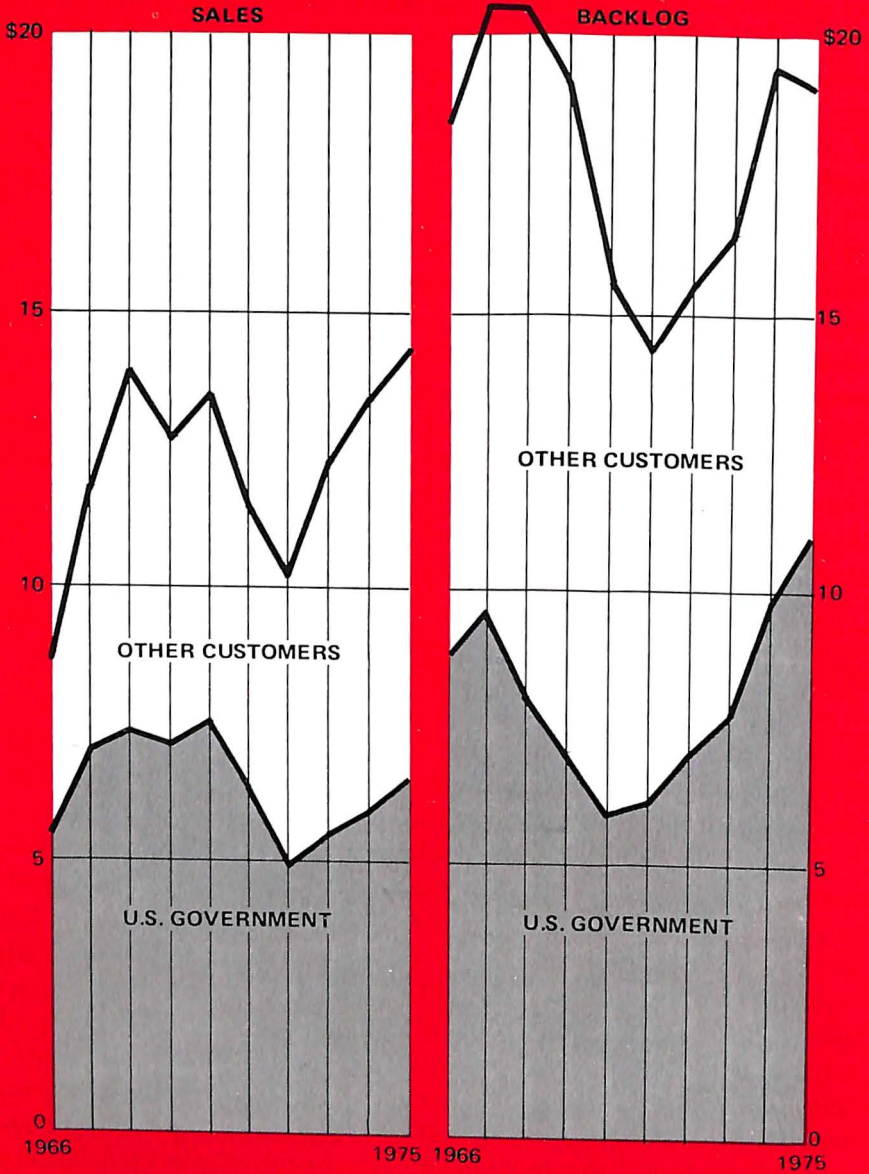
Year	TOTAL	Military	Civil
1961	8,936	1,582	7,354
1962	9,213	1,975	7,238
1963	10,143	1,970	8,173
1964	12,517	2,439	10,078
1965	15,489	2,806	12,683
1966	20,283	3,609	16,674
1967	18,993	4,481	14,512
1968	19,362	4,440	14,922
1969	17,249	3,644	13,505
1970	11,161	3,085	8,076
1971	10,390	2,232	8,158
1972 <sup>r</sup>	12,693	2,117	10,576
1973 <sup>r</sup>	16,081	1,372	14,709
1974	16,435	1,110	15,325
1975	16,593	1,357	15,236

Source: Aerospace Industries Association, company reports; General Aviation Manufacturers' Association, company reports; Department of Defense.

NOTE: As of 1972, aircraft produced for Security Assistance Programs are included.  
r Revised.

## AIRCRAFT SALES AND BACKLOG

(Billions of Dollars)



Source: Department of Commerce

## AIRCRAFT SALES AND BACKLOG COMPLETE AIRCRAFT, AIRCRAFT ENGINES, AND PARTS

Calendar Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL			Aircraft & Parts <sup>a</sup>		Aircraft Engines & Parts	
	TOTAL	U.S. Gov't	Other	U.S. Gov't	Other	U.S. Gov't	Other

**SALES**

1960	\$ 6,429	\$ 4,246	\$ 2,183	\$ 3,333	\$ 1,766	\$ 913	\$ 417
1961	5,855	3,967	1,888	2,946	1,455	1,021	433
1962	5,900	4,128	1,772	2,998	1,389	1,130	383
1963	5,617	4,158	1,459	2,986	1,055	1,172	404
1964	6,431	4,568	1,863	3,502	1,409	1,066	454
1965	7,057	4,525	2,532	3,393	1,950	1,132	582
1966	8,725	5,458	3,267	4,086	2,544	1,372	723
1967	11,894	7,141	4,753	5,345	3,737	1,796	1,016
1968	13,850	7,411	6,439	5,697	5,188	1,714	1,251
1969	12,764	7,161	5,603	5,382	4,517	1,779	1,086
1970	13,466	7,586	5,880	5,674	4,683	1,912	1,197
1971	11,392	6,313	5,079	4,953	4,093	1,360	986
1972	10,153	4,954	5,199	3,666	4,085	1,288	1,114
1973	12,278	5,539	6,739	4,231	5,322	1,308	1,417
1974 <sup>r</sup>	13,542	5,982	7,560	4,562	5,846	1,420	1,714
1975	14,323	6,633	7,690	5,271	6,001	1,362	1,689

**BACKLOG—AS OF DECEMBER 31**

1960	\$ 7,736	\$ 5,357	\$ 2,379	\$ 4,101	\$ 2,031	\$ 1,256	\$ 348
1961	7,192	5,056	2,136	3,968	1,678	1,088	458
1962	6,572	4,900	1,672	3,736	1,309	1,164	363
1963	6,811	4,924	1,887	3,844	1,457	1,080	430
1964	7,797	5,282	2,515	4,290	1,987	992	528
1965	11,388	6,072	5,316	4,425	4,460	1,647	856
1966	18,479	8,761	9,718	6,515	8,140	2,246	1,578
1967	20,628	20,628	7,071	9,306	4,251		
1968	20,559	8,150	12,409	5,999	10,609	2,151	1,800
1969	19,188	7,089	12,099	5,270	10,340	1,819	1,759
1970	15,713	5,913	9,800	4,663	8,601	1,250	1,199
1971	14,280	6,221	8,059	4,876	7,123	1,345	936
1972	15,632	7,027	8,605	5,705	7,355	1,322	1,250
1973	16,373	7,815	8,550	6,312	7,232	1,503	1,318
1974 <sup>r</sup>	19,391	9,789	9,602	7,698	7,791	2,091	1,811
1975	19,079	10,862	8,217	8,830	6,669	2,032	1,548

Source: Bureau of the Census, "Current Industrial Reports," Series MQ37D (Quarterly).

NOTE: Based on reports from about 55 aerospace companies.

a Including Aircraft Propellers and Parts.

r Revised.

**CIVIL AIRCRAFT SHIPMENTS**

Number and Value  
Calendar Years 1961 to Date

Year	TOTAL	Transport Aircraft	Helicopters	General Aviation
<b>NUMBER OF AIRCRAFT SHIPPED</b>				
1961	7,354	198	378	6,778
1962	7,238	134	407	6,697
1963	8,173	100	504	7,569
1964	10,078	163	579	9,336
1965	12,683	233	598	11,852
1966	16,674	344	583	15,747
1967	14,512	480	455	13,577
1968	14,922	702	522	13,698
1969	13,505	514	534	12,457
1970	8,076	311	482	7,283
1971	8,158	223	469	7,466
1972	10,576	227	575	9,774
1973	14,709	294	770	13,645
1974	15,325	332	828	14,165
1975	15,236	315	864	14,057
<b>VALUE—Millions of Dollars</b>				
1961	\$ 849	\$ 725	\$ N.A.	\$ 124
1962	742	605	N.A.	137
1963	559	406	N.A.	153
1964	986	787	N.A.	199
1965	1,554	1,197	39	318
1966	2,183	1,699	40	444
1967	2,861	2,458	43	360
1968	4,267	3,789	57	421
1969	3,598	2,939	75	584
1970	3,546	3,158	49	339
1971	2,984	2,594	69	321
1972	3,308	2,660	90	558
1973	4,665	3,718	121	826
1974	5,090	3,993	189	908
1975	5,086	3,779	274	1,033

Source: Transport aircraft and helicopters: Aerospace Industries Association.  
General Aviation: General Aviation Manufacturers' Association.

**HELICOPTER  
COMMERCIAL PRODUCTION**

Calendar Years 1971 to Date -

	1971	1972	1973	1974	1975
<b>Number of Helicopters Shipped . . .</b>	469	575	770	828	864
<b>Value — Millions of Dollars . . . . .</b>	\$ 69	\$ 90	\$ 121	\$ 189	\$ 274
<b>Company and Model</b>					
<u>Bell — TOTAL . . . . .</u>	<u>274</u>	<u>329</u>	<u>477</u>	<u>467</u>	<u>495</u>
47 Series . . . . .	110	97	92	3	3
204 Series . . . . .	1	—	4	—	1
205 Series . . . . .	13	17	29	26	40
206 Series . . . . .	129	193	304	368	325
212 Series . . . . .	21	22	48	70	126
<u>Boeing-Vertol — TOTAL . . . . .</u>	<u>5</u>	<u>6</u>	<u>2</u>	<u>11</u>	<u>10</u>
CH-47C . . . . .	5	6	2	11	10
<u>Enstrom — TOTAL . . . . .</u>	<u>17</u>	<u>38</u>	<u>64</u>	<u>87</u>	<u>77</u>
F-28A . . . . .	17	38	64	86	59
280 . . . . .	—	—	—	1	18
<u>Fairchild — TOTAL . . . . .</u>	<u>21</u>	<u>28</u>	<u>10</u>	<u>—</u>	<u>—</u>
FH-1100 . . . . .	21	28	10	—	—
<u>Hiller — TOTAL . . . . .</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>3</u>	<u>35</u>
12-E . . . . .	—	—	—	3	35
<u>Hughes — TOTAL . . . . .</u>	<u>137</u>	<u>155</u>	<u>211</u>	<u>248</u>	<u>214</u>
300's . . . . .	54	71	96	105	92
500's . . . . .	83	84	115	143	122
<u>Sikorsky (UTC) — TOTAL . . . . .</u>	<u>15</u>	<u>19</u>	<u>6</u>	<u>12</u>	<u>33</u>
S-61 . . . . .	9	13	6	12	13
S-64 . . . . .	—	—	—	—	3
S-65 . . . . .	6	6	—	—	17

Source: Aerospace Industries Association, company reports.  
NOTE: All figures exclude the production by foreign licensees.



## TRANSPORT AIRCRAFT PRODUCTION

Calendar Years 1971 to Date

Company and Model	1971	1972	1973	1974	1975
<b>TOTAL</b>					
Number of Aircraft Shipped . . . . .	223	227	294	332	315
Value — Millions of Dollars . . . . .	\$ 2,594	\$ 2,660	\$ 3,718	\$ 3,993	\$ 3,779
<b>Boeing — TOTAL . . . . .</b>	<u>141</u>	<u>96</u>	<u>148</u>	<u>174</u>	<u>169</u>
B-707 . . . . .	10	3	11	21	7
B-727 . . . . .	33	41	92	91	91
B-737 . . . . .	29	22	17	41	51
B-747 . . . . .	69	30	28	21	20
<b>Lockheed — TOTAL . . . . .</b>	<u>13</u>	<u>51</u>	<u>68</u>	<u>64</u>	<u>68</u>
L-1011 . . . . .	—	17	39	41	25
L-100-30/C-130 (Hercules) . . . . .	13	34	29	23	43
<b>McDonnell Douglas — TOTAL . . . . .</b>	<u>69</u>	<u>80</u>	<u>78</u>	<u>94</u>	<u>78</u>
DC-8 . . . . .	13	4	—	—	—
DC-9 . . . . .	43	24	21	48	35
DC-10 . . . . .	13	52	57	46	43

Source: Aerospace Industries Association, company reports.

NOTE: Differs from FAA totals which include executive type aircraft.

## TRANSPORT AIRCRAFT ORDERS

Domestic and Foreign  
As of December 31, 1975

Company and Model	Aircraft for Delivery in 1976 or Later		
	TOTAL	Domestic	Foreign
<b>TRANSPORTS</b>			
Number of Aircraft on Order . . . . .	381	123	258
Value—Millions of Dollars <sup>a</sup> . . . . .	\$ 6,369	\$ 1,747	\$ 4,622
<b>Boeing—TOTAL . . . . .</b>	<u>130</u>	<u>48</u>	<u>82</u>
B-707 . . . . .	9	—	9
B-727 . . . . .	60	40	20
B-737 . . . . .	29	1	28
B-747 . . . . .	32	7	25
<b>Lockheed—TOTAL . . . . .</b>	<u>134</u>	<u>47</u>	<u>87</u>
L-1011 <sup>b</sup> . . . . .	81	45	36
L-100-30/C-130 (Hercules) . . . . .	53	2	51
<b>McDonnell Douglas<sup>b</sup>—TOTAL . . . . .</b>	<u>117</u>	<u>28</u>	<u>89</u>
DC-9 . . . . .	65	25	40
DC-10 . . . . .	52	3	49

Source: Aerospace Industries Association, company reports.

a Dollar value excludes the cost of spare parts.

b Includes options.

## GENERAL AVIATION AIRCRAFT SHIPMENTS

By Selected Manufacturers  
Calendar Years 1960 to Date

Year	TOTAL	Beech	Cessna	Gates Learjet	Grumman American	Piper	Rockwell Intl.	Other
<b>NUMBER OF AIRCRAFT SHIPPED</b>								
1960	7,588	962	3,720	—	—	2,313	155	438
1961	6,778	818	2,746	—	—	2,646	139	429
1962	6,697	830	3,124	—	—	2,139	121	483
1963	7,569	1,061	3,456	—	—	2,321	114	617
1964	9,336	1,103	4,188	3	—	3,196	109	737
1965	11,852	1,192	5,629	80	—	3,776	110	1,065
1966	15,747	1,535	7,888	51	70	4,437	265	1,501
1967	13,577	1,260	6,233	34	52	4,490	386	1,122
1968	13,698	1,347	6,578	41	N.A.	4,228	471	1,033
1969	12,457	1,061	5,887	61	306	3,951	344	847
1970	7,283	793	3,730	35	217	1,675	211	622
1971	7,466	519	3,859	23	435	2,055	202	373
1972	9,774	802	4,964	39	620	2,461	242	646
1973	13,645	1,110	7,262	66	663	3,233	418	893
1974	14,165	1,303	7,187	66	628	3,415	545	1,021
1975	14,057	1,212	7,564	79	758	3,070	433	941

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

1960	\$ 151.2	\$ 43.1	\$ 56.7	\$ —	\$ —	\$ 35.1	\$ 11.9	\$ 4.4
1961	124.3	37.1	42.3	—	—	28.9	11.0	5.0
1962	136.8	37.4	50.2	—	—	32.1	10.8	6.3
1963	153.4	38.6	55.7	—	—	38.5	11.8	8.8
1964	198.9	54.9	66.8	N.A.	—	54.5	12.0	10.7
1965	318.3	72.2	97.2	45.1	—	61.7	27.7	14.4
1966	444.2	97.3	128.2	28.6	N.A.	80.1	51.5	58.5
1967	359.6	92.0	116.6	20.2	N.A.	79.4	31.8	19.6
1968	421.5	115.7	138.8	28.7	N.A.	85.5	22.3	30.5
1969	584.5	113.1	145.6	46.5	129.0	98.2	25.4	26.7
1970	339.4	80.7	97.2	26.9	42.2	48.5	20.1	23.8
1971	321.5	52.1	102.4	18.1	45.6	56.7	24.7	21.9
1972	557.6	113.3	183.2	35.1	58.4	72.3	60.9	34.4
1973	826.4	140.4	298.0	61.5	75.0	126.8	80.4	44.3
1974	907.7	170.2	313.9	66.0	67.6	131.7	125.2	33.1
1975	1,032.9	187.1	336.3	99.7	89.9	160.6	114.4	44.9

Sources: 1960-1969: Aerospace Industries Association, company reports.

1970-1975: General Aviation Manufacturers' Association.

NOTE: "Other" includes Bellanca, Lake, Lockheed Jetstar, Maule, Mooney and Swearingen.

<sup>a</sup> Manufacturers' Net Billing Price.

N.A. / Not Available.

**CIVIL AIRCRAFT ENGINE PRODUCTION**

Fiscal Years 1970 to Date  
(Number of Engines)

Year	TOTAL	Type of Engine		
		Turbojet	Turboprop	Piston
1970	14,512	1,576	657	12,279
1971	11,687	1,134	625	9,928
1972	13,344	641	811	11,892
1973	18,159	688	1,220	16,251
1974 <sup>r</sup>	22,770 <sup>r</sup>	1,410	1,590	19,770 <sup>r</sup>
1975	22,552	1,463	2,075	19,014
1976 <sup>E</sup>	19,257	1,497	2,066	15,694

Source: Federal Aviation Administration, Office of Aviation Economics, "Aviation Forecasts."  
 NOTE: For an explanation of the Fiscal Year, see page 22.  
 E Estimate.  
 r Revised.

**AIRCRAFT ENGINE PRODUCTION  
BY SELECTED MANUFACTURERS**

Calendar Years 1971 to Date  
(Number of Engines)

Manufacturer and Engine Model	1971	1972	1973	1974	1975
TOTAL . . . . .	7,309	8,902	12,147	13,178	10,860
<u>General Electric—TOTAL . . . . .</u>	<u>235</u>	<u>261</u>	<u>393</u>	<u>447</u>	<u>345</u>
CT-58 . . . . .	2	13	12	31	43
CF-6 . . . . .	119	122	162	210	132
CJ-610 . . . . .	87	100	101	105	124
CF-700 . . . . .	27	26	118	101	46
<u>Pratt &amp; Whitney—TOTAL . . . . .</u>	<u>594</u>	<u>443</u>	<u>759</u>	<u>1,246</u>	<u>1,291</u>
JT-3D . . . . .	49	13	74	120	21
JT-8D . . . . .	176	282	469	600	542
JT-9D . . . . .	369	148	164	106	159
JT-12 . . . . .	—	—	52	48	58
JT-15 . . . . .	—	—	—	191	167
PT-6 . . . . .	—	—	—	181	344
<u>Avco-Lycoming—TOTAL . . . . .</u>	<u>6,480</u>	<u>8,198</u>	<u>10,995</u>	<u>11,485</u>	<u>9,224</u>

Source: Aerospace Industries Association, company reports.

**DEPARTMENT OF DEFENSE  
OUTLAYS FOR AIRCRAFT PROCUREMENT**

By Agency  
Fiscal Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL DOD	Air Force	Navy	Army
1960	\$ 6,272	\$ 4,414	\$ 1,765	\$ 93
1961	5,898	3,926	1,832	140
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

Source: Department of Defense, OASD (Comptroller), FAD 748/75, June 30, 1975, and earlier reports.

NOTE: Fiscal Years ending June 30.

## MILITARY AIRCRAFT PROGRAM PROCUREMENT INCLUDING INITIAL SPARES<sup>a</sup>

By Agency, Type and Model  
Fiscal Years 1976, the Transition Quarter and 1977  
(Millions of Dollars)

Agency, Type and Model	1976 <sup>E</sup>		Transition Quarter <sup>E</sup>		1977 <sup>E</sup>	
	No.	Cost	No.	Cost	No.	Cost
<b>AIR FORCE</b>						
B-1 Bomber . . . . .	—	\$ 64.0	—	\$ 23.0	3	\$1,049.5
A-10 Close Air Support . .	53	405.6	20	79.6	100	604.9
F-15 Eagle . . . . .	108	1,567.4	24	327.0	108	1,489.4
F-16 Air Combat Fighter .	—	—	—	—	16	360.6
Adv. Tanker Cargo Aircraft . . . . .	—	—	—	—	—	37.2
E-3A AWACS . . . . .	4	276.4	—	45.9	6	474.7
HH-53C Medium Lift Helicopter . . . . .	—	—	—	—	4	18.8
U-4B . . . . .	—	—	—	—	2	1.6
<b>NAVY</b>						
A-4M Skyhawk . . . . .	—	8.2	3	9.8	21	99.4
A-6E Intruder . . . . .	11	156.2	—	—	—	1.5
EA-6B Prowler . . . . .	6	115.5	1	13.5	6	139.9
A-7E Corsair II . . . . .	3	171.6	6	29.5	30	235.2
F-14A Tomcat . . . . .	36	619.7	9	138.4	36	708.2
CH-53E Sea Stallion . . . .	—	—	—	20.0	10	102.3
UH-1N Iroquois . . . . .	24	30.3	6	6.5	12	20.3
AH-1J Sea Cobra . . . . .	7	25.6	7	12.6	23	64.2
P-3C Orion . . . . .	12	172.3	3	49.4	12	241.9
S-3A Viking . . . . .	41	503.1	—	0.8	—	—
E-2C Hawkeye . . . . .	6	161.4	1	23.3	6	170.9
US-3A COD . . . . .	—	9.7	—	6.2	12	169.9
T-34C Mentor . . . . .	75	29.5	23	9.7	33	11.8
VTAMX Adv. Trainer . . . .	15	9.2	3	4.8	20	15.3
EC-130Q TACAMO IV . . . .	1	21.2	—	—	—	—
KC-130R Hercules . . . . .	—	—	4	39.6	—	—
<b>ARMY</b>						
C-12A . . . . .	20	13.8	—	—	20	16.2
AH-1G/S Cobra/TOW . . . .	38	55.9	22	27.2	82	121.4
UTTAS . . . . .	—	—	—	—	15	137.5

Source: "Program Acquisition Costs by Weapon System," Department of Defense Budget for Fiscal Year 1977.

NOTE: For an explanation of the Transition Quarter and the change in the Fiscal Year, see page 22.

a Total Obligational Authority.

E Estimate.

## MILITARY AIRCRAFT PRODUCED NUMBER AND FLYAWAY VALUE

Calendar Years 1961 to 1973 -

Year	Type of Aircraft						
	TOTAL	Bomber	Fighter/ Attack	Trans- port	Trainer	Heli- copter	Other
<b>NUMBER</b>							
1961	1,582	397	376	148	203	366	92
1962	1,975	398	437	256	211	554	119
1963	1,970	310	423	282	204	672	79
1964	2,439	362	586	254	191	1,007	39
1965	2,806	283	496	136	396	1,470	25
1966	3,609	214	627	142	442	2,164	20
1967	4,481	404	811	135	331	2,448	352
1968	4,440	34	1,007	18	292	2,800	289
1969	3,644	31	792	44	295	2,165	317
1970	3,085	66	734	37	173	1,944	131
1971	2,232	48	386	42	135	1,587	34
1972 <sup>r</sup>	2,117	13	563	29	148	1,312	52
1973 <sup>r</sup>	1,372	30	422	22	90	808	-
1974	1,110	50	478	27	49	506	-
1975	1,357	62	627	34	40	594	-

### FLYAWAY VALUE—Millions of Dollars

1961	\$ 4,497	\$ 2,575	\$ 1,054	\$ 385	\$ 200	\$ 228	\$ 55
1962	3,816	1,629	1,005	674	194	250	64
1963	2,876	798	931	587	182	337	41
1964	3,080	802	1,155	624	122	356	21
1965	2,875	639	960	655	108	490	23
1966	3,554	612	1,289	701	190	749	13
1967	4,476	822	1,721	759	144	962	68
1968	3,871	117	2,451	81	167	905	150
1969	3,693	248	2,204	101	164	845	131
1970	3,920	545	1,940	555	111	694	75
1971	2,996	397	1,322	688	112	469	8
1972 <sup>a</sup>	3,247	129	2,068	536	100	396	18
1973 <sup>a</sup>	2,571	325	1,490	348	140	268	-
1974 <sup>a</sup>	2,224	584	1,222	101	111	206	-
1975 <sup>a</sup>	2,914	584	1,816	128	27	359	-

Source: Department of Defense.

NOTE: Data exclude gliders and targets, and include spares, spare parts, and support equipment that are procured with the aircraft.

1961-1967, Navy attack planes included with bombers; 1968-1973, Navy attack planes included under fighter/attack.

a 1972-1975, Flyaway value does not include the value of planes produced for the security assistance programs and accepted by the USAF.

r Revised.

**MILITARY AIRCRAFT PRODUCTION**

Air Force Acceptances by Type and Model  
 Calendar Years 1974 and 1975  
 (Millions of Dollars)

Type and Model	Number		Flyaway Cost <sup>a</sup>		Weapon System Cost <sup>b</sup>	
	1974	1975	1974	1975	1974	1975
<b>AIR FORCE, TOTAL . . . .</b>	<b>315</b>	<b>377</b>	<b>\$ 488</b>	<b>\$ 925</b>	<b>\$ 566</b>	<b>\$ 1,072</b>
<b>Fighters/Attack, Total . . . .</b>	<u>95</u>	<u>152</u>	<u>249</u>	<u>718</u>	<u>310</u>	<u>854</u>
A-7D . . . . .	24	24	66	69	91	76
A-10A . . . . .	—	3	—	16	—	26
A-37B . . . . .	5	39	3	21	3	21
F-4E . . . . .	1	34	3	113	3	117
F-5, A/B . . . . .	5	—	8	—	9	—
F-5E/F . . . . .	51	11	80	17	91	20
F-111F . . . . .	7	8	65	92	83	99
F/TF-15A . . . . .	2	33	24	390	30	495
<b>Transports/Command &amp; Control, Total . . . . .</b>	<u>18</u>	<u>34</u>	<u>101</u>	<u>128</u>	<u>104</u>	<u>136</u>
C-9A . . . . .	—	3	—	18	—	19
C-12A . . . . .	—	9	—	6	—	6
C-130E . . . . .	1	—	2	—	2	—
C-130H . . . . .	16	22	67	104	70	111
E-4A . . . . .	1	—	32	—	32	—
<b>Trainers, Total . . . . .</b>	<u>14</u>	—	<u>78</u>	—	<u>90</u>	—
T-43 . . . . .	14	—	78	—	90	—
<b>Helicopters, Other, Total . .</b>	<u>188</u>	<u>191</u>	<u>60</u>	<u>79</u>	<u>62</u>	<u>82</u>
UH-1H . . . . .	182	181	44	58	46	61
HH-3, 53C . . . . .	6	—	16	—	16	—
CH-47C . . . . .	—	10	—	21	—	21

Source: Department of the Air Force.

a Flyaway Cost includes airframe, engines, electronics, communications, armament and other installed equipment.

b Weapon System Cost includes flyaway costs initial spares, ground equipment training equipment and technical data.

**MILITARY AIRCRAFT PRODUCTION**  
**Reimbursable Programs<sup>a</sup> by Type and Model**  
**Calendar Years 1972, 1973, 1974 and 1975**

Type and Model	Number of Aircraft Accepted			
	1972	1973	1974	1975
<b>Security Assistance, TOTAL . . .</b>	124	129	297	338
<b>Fighters/Attack, Total . . . . .</b>	<u>72</u>	<u>113</u>	<u>283</u>	<u>317</u>
A-37B . . . . .	4	4	2	44
F-4E/F . . . . .	36	79	181	119
F/RF-5A/B . . . . .	32	14	7	11
F-5E . . . . .	—	16	93	143
<b>Transports/Tankers, Total . . . .</b>	<u>1</u>	<u>—</u>	<u>9</u>	<u>—</u>
C-130E/H . . . . .	1	—	3	—
KC-707-3J9C . . . . .	—	—	6	—
<b>Trainers, Total . . . . .</b>	<u>51</u>	<u>16</u>	<u>5</u>	<u>14</u>
T-37C . . . . .	3	11	—	14
T-41D . . . . .	48	5	5	—
<b>Helicopters/Other, Total . . . . .</b>	<u>—</u>	<u>—</u>	<u>—</u>	<u>7</u>
UH-1H . . . . .	—	—	—	2
AU-23 . . . . .	—	—	—	5

Source: Department of the Air Force.  
a Grant Aid, Foreign Military Sales, other Agencies, accepted by the USAF for delivery to foreign governments.



## MILITARY AIRCRAFT PRODUCTION

Navy Acceptances by Type and Model  
 Calendar Years 1974 and 1975  
 (Millions of Dollars)

Type and Model	Number		Flyaway Cost <sup>a</sup>		Weapon System Cost <sup>b</sup>	
	1974	1975	1974	1975	1974	1975
<b>NAVY, TOTAL . . .</b>	<b>265</b>	<b>274</b>	<b>\$ 1,609</b>	<b>\$ 1,730</b>	<b>\$ 2,220</b>	<b>\$ 2,113</b>
<b>Patrol, Total . . . . .</b>	<b><u>50</u></b>	<b><u>62</u></b>	<b><u>584</u></b>	<b><u>584</u></b>	<b><u>859</u></b>	<b><u>696</u></b>
P-3C . . . . .	12	12	107	119	115	141
S-3A . . . . .	38	50	477	465	644	555
<b>Attack, Total . . . . .</b>	<b><u>100</u></b>	<b><u>87</u></b>	<b><u>396</u></b>	<b><u>369</u></b>	<b><u>535</u></b>	<b><u>491</u></b>
A-4M . . . . .	—	30	—	58	—	76
A-6E . . . . .	18	16	92	97	138	147
EA-6B . . . . .	6	6	72	90	128	118
A-7E . . . . .	48	24	147	80	168	106
AV-8A . . . . .	28	11	85	34	101	44
<b>Fighters, Total . . . . .</b>	<b><u>60</u></b>	<b><u>71</u></b>	<b><u>577</u></b>	<b><u>729</u></b>	<b><u>766</u></b>	<b><u>867</u></b>
F-14A . . . . .	60	71	577	729	766	867
<b>Trainers, Total . . . . .</b>	<b><u>30</u></b>	<b><u>26</u></b>	<b><u>33</u></b>	<b><u>27</u></b>	<b><u>41</u></b>	<b><u>35</u></b>
T-2C . . . . .	24	24	23	24	31	32
TA-4J . . . . .	6	2	10	3	10	3
<b>Helicopters, Total . . . . .</b>	<b><u>25</u></b>	<b><u>28</u></b>	<b><u>19</u></b>	<b><u>21</u></b>	<b><u>19</u></b>	<b><u>24</u></b>
UH-1N . . . . .	25	28	19	21	19	24

Source: Department of the Navy.

- a Flyaway Cost includes airframe, engines, electronics, communications, armament and other installed equipment.  
 b Weapon System Cost includes flyaway items, initial spares, ground equipment and training equipment.

## MILITARY AIRCRAFT PRODUCTION

Army Acceptances by Type and Model  
 Calendar Years 1974 and 1975  
 (Millions of Dollars)

Type and Model	Number		Flyaway Cost <sup>a</sup>	
	1974	1975	1974	1975
<b>ARMY, TOTAL</b> . . . . .	287	383	\$ 129	\$ 264
<b>Helicopters, Total</b> . . . . .	<u>286</u>	<u>375</u>	<u>127</u>	<u>259</u>
AH-1J . . . . .	34	67	37	74
UH-1H . . . . .	251	211	87	73
OH-58A . . . . .	—	29	—	4
CH-47C . . . . .	1	13	3	42
214-A . . . . .	—	55	—	66
<b>Other, Total</b> . . . . .	<u>1</u>	<u>8</u>	<u>2</u>	<u>5</u>
C-12A . . . . .	—	8	—	5
RU-21J . . . . .	1	—	2	—
<b>Accepted for Shipment of a Foreign Government, TOTAL<sup>a</sup></b> .	68	187	\$ 49	\$ 168
<b>Helicopters, Total</b> . . . . .	<u>68</u>	<u>187</u>	<u>49</u>	<u>168</u>
AH-1J . . . . .	34	67	37	74
UH-1H . . . . .	34	32	12	11
OH-58A . . . . .	—	29	—	4
CH-47C . . . . .	—	4	—	13
214-A . . . . .	—	55	—	66

Source: Department of the Army, Material Development and Readiness Command.

a Included in ARMY, TOTAL.

# Missile Programs



Aerospace industry sales of missile systems (excluding military engines and propulsion units), amounted in 1975 to \$3.6 billion, approximately 13 percent of the industry's total output. While the industry's missile business in 1975 represented an increase of \$180 million over 1974, the percentage gain (5 percent) was below the nation's rate of inflation during the year. Hence, in terms of real industry activity, 1975 figures adjusted for inflation show another slight decline in missile programs—the fourth straight year of decline.

In accordance with SALT I principles, the U.S. continued to maintain its strategic missile strength at 1,710 launchers, including 1,054 land-based intercontinental ballistic missiles (ICBMs) and 656 sea-launched ballistic missiles (SLBMs). The Air Force's silo-based ICBM force was composed of 1,000 Minuteman missiles and 54 Titan IIs. The Navy's SLBM component consisted of a mix of Polaris and Poseidon weapons aboard 41 nuclear submarines, each carrying 16 launching tubes.

Production-type strategic weapons in 1975/76 included only Poseidon and Minuteman III. With regard to the latter missile, the Department of Defense announced a plan to continue production through Fiscal Year 1979, permitting an eventual Minuteman mix of 700 Minuteman IIIs and 300 Minuteman IIs.

Preparations were under way for the introduction of a new strategic missile to production status—the Trident SLBM. In advanced development, the Trident program involves both a new submarine and a new missile with considerably greater range than Poseidon—4,000 miles, compared with Poseidon's 2,500. Pre-production work is in progress and the Department of Defense planned initial operational capability of the Trident missiles in the Trident sub for Fiscal Year 1979. Other Trident missiles would be "backfitted" into Polaris/Poseidon subs.

Among the high-volume missiles being produced are several of the joint-use type, those used by more than one of the military services. These include the Sparrow and Sidewinder air-to-air weapons: Shrike, an air-to-ground countermeasure missile; Hawk, an antiaircraft weapon, and Dragon and TOW, two types of antitank missiles.

Other than Minuteman III, the Air Force's major production program is the Maverick air-to-surface missile. Navy production programs include the Phoenix air-to-air weapon, Harpoon air-to-surface missile, the TV guided Condor air-to-surface missile, and Standard, a ship-based air defense weapon built in medium and extended range versions. In production for the Army is the Chaparral, a short range air defense weapon.

In addition to producing operational missiles, the aerospace industry conducts for the Department of Defense a wide variety of research and development programs aimed at increasing the missile force capability. Sales in this area amounted to \$2.2 billion in 1975, a figure almost identical to the previous year's and one reflecting slightly reduced R&D workload when the inflation impact is considered.

Trident represents the major 1975/76 activity in the R&D category. Another strategic missile in development is the Air Force's M-X, a planned follow-on to Minuteman designed for greater survivability and for operational readiness in the 1980s.

Other DOD research and development programs include the Air-Launched Cruise Missile (ALCM) and the Sea-Launched Cruise Missile (SLCM); the SAM-D battlefield air defense system; the Stinger shoulder-launched, infrared-guided anti-aircraft weapon; the Roland short-range air defense system; the Improved Hawk medium-to-high altitude missile; laser-guided antitank missile; the Brazo air-to-air missile; the High Speed Anti-Radiation (HARM) missile; the GBU-15 family of Modular Guided Glide Bombs; and improved versions of several missiles already in production or operational status.

**SALES AND BACKLOG  
MISSILE SYSTEMS AND PARTS**  
Calendar Years 1961 to Date  
(Millions of Dollars)

Year	Missile Systems and Parts	
	Net Sales	Backlog December 31
1961	\$ 3,628	\$ 2,873
1962	3,699	2,143
1963	3,318	2,146
1964	2,580	1,921
1965	2,082	2,394
1966	2,260	2,157
1967	2,877	3,121
1968	2,812	3,218
1969	2,676	2,511
1970	2,826	2,721
1971	2,641	3,344
1972	3,335	3,642
1973 <sup>r</sup>	3,391	3,868
1974 <sup>r</sup>	3,454	4,473
1975	3,634	4,484

Source: Bureau of the Census, "Current Industrial Reports," Series MQ37D (Quarterly).

NOTE: Based on data from about 55 companies engaged in the manufacture of aerospace products. Data exclude sales of military engines and propulsion units. See page 49.

r Revised.

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

Calendar Years 1961 to Date  
(Millions of Dollars)

Year	Net Sales			Backlog, December 31		
	TOTAL	Military	Non-Military	TOTAL	Military	Non-Military
1961	\$ N.A.	\$ 784	\$ (a)	\$ N.A.	\$ 367	\$ (a)
1962	N.A.	1,060	(a)	N.A.	498	(a)
1963	1,675	1,153	522	888	699	189
1964	1,579	851	728	1,024	557	467
1965	1,288	560	728	883	513	370
1966	1,211	511	700	859	534	325
1967	978	441	537	609	405	204
1968	907	676	231	535	406	129
1969	702	667	35	497	485	12
1970	640	618	222	617	610	7
1971	605	596	9	520	513	7
1972	607	596	11	671	659	12
1973	627	607	20	615	615	10
1974 <sup>r</sup>	649	633	16	678	662	16
1975	651	634	17	535	523	12

Source: Bureau of the Census, "Current Industrial Reports," Series MQ37D (Quarterly).

NOTE: Based on data from about 55 companies engaged in the manufacture of aerospace products. The figures are inflated by the inclusion of subcontracts.

a Data included in totals for space vehicle systems. See page 65.

r Revised.

N.A. Not available.

**DEPARTMENT OF DEFENSE  
OUTLAYS FOR MISSILES**  
Fiscal Years<sup>a</sup> 1960 to Date  
(Millions of Dollars)

Year	TOTAL DOD	Procurement	Research, Development, Test and Evaluation
1960	\$ 5,086	\$ 3,027	\$ 2,059
1961	5,997	2,972	3,025
1962	6,219	3,442	2,777
1963	6,058	3,817	2,241
1964	5,929	3,577	2,352
1965	3,997	2,096	1,901
1966	3,870	2,069	1,801
1967	4,432	1,930	2,502
1968	4,741	2,219	2,522
1969	4,919	2,509	2,410
1970	5,108	2,912	2,196
1971	5,148	3,140	2,008
1972	5,166	3,009	2,157
1973	5,061	3,023	2,038
1974	5,141	2,981	2,160
1975	5,065	2,889	2,176

Source: Department of Defense, OASD (Comptroller), FAD 748/75, June 30, 1975, and earlier reports.

NOTE: Does not include Military Assistance.

a Fiscal Years ending June 30.

**DEPARTMENT OF DEFENSE  
OUTLAYS FOR MISSILE PROCUREMENT**

By Agency  
Fiscal Years<sup>a</sup> 1960 to Date  
(Millions of Dollars)

Year	TOTAL DOD	Air Force	Navy	Army
1960	\$ 3,027	\$ 2,021	\$ 423	\$ 583
1961	2,972	1,922	493	557
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

Source: Department of Defense, OASD (Comptroller), FAD 748/75, June 30, 1975, and earlier reports.

NOTE: For data on research and development expenditures for missiles, see page 99.

a Fiscal Years ending June 30.



### MISSILE PROGRAM PROCUREMENT INCLUDING INITIAL SPARES<sup>a</sup>

By Agency, Type and Model  
Fiscal Years 1976, the Transition Quarter and 1977  
(Millions of Dollars)

Agency, Type and Model	1976 <sup>E</sup>		Transition Quarter <sup>E</sup>		1977 <sup>E</sup>	
	Units	Cost	Units	Cost	Units	Cost
<b>AIR FORCE</b>						
LGM-30F/G Minuteman II/III . . . . .	50	\$681.4	—	\$70.5	—	\$369.2
AGM-69A SRAM . . . . .	—	—	—	—	—	20.8
AGM-65A/B E/O Maverick . . . . .	6,000	118.1	—	—	—	4.9
AGM-65C Laser Maverick . . . . .	—	—	—	—	100	48.1
Aerial Targets & Drones <sup>b</sup> . . . . .	—	86.3	—	11.3	—	118.1
<b>NAVY</b>						
Poseidon . . . . .	—	28.1	—	5.7	—	25.4
Trident I . . . . .	—	216.7	—	172.6	80	1,145.7
Sparrow <sup>c</sup> . . . . .	980	143.2	—	1.7	1,530	153.4
Sidewinder <sup>c</sup> . . . . .	1,510	91.2	—	0.9	1,420	93.2
Phoenix . . . . .	340	101.2	—	27.0	240	84.0
Shrike <sup>c</sup> . . . . .	1,318	47.0	300	9.7	1,337	51.3
Condor . . . . .	182	91.0	33	10.4	40	12.7
Standard ARM . . . . .	—	1.1	—	0.1	—	0.2
Harpoon . . . . .	179	135.7	80	44.9	350	186.0
Standard MR . . . . .	200	29.0	50	7.1	220	44.9
Standard ER . . . . .	22	53.7	—	—	36	46.5
<b>ARMY</b>						
Chaparral . . . . .	—	37.5	—	1.0	2,000	61.7
Hawk <sup>d</sup> . . . . .	660	86.7	—	0.1	526	87.5
Stinger <sup>d</sup> . . . . .	—	—	—	—	445	51.2
Dragon <sup>d</sup> . . . . .	26,314	142.0	8,128	33.5	16,080	110.9
TOW <sup>d</sup> . . . . .	24,311	144.1	2,615	9.9	13,051	108.3
Lance . . . . .	—	—	—	—	360	75.0

Source: "Program Acquisition Costs by Weapon System," Department of Defense Budget for Fiscal Year 1977.

NOTE: For an explanation of the Transition Quarter and the change in the Fiscal Year, see page 22.

a Total Obligational Authority.

b Includes Army and Navy procurement.

c Includes Air Force procurement.

d Includes Marine Corps procurement.

## MAJOR MISSILES DEVELOPMENT, PRODUCTION AND OPERATION

Project	Agency	Systems Contractor	Propulsion		Guidance Manufacturer	Status
			Manufacturer	Type		
<b>AIR-TO-AIR</b>						
BDM	USAF	Raytheon	—	—	—	Research
Brazo	USAF, USN	Hughes	—	—	Navy Elect. Center	Develop- ment
Falcon	USAF	Hughes	Thiokol	Solid	Hughes	Operational
Nuclear Falcon Genie	USAF	Hughes	Thiokol	Solid	Hughes	Operational
	USAF	McDonnell Douglas	Thiokol	Solid	—	Operational
Phoenix	USN	Hughes	RI/Rocket- dyne	Solid	Hughes	Production
Sidewinder- 9D	USN	Raytheon/ GE	RI/Rocket- dyne	Solid	Raytheon/ GE	Operational
Sidewinder- 9J	USAF	Aero- nutronic- Ford	—	Solid	Aero- nutronic- Ford	Production
Sidewinder- 9L	USN	NWC/ Raytheon	—	—	Raytheon	Develop- ment
Sparrow	USN	Raytheon	Hercules	Solid	Raytheon	Operational
<b>AIR-TO-SURFACE</b>						
ALCM	USAF	Boeing	Williams	Turbojet	—	Develop- ment
Bullpup (12B)	USN	Numax	Thiokol	Liquid	Numax	Operational
Condor	USN	NASC/RI	RI/Rocket- dyne	Solid	RI/MSD	Production
HARM	USN	NWC	Thiokol	Solid	—	Research
Harpoon	USN	McDonnell Douglas	Teledyne CAE/ Aerojet	Solid	Texas Instru- ments/ IBM	Develop- ment
Hornet	USAF	RI/MSD	Thiokol	Solid	RI/Auto- netics	Develop- ment
Hound Dog	USAF	RI	P & W	Turbojet	RI/Auto- netics	Operational
Maverick	USAF	Hughes	Thiokol	Solid	—	Production
Quail	USAF	McDonnell Douglas	General Electric	Turbojet	McDonnell Douglas	Operational
Shrike	USN, USAF	NASC/NWC	Aerojet	Solid	Texas Instru- ments	Operational
SRAM	USAF	Boeing	Thiokol	Solid	Singer	Operational

(Continued on next page)

**MAJOR MISSILES**  
**DEVELOPMENT, PRODUCTION AND OPERATION (Continued)**

Project	Agency	Systems Contractor	Propulsion		Guidance Manufacturer	Status
			Manufacturer	Type		
<b>AIR-TO-SURFACE (Cont.)</b>						
Standard ARM	USN, USAF	General Dynamics	Aerojet	Solid	Numax	Operational
Walleye	USN	Martin Marietta/Hughes	—	Glide Bomb	Martin Marietta/Hughes	Operational
<b>ANTI-SUBMARINE</b>						
Asroc	USN	Honeywell	Navy	Solid	—	Operational
Subroc	USN	Goodyear Aerospace	Thiokol	Solid	Singer	Operational
<b>SURFACE-TO-AIR</b>						
Chaparral	Army	Aero-nutronic-Ford	RI/Rocket-dyne	Solid	GE/Raytheon	Operational
Hawk	Army	Raytheon	Aerojet	Solid	Raytheon	Operational
Nike-Hercules	Army	Western Electric	Thiokol/Hercules	Solid	BTL/Western Electric	Operational
Redeye	Army	General Dynamics	Atlantic Research	Solid	Norden	Operational
Roland	Army	Hughes/Boeing	Hercules	Solid	Hughes/Boeing	Development
SAM-D	Army	Raytheon	Thiokol	Solid	Raytheon	Development
Sea Sparrow	USN	Raytheon	Aerojet	Solid	Raytheon	Operational
Safeguard/Spartan	Army	BTL/Western Electric	Thiokol	Solid	BTL/Western Electric	Production
Safeguard/Sprint	Army	BTL/Western Electric	Hercules	Solid	BTL/Western Electric	Production
Standard (MR)	USN	General Dynamics	Aerojet/Hercules	Solid	General Dynamics	Operational
Standard (ER)	USN	General Dynamics	Atlantic Research	Solid	General Dynamics	Operational
Stinger	Army, USMC	General Dynamics	Atlantic Research	—	General Dynamics	Development

(Continued on next page)

## MAJOR MISSILES DEVELOPMENT, PRODUCTION AND OPERATION (Continued)

Project	Agency	Systems Contractor	Propulsion		Guidance Manufacturer	Status
			Manufacturer	Type		
<b>SURFACE-TO-AIR (Cont.)</b>						
Talos	USN	Bendix	Bendix	Ramjet	Bendix	Operational
Tartar	USN	General Dynamics	Aerojet	Solid	General Dynamics	Operational
Terrier	USN	General Dynamics	Atlantic Research	Solid	General Dynamics	Operational
<b>SURFACE-TO-SURFACE</b>						
Minuteman 2	USAF	AFLC Hill AFB	Thiokol/Aerojet/Hercules	Solid	RI/Autonetics	Operational
Minuteman 3	USAF	Boeing	Thiokol/Aerojet	Solid	RI/Autonetics	Operational
Missile MX	USAF	AFRPL	Hercules	—	—	Research
Polaris A2	USN	Lockheed MSC	Aerojet/Hercules	Solid	GE/MIT/Hughes	Operational
Polaris A3	USN	Lockheed MSC	Aerojet/Hercules	Solid	GE/MIT/Hughes	Operational
Poseidon	USN	Lockheed MSC	Thiokol/Hercules	Solid	GE/MIT/Hughes/Raytheon	Operational
Tomahawk	USN	General Dynamics	Williams	Turbofan	McDonnell Douglas	Development
Titan 2	USAF	AFLC	Aerojet	Liquid	GM/Delco Electronics	Operational
Trident	USN	Lockheed MSC	Hercules/Thiokol	Solid	GM/MIT/Raytheon/Hughes	Production
<b>BATTLEFIELD SUPPORT GUIDED MISSILES</b>						
Dragon	Army	McDonnell Douglas/Raytheon	McDonnell Douglas/Hercules	Solid	McDonnell Douglas	Production
Hellfire	Army	Hughes	Hercules	Solid	—	Development
Lance	Army	Vought	RI/Rocketdyne	Liquid	Arma/E-Systems	Operational
Perishing 1-A	Army	Martin Marietta	Thiokol	Solid	Bendix	Operational
Sergeant Shillelagh	Army	SR/Univac	Thiokol	Solid	SR/Univac	Operational
	Army	Aero-nutronic-Ford	Hercules	Solid	Aero-nutronic-Ford	Operational
TOW	Army	Hughes	Hercules	Solid	Emerson Electric	Operational

Source: Aerospace Industries Association, based on latest available information.



## Space Programs



The U.S. space program continued in 1975 at an activity level slightly below that of the preceding year. In unadjusted dollars, government outlays for space were up very slightly, but the increase did not compensate for the year's inflation. NASA outlays for FY 1975 reached the lowest level since 1963, when the Apollo program was in its infancy. Department of Defense outlays increased by \$54 million, but in constant dollar terms this, too, represented a decline.

There were indications that industry space activity, in continual decline since 1966, had reached the bottom of the curve. Estimates for FY 1976 government outlays indicate an increase of almost \$400 million. Even allowing for inflation, this represents a gain. Principal component of the increase is an estimated NASA outlay rise of about \$240 million. DOD's outlays were also expected to increase substantially. Further increases of similar order were contemplated for FY 1977 in the budget plans of NASA and the Department of Defense.

The main reason for the estimated NASA funding increases in FY 1976 and 1977 is expanding effort on the Space Shuttle, the transportation system designed for high-frequency earth-orbital flights involving a wide variety of earth-benefit applications and scientific projects. The Shuttle Orbiter, the reusable segment of

the shuttle system, was scheduled for atmospheric flight testing in 1977. Space testing of the whole system, including the launch vehicle, was planned for 1979 and the system was expected to be operational in the latter half of 1980.

In terms of contractor development effort, the Space Shuttle was the principal program of 1975—and it will be for the remainder of the decade. In terms of operational flights, 1975's main project was the Apollo-Soyuz Test Project. ASTP was a joint mission with the Soviet Union, aimed at development of a universal docking system for future international cooperative flights. The mission, involving a rendezvous and docking of the American Apollo and the Soviet Soyuz spacecraft, proved highly successful.

NASA's major unmanned space program of 1975 was the successful launching of two Viking spacecraft. Viking, a Mars explorer, is designed to orbit the Red Planet and telemeter to earth data about the Martian environment; additionally, each Viking mother craft will send a Mars-landing probe to the planet's surface for an environmental and life-search study. The first of the two landers was to touch down on Mars July 4, 1976, as a bicentennial commemoration. The second was to land September 1.

Other important NASA launches of 1975 included Landsat 2, the second of a series of earth resources technology satellites; a Synchronous Meteorological Satellite (SMS-2) and a companion metsat known as GOES-A, for Geostationary Operational Environmental Satellite; Nimbus 6, another in the series of research and development satellites aimed at improving space-meteorology capability; the GEOS-3 oceanic and geodetic satellite; OSO-8, the eighth of a line of sun-study scientific satellites; and Explorers 54 and 55, a part of scientific satellites designed to investigate the mechanisms which control earth's atmosphere. NASA also provided launch services, on a reimbursable basis, for U.S., Canadian and French/German communications satellites and a European Space Agency scientific satellite.

NASA's 1976 schedule involves for the most part reimbursable flights paid for by foreign nations, private firms or other U.S. government agencies. NASA plans 18 launches in this category, seven of them comsats for the U.S., Canada, NATO, Indonesia and private firms. Among NASA's own projects were the Laser Geodynamic Satellite (Lageos) for precise geographic measurements, and the Relativity/Gravity Probe.

The Department of Defense continues to develop new systems and advanced technology for several programs involving application of unmanned satellites to defense needs, such as communications, early warning and meteorology. DOD's principal project is the NavStar Global Positioning System. A 24-satellite system to be operational in the mid-1980s, NavStar will provide positioning data of unprecedented precision for great enhancement of such military capabilities as missile delivery, bombing, navigation, artillery fire, troop movement and rendezvous.

U. S. MAN-HOURS SPACE FLIGHT TIME LOG

Calendar Years 1961 - 1975

Mission	Launch Date	Man-Hours in Mission		Total Cumulative Time	
		Hrs.	Min.	Hrs.	Min.
	<u>1961</u>				
MR-3 (Shepard)	May 5	—	15	—	15
MR-4 (Grissom)	July 21	—	16	—	31
	<u>1962</u>				
MR-6 (Glenn)	Feb 20	4	55	5	26
MA-7 (Carpenter)	May 24	4	56	10	22
MA-8 (Schirra)	Oct 3	9	13	19	35
	<u>1963</u>				
MA-9 (Cooper)	May 15	34	20	53	55
	<u>1965</u>				
Gemini 3 (Grissom, Young)	Mar 23	9	46	63	41
Gemini 4 (McDivitt, White)	June 3	195	52	259	33
Gemini 5 (Cooper, Conrad)	Aug 21	381	50	641	23
Gemini 6 (Schirra, Stafford)	Dec 15	51	42	693	05
Gemini 7 (Borman, Lovell)	Dec 4	661	10	1,354	15
	<u>1966</u>				
Gemini 8 (Armstrong, Scott)	Mar 16	21	21	1,375	36
Gemini 9 (Stafford, Cernan)	June 3	144	42	1,520	32
Gemini 10 (Young, Collins)	July 18	141	34	1,662	06
Gemini 11 (Conrad, Gordon)	Sept 12	142	34	1,804	40
Gemini 12 (Lovell, Aldrin)	Nov 11	189	10	1,993	50
	<u>1968</u>				
Apollo 7 (Schirra, Eisele, Cunningham)	Oct 11	780	27	2,774	17
Apollo 8 (Borman, Lovell, Anders)	Dec 21	441	03	3,215	20

(Continued on next page)

## U. S. MAN-HOURS SPACE FLIGHT TIME LOG

(Continued)

Mission	Launch Date	Man-Hours in Mission		Total Cumulative Time	
		Hrs.	Min.	Hrs.	Min.
	<u>1969</u>				
Apollo 9 (McDivitt, Scott, Schweikart)	Mar 3	723	03	3,938	23
Apollo 10 (Stafford, Young, Cernan)	May 18	576	09	4,514	32
Apollo 11 (Armstrong, Collins, Aldrin)	July 16	585	57	5,100	29
Apollo 12 (Conrad, Gordon, Bean)	Nov 14	733	48	5,834	17
	<u>1970</u>				
Apollo 13 (Lovell, Haise, Swigert)	Apr 11	428	45	6,623	02
	<u>1971</u>				
Apollo 14 (Shepard, Roosa, Mitchell)	Jan 31	650	06	6,913	08
Apollo 15 (Scott, Worden, Irwin)	July 26	885	36	7,808	44
	<u>1972</u>				
Apollo 16 (Young, Duke, Mattingly)	Apr 16	797	33	8,606	17
Apollo 17 (Cernan, Schmitt, Evans)	Dec 7	905	36	9,511	53
	<u>1973</u>				
Skylab 2 (Conrad, Kerwin, Weitz)	May 25	2,018	30	11,530	29
Skylab 3 (Bean, Lousma, Garriott)	July 28	4,287	27	15,817	56
Skylab 4 (Carr, Gibson, Pogue)	Nov 16	6,051	48	21,869	44
	<u>1975</u>				
Apollo (Stafford, Slayton, Brand)	July 15	652	24	22,522	08

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



## NASA MAJOR LAUNCH RECORD, 1975

Date	Designation	Objective
Jan. 22	LANDSAT-2	Second Earth Resources Technology Satellite to locate, map, and measure earth resources parameters from space and demonstrate the applicability of this approach to the management of the world's resources.
Feb. 6	SMS-B (2)	Second developmental meteorological satellite to provide continuous observation of environmental phenomena and help develop an environmental network for routine observations and early warning.
Apr. 9	GEOS-C (3)	Oceanographic and geodetic satellite to measure ocean topography, sea state and other features of the earth.
May 7	SAS-C (EXPL. 53)	Scientific satellite: To search for source radiating in the X-ray, gamma ray, ultraviolet, and other spectral regions both inside and our galaxy.
May 7	Telesat-C (ANIK3)	Canadian Domestic Communications Satellite—Reimbursable.
May 22	Intelsat IV F-1	Comsat Communications Satellite—Last of the IV series-Reimbursable.
Jun. 12	Nimbus F (6)	Meteorological Satellite—R&D of instruments for expanding capabilities for remote sensing of the atmosphere.
Jun. 21	OSO-I (8)	Scientific satellite to study specific features of the Sun.
Jul. 15	Apollo (ASTP)	Apollo Soyuz Test Project (ASTP) Manned: T.P. Stafford, V. Brand and D.K. Slayton—Docked with Soyuz 19 on 17 July, Mission duration 217 hrs. 28 minutes.
Aug. 8	COS-B	Cosmic Ray Satellite to study Extraterrestrial Gamma Radiation—Launched for the European Space Agency—Reimbursable.
Aug. 20	Viking-A (1)	Scientific Investigation of Mars—United States first attempt to soft land a spacecraft on another planet.
Aug. 26	Symphonie-B	Communications Satellite—French/German Cooperative—Reimbursable.

(Continued on next page)

## NASA MAJOR LAUNCH RECORD, 1975 (Continued)

Date	Designation	Objective
Sept. 9	Viking-B (2)	Scientific Investigation of Mars—United States First attempt to soft land a spacecraft on another planet.
Sept. 25	Intelsat IVA F-1	First in a series of improved COMSAT Communications Satellites—Double the capacity of previous Intelsats. Reimbursable.
Oct. 6	AE-D (Expl. 54)	Scientific satellite to investigate the chemical processes and energy transfer mechanisms which control Earth's atmosphere.
Oct. 12	U.S. Navy	Navy Transit Navigation Satellite—Reimbursable.
Oct. 16	SMS-C (GOES-A)	Geostationary Operational Environmental Satellite—Constructed and launched by NASA—Funded and Reimbursed by NOAA.
Nov. 20	AE-E (Expl. 55)	Scientific satellite to investigate the chemical processes and energy transfer mechanisms which control Earth's atmosphere.
Dec. 5	DAD-A/B	Scientific satellite to measure global density of upper atmosphere and lower exosphere—Vehicle failed.
Dec. 13	RCA-A	Communication Satellite—First RCA Domestic Communications Satellite—Reimbursable.

Source: National Aeronautics and Space Administration, "Historical Pocket Statistics," January, 1976.

NOTE: For data for earlier years, see previous editions of "Aerospace Facts and Figures."

## CHRONOLOGY OF MANNED SPACE FLIGHTS

Calendar Years 1972 - 1975

Launch Date	Project	Pilots	Nation	Duration
<u>1972</u>				
Apr 16	Apollo 16	John W. Young Charles M. Duke, Jr. Thomas K. Mattingly, II	USA	265 hr. 51 min.
Dec 17	Apollo 17	Eugene A. Cernan Harrison H. Schmitt Ronald E. Evans	USA	301 hr. 52 min.
<u>1973</u>				
May 25	Skylab 2	Charles Conrad, Jr. Joseph P. Kerwin Paul J. Weitz	USA	672 hr. 50 min.
July 28	Skylab 3	Alan L. Bean Jack R. Lousma Owen K. Garriott	USA	1,427 hr. 09 min.
Sept 27	Soyuz 12	Vasily Lazarev Oleg Makarov	USSR	47 hr. 16 min.
Nov 16	Skylab 4	Gerald P. Carr Edward G. Gibson William R. Pogue	USA	2,017 hr. 16 min.
Dec 18	Soyuz 13	Petr Klimuk Valentin Lebedev	USSR	188 hr. 55 min.
<u>1974</u>				
July 3	Soyuz 14	Pavel Popovich Yuriy Artyukhin	USSR	377 hr. 30 min.
Aug 26	Soyuz 15	Gennadiy Sarafanov Lev Demin	USSR	48 hr. 12 min.
Dec 2	Soyuz 16	Anatoliv Filipchenko Nikolai Rukavishnikov	USSR	142 hr. 24 min.
<u>1975</u>				
Jan 10	Soyuz 17	Aleksey Gubarev Georgiy Grechko	USSR	709 hr. 20 min.
Apr 5	Anomaly	Vasiley Lazarev Oleg Makarov	USSR	— 20 min.
May 24	Soyuz 18	Petr Klimak Viralii Sevastyanov	USSR	1,511 hr. 20 min.
July 15	Soyuz 19	Aleksey Leonov Valeriy Kubasov	USSR	142 hr. 31 min.
July 15	Apollo	Thomas P. Stafford Donald K. Slayton Vance D. Brand	USA	217 hr. 28 min.

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

NOTE: For data for earlier years, see previous editions of "Aerospace Facts and Figures."

## SPACECRAFT LAUNCHINGS

As of May 2, 1976

Country	TOTAL	Payloads in Earth Orbit	Payloads Decayed	Space Probes
<b>TOTAL</b> . . . . .	1,940	790	1,096	54
U.S.S.R. . . . .	1,031	352	654	25
United States . . . . .	838	385	426	27
France . . . . .	13	13	—	—
United Kingdom . . . . .	11	8	3	—
West Germany . . . . .	10	2	6	2
Canada . . . . .	8	8	—	—
Japan . . . . .	8	8	—	—
Italy . . . . .	4	1	3	—
N.A.T.O. . . . .	3	3	—	—
Netherlands . . . . .	3	1	2	—
E.S.R.O. . . . .	2	1	1	—
Australia . . . . .	2	1	1	—
People's Republic of China . . . . .	2	2	—	—
France/Germany . . . . .	2	2	—	—
Spain . . . . .	1	1	—	—
India . . . . .	1	1	—	—
E.S.A. . . . .	1	1	—	—

Source: National Aeronautics and Space Administration.

## UNITED STATES SPACE LAUNCH VEHICLES

Vehicle	Stages	Thrust (in Thousands of Pounds)	Payload (Pounds)	
			300 Nautical Miles Orbit	Escape
Scout	1. Algol IIIA* 2. Castor IIA* 3. Antares IIB* 4. Altair III*	108.3 63.2 28.5 5.9	410	85
Thor-Delta 2900 Series	1. Thor plus nine TX354-5* 2. Delta (DSV-3) 3. TE 364-4*	205 plus 99 10.3 15	3,900	1,050
Atlas F/TE 364-4	1. Atlas Booster and Sustainer (Atlas F) 2. TE 364-4*	413 15	3,300	—
Atlas-Agena	1. Atlas Booster and Sustainer (SLV-3A) 2. Agena	503 16	6,000	1,000
Titan IIIB-Agena	1. LR-87 2. LR-91 3. Agena	520 100 16	7,100	1,500
Titan IIIC	1. Two 5-segment 120" diameter* 2. LR-87 3. LR-91 4. Transtage	2,600 2,600 520 102 16	26,500	7,000
Titan IIID	1. Two 5-segment 120" diameter* 2. LR-87 3. LR-91	2,600 520 102	6,500	—
Titan IIIE - Centaur	1. Two 5-segment 120" diameter* 2. LR-87 3. LR-91 4. Centaur (Two RL-10)	2,600 520 102 30	—	11,300
Atlas-Centaur	1. Atlas Booster and Sustainer 2. Centaur (Two RL-10)	503 30	10,300	2,500
Saturn IB	1. S-IB (8H-1) 2. S-IVB (1J-2)	1,640 230	34,000	—

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

\* Solid propellant, all others are liquid.

**SALES AND BACKLOG  
SPACE VEHICLE SYSTEMS**  
(Excluding Engines and Propulsion Units)  
Calendar Years 1961 to Date  
(Millions of Dollars)

Year	Net Sales			Backlog, December 31		
	TOTAL	Military	Non-Military	TOTAL	Military	Non-Military
1961	\$ 775	\$ 551	\$ 224 <sup>a</sup>	\$ 586	\$ 350	\$ 236 <sup>a</sup>
1962	1,319	712	607 <sup>a</sup>	1,435	852	583 <sup>a</sup>
1963	1,911	1,061	850	1,612	856	756
1964	2,222	732	1,490	1,611	391	1,220
1965	2,449	602	1,847	2,203	503	1,700
1966	2,710	734	1,976	1,494	428	1,066
1967	2,199	789	1,410	1,974	1,096	878
1968	2,357	899	1,458	1,329	834	495
1969	2,282	1,187	1,095	1,330	869	461
1970	1,956	1,025	931	1,184	786	398
1971	1,725	860	865	916	603	313
1972	1,656	905	751	959	646	313
1973	1,562	902	660	1,177	923	254
1974 <sup>r</sup>	1,751	944	807	1,492	1,131	361
1975	2,161	1,132	1,029	1,296	1,016	280

Source: Bureau of the Census, "Current Industrial Reports," Series MQ37D (Quarterly).

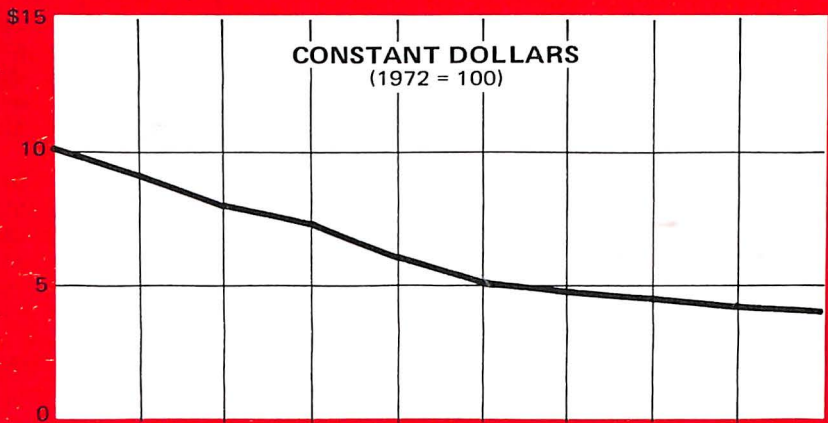
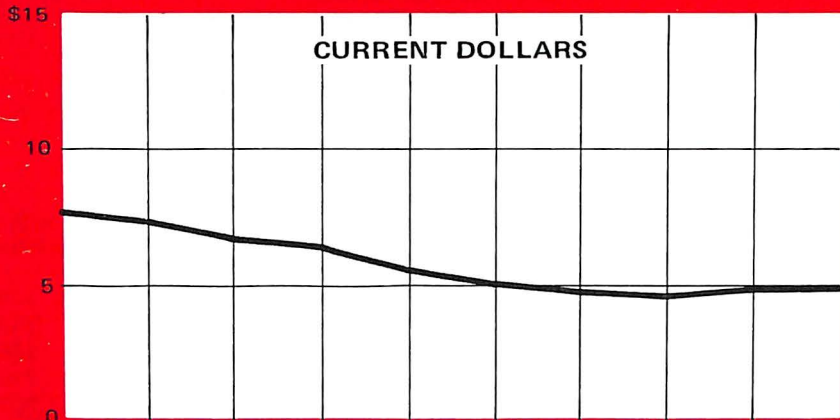
NOTE: Based on data from about 55 companies engaged in the manufacture of aerospace products.

a Includes engines and propulsion units.

r Revised.

### FEDERAL OUTLAYS FOR SPACE ACTIVITIES

(Billions of Dollars)



1966

1975

Source: Aeronautics and Space Report of the President

## OUTLAYS FOR SPACE ACTIVITIES

Fiscal Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL	NASA <sup>a</sup>	DOD <sup>b</sup>	AEC	Other
1960	\$ 960	\$ 401	\$ 518	\$ —	\$ 41
1961	1,518	744	710	—	64
1962	2,418	1,257	1,029	130	2
1963	4,114	2,552	1,368	181	13
1964	5,970	4,171	1,564	220	15
1965	6,886	5,035	1,592	232	27
1966	7,719	5,858	1,638	188	35
1967	7,237	5,337	1,673	184	43
1968	6,667	4,595	1,890	146	36
1969	6,330	4,083	2,095	116	36
1970	5,453	3,565	1,756	103	29
1971	4,999	3,171	1,693	97	38
1972	4,772	3,195	1,470	60	47
1973	4,719	3,069	1,557	51	42
1974	4,854	2,960	1,777	39	78
Year	TOTAL	NASA	DOD	ERDA <sup>c</sup>	Other
1975	4,891	2,951	1,831	34	75
1976 <sup>E</sup>	5,272	3,187	1,963	34	88
Tr.Qtr. <sup>E</sup>	1,390	828	526	10	26
1977 <sup>E</sup>	5,608	3,337	2,132	32	107

Source: 1960-1969: "The Budget of the United States" (Annually).  
1970-Date: "Aeronautics and Space Report of the President" (Annually).

NOTE: Tr. Qtr. - Transition Quarter. For an explanation of the change in the Federal Government's Fiscal Year and the Transition Quarter, see page 22.

a Excludes amount for aircraft technology beginning with 1965.

b Includes the astronautics budget activity and other activities which contribute to the space effort.

c AEC research and development programs transferred to ERDA with 1974 reorganization.

E Estimate.



**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
OUTLAYS**

Fiscal Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL	Research and Development	Construction of Facilities	Research & Program Management
1960	\$ 401	\$ 256	\$ 54	\$ 91
1961	744	487	98	159
1962	1,257	936	114	207
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 <sup>E</sup>	3,517	2,608	115	794
Tr. Qtr. <sup>E</sup>	908	656	31	221
1977 <sup>E</sup>	3,676	2,736	126	814

Source: "The Budget of the United States" (Annually).

NOTE: For an explanation of the Transition Quarter (Tr. Qtr.) and the change in the Federal Government's Fiscal Year, see page 22.

<sup>E</sup> Estimate.

...  
**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**  
**BUDGET AUTHORITY**  
**Fiscal Years 1960 to Date**  
**(Millions of Dollars)**

Year	TOTAL	Research and Development	Construction of Facilities	Research & Program Management
1960	\$ 614	\$ 333	\$ 190	\$ 91
1961	964	672	125	167
1962	1,825	1,285	326	214
1963	3,673	2,929	744	(a)
1964	5,099	3,890	713	496
1965	5,250	4,360	267	623
1966	5,175	4,502	61	612
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 <sup>E</sup>	3,555	2,677	82	796
Tr. Qtr. <sup>E</sup>	932	700	11	221
1977 <sup>E</sup>	3,697	2,759	124	814

Source: "The Budget of the United States" (Annually).

NOTE: For an explanation of the Transition Quarter (Tr. Qtr.) and the change in the Federal Government's Fiscal Year, see page 22.

a Included in Research & Development for one year.

E Estimate.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
RESEARCH AND DEVELOPMENT PROGRAMS BUDGET PLAN

Fiscal Years 1974 to Date  
(Millions of Dollars)

	1974	1975	1976 <sup>E</sup>	Tr.Qtr. <sup>E</sup>	1977 <sup>E</sup>
<b>TOTAL</b> . . . . .	\$ 2,311	\$ 2,324	\$ 2,677	\$ 701	\$ 2,759
<b>MANNED SPACE FLIGHT – TOTAL</b> . . . . .	<u>1,178</u>	<u>1,236</u>	<u>1,561</u>	<u>407</u>	<u>1,645</u>
Space Shuttle . . . . .	475	797	1,206	321	1,288
Space Flight Operations . . . . .	525	299	189	49	205
Expendable Launch Vehicles . . . . .	178	140	166	37	152
<b>SPACE SCIENCE AND APPLICATIONS – TOTAL</b> . . . . .	<u>645</u>	<u>592</u>	<u>612</u>	<u>164</u>	<u>577</u>
Physics and Astronomy . . . . .	94	136	159	43	166
Lunar and Planetary Explorations . . . . .	392	261	254	68	191
Life Sciences . . . . .	—	20	21	5	22
Space Applications . . . . .	159	175	178	48	198
<b>AERONAUTICS AND SPACE TECHNOLOGY – TOTAL</b> . . . . .	<u>234</u>	<u>238</u>	<u>250</u>	<u>63</u>	<u>271</u>
Aeronautical Research & Technology . . . . .	168	167	175	44	189
Space & Nuclear Research & Technology . . . . .	66	71	75	19	82
<b>ENERGY PROGRAMS – TOTAL</b> . . . . .	<u>5</u>	<u>4</u>	<u>6</u>	<u>2</u>	<u>—</u>
<b>TRACKING AND DATA ACQUISITION – TOTAL</b> . . . . .	244	248	241	63	258
<b>TECHNOLOGY UTILIZATION – TOTAL</b> . . . . .	<u>5</u>	<u>6</u>	<u>7</u>	<u>2</u>	<u>8</u>

Source: NASA, Briefing on the Budget of the United States, January 21, 1976.  
NOTE: Tr. Qtr — Transition Quarter. For an explanation of the Transition Quarter and the change in the Fiscal Year, see page 22.  
E Estimate.

# Air Transportation



The year 1975 was a year of adjustment for the airlines of the United States and the world. The overall economic problems of the world, especially inflation in fuel and labor costs, resulted in service cutbacks, changed long-range plans for equipment purchases and pulled several airlines closer to possible financial disaster.

There were some statistical gains in traffic, but they occurred in the latter part of the year, and were nowhere near the growth rates of six to fourteen percent experienced during the late sixties and early seventies. World airlines, including the Soviet Union, flew 420 billion passenger-miles, up from 406 billion in 1974. Cargo ton-miles remained at about 13 billion, and the number of passengers boarded increased from 514 to 529 million.

In the United States, there was little or no change in domestic service, with increases in passenger-miles more than offset by a decrease in the number of boardings. Internationally, the American flag carriers experienced a further drop in traffic. For 1975, they flew 31 billion passenger-miles and boarded 16.3

million passengers—a reduction of more than two billion passenger-miles and 1.4 million fewer passengers.

Cargo haulage by U.S. carriers, both domestic and international, declined after five straight years of substantial increases, dropping from 5.3 billion in 1974 to 5.1 billion in 1975. Some of the decline may have been due to the reduced frequency of available flights, but it was more probably attributable to the reduction in business activity.

The low or non-existent rates of traffic growth were due in major part to the continuing recession, although passenger volume picked up in the latter part of the year as the U.S. economy improved. Fuel costs stabilized to some degree in 1975, but prices were far above the pre-embargo levels: domestically fuel prices averaged just over 30 cents a gallon, compared with about 18 cents in 1972, and internationally prices rose to more than 40 cents a gallon.

Capital formation was also a major problem for the nation's airlines. Declining rates of traffic growth and heavy losses incurred by a number of airlines aggravated the industry's difficulty in generating essential investment capital. A further obstacle to attracting capital developed in 1975 with the disclosure of an Administration plan to deregulate the airlines, a move opposed by many U.S. carriers. Uncertainties as to the effect of deregulation on the viability of the air transportation industry generated further uncertainties in the investment community.

Still another obstacle was the Treasury Department's announcement of planned rule changes under which aircraft would be depreciated for tax purposes on a 12-year, rather than a six-year, basis. Since the airlines' depressed financial condition has forced deferment of re-equipment plans by many companies, the change would have little immediate effect, but it was seen as a further deterrent to capital formation in later years.

Beset by these and other problems, U.S. air carriers experienced a drop in operating profits of 84 percent between 1974 and 1975. In 1975, operating profit was only one percent of operating revenues, \$127 million, compared with operating profits of \$785 million (7 percent of operating revenues) in 1974.

## U. S. MANUFACTURED TRANSPORT AIRCRAFT

In Operation on World Civil Airlines, By Model  
Calendar Years 1970 to Date

	1970	1971	1972	1973	1974
<b>TOTAL, MANUFACTURED IN U.S.</b>	<b>3,042</b>	<b>3,094</b>	<b>3,247</b>	<b>3,310</b>	<b>3,311</b>
<b>Four-Engine, TOTAL</b>	<b>1,493</b>	<b>1,490</b>	<b>1,417</b>	<b>1,382</b>	<b>1,265</b>
Turbojets	1,318	1,355	1,309	1,289	1,200
Boeing 707	604	584	568	570	553
Boeing 720/720B	101	106	57	41	40
Boeing 747	89	163	191	211	211
McDonnell Douglas DC-8	465	451	445	431	389
Convair 880	45	41	41	29	—
Convair 990	14	10	7	7	7
Turboprops	55	42	34	35	31
Lockheed Electra	51	38	31	32	28
Lockheed L-100 Hercules	4	4	3	3	3
Piston Engine	120	93	74	58	34
Lockheed Constellation	1	—	—	—	—
Douglas DC-7	1	1	—	—	—
Douglas DC-6	58	43	38	26	14
Douglas DC-4	60	49	36	32	20
<b>Three-Engine, Turbojets, TOTAL</b>	<b>713</b>	<b>738</b>	<b>870</b>	<b>989</b>	<b>1,083</b>
Boeing 727	713	725	790	868	868
McDonnell Douglas DC-10	—	13	63	70	132
Lockheed L-1011	—	—	17	51	83
<b>Twin-Engine, TOTAL</b>	<b>815</b>	<b>826</b>	<b>899</b>	<b>867</b>	<b>917</b>
Turbojets	547	595	662	667	720
Boeing 737	143	154	160	170	206
McDonnell Douglas DC-9	404	441	501	497	514
Lockheed Jetstar	—	—	1	—	—
Turboprops	24	30	52	55	56
Fairchild F-27/F-227	17	23	6	9	26
Convair 640/580	4	5	43	45	30
Other	3	2	3	1	—
Piston Engine	244	201	185	144	141
Convair 240, 340, 440	53	43	28	19	12
Custiss Commando C-46	7	2	1	1	—
Douglas DC-3/C-47	164	137	118	86	81
Other	20	19	38	38	48
<b>Single-Engine, TOTAL</b>	<b>4</b>	<b>25</b>	<b>47</b>	<b>60</b>	<b>31</b>
<b>Helicopters</b>	<b>17</b>	<b>15</b>	<b>14</b>	<b>12</b>	<b>15</b>
<b>All Manufacturers, Grand Total</b>	<b>3,983</b>	<b>3,973</b>	<b>4,097</b>	<b>4,225</b>	<b>4,133</b>
Percent of Grand Total Manufactured in U.S.	76.4	77.9	79.3	78.3	80.1

Source: International Air Transport Association, "World Air Transport Statistics" (Annually).

NOTE: Excludes U.S.S.R., People's Republic of China and non-IATA members.

**U.S. AIRLINE FLEET  
TYPE OF AIRCRAFT, NUMBER OF ENGINES AND MODEL**

As of December 31, 1971 to Date

Type of Aircraft, Number of Engines and Model	1971	1972	1973	1974	1975 <sup>a</sup>
<b>TOTAL</b> . . . . .	<b>2,642</b>	<b>2,583</b>	<b>2,599</b>	<b>2,472</b>	<b>2,672</b>
<b>Four-Engine, TOTAL</b> . . . . .	<b>1,010</b>	<b>917</b>	<b>866</b>	<b>730</b>	<b>710</b>
Turbojets . . . . .	<u>890</u>	<u>811</u>	<u>750</u>	<u>632</u>	<u>602</u>
Boeing 707 . . . . .	365	342	316	281	264
Boeing 720 . . . . .	106	57	45	35	29
Boeing 747 . . . . .	104	106	111	104	98
Convair 880 . . . . .	41	41	37	—	—
Convair 990 . . . . .	8	8	8	5	—
Lockheed L-1329 . . . . .	1	1	—	1	1
McDonnell Douglas DC-8 . . . . .	265	256	233	206	210
Turboprops . . . . .	<u>89</u>	<u>79</u>	<u>74</u>	<u>67</u>	<u>68</u>
Armstrong Whitworth AW-650 . . . . .	6	—	—	—	—
Boeing 377S . . . . .	1	1	1	—	—
Canadair CL-44 . . . . .	1	—	—	—	—
Lockheed 188 . . . . .	60	57	53	48	48
Lockheed 382 . . . . .	21	21	20	19	20
Piston-Engine . . . . .	<u>31</u>	<u>27</u>	<u>42</u>	<u>31</u>	<u>40</u>
Boeing 377 . . . . .	1	1	1	—	—
Douglas DC-4 . . . . .	4	3	4	1	1
Douglas DC-6 . . . . .	17	21	31	28	36
Douglas DC-7 . . . . .	7	—	5	1	2
Lockheed 749 . . . . .	1	1	—	—	—
Lockheed 1049/1649 . . . . .	1	1	1	1	1
<b>Three-Engine, Turbojets, TOTAL</b> . . . . .	<b>678</b>	<b>759</b>	<b>872</b>	<b>923</b>	<b>994</b>
Boeing 727 . . . . .	665	683	733	747	792
Lockheed L-1011 . . . . .	—	17	48	68	77
McDonnell Douglas DC-10 . . . . .	13	59	91	108	125
<b>Twin-Engine, TOTAL</b> . . . . .	<b>926</b>	<b>880</b>	<b>833</b>	<b>797</b>	<b>953</b>
Turbojets . . . . .	<u>564</u>	<u>548</u>	<u>523</u>	<u>523</u>	<u>575</u>
Boeing 737 . . . . .	<u>155</u>	<u>153</u>	<u>152</u>	<u>150</u>	<u>147</u>
British Aircraft Corp., BAC-111 . . . . .	62	58	31	36	30
Dassault MD-20 . . . . .	5	2	—	—	44
DeHavilland DH-125 . . . . .	—	—	—	—	1
Grumman G-1159 . . . . .	—	—	—	—	2
Lear Jet LR-23 . . . . .	—	—	—	3	—
Lear Jet LR-25 . . . . .	—	—	—	—	7
Lear Jet LR-35 . . . . .	—	—	—	—	1
McDonnell Douglas DC-9 . . . . .	341	335	340	334	341
Hamburger Flugzeugbau HF-320 . . . . .	1	—	—	—	1
Rockwell International NA-265 . . . . .	—	—	—	—	1

(Continued on next page)

**U.S. AIRLINE FLEET**  
**TYPE OF AIRCRAFT, NUMBER OF ENGINES AND MODEL (Continued)**

Type of Aircraft, Number of Engines and Model	1971	1972	1973	1974	1975 <sup>a</sup>
<b>Twin-Engine, continued</b>					
Turboprops . . . . .	<u>258</u>	<u>239</u>	<u>230</u>	<u>199</u>	<u>205</u>
Aero Commander AC-680-V . . . . .	—	1	1	—	—
Beech 99 . . . . .	5	1	—	—	4
Convair 580 . . . . .	106	104	105	89	71
Convair 600, 640 . . . . .	33	34	32	29	32
DeHavilland DHC-6 . . . . .	8	13	9	8	21
Fairchild F-27 . . . . .	34	29	25	15	10
Fairchild FH-227 . . . . .	48	32	31	33	29
Grumman G-159 . . . . .	1	1	1	1	2
Hawker Siddley HS748 . . . . .	—	—	1	1	1
Nihon YS-11 . . . . .	21	22	23	21	23
Nord ND-262 . . . . .	—	—	—	—	10
Short SC-7 . . . . .	2	2	2	2	2
Piston-Engine . . . . .	<u>104</u>	<u>93</u>	<u>80</u>	<u>75</u>	<u>173</u>
Aero Commander 500 . . . . .	1	1	1	1	3
Aero Commander 680E . . . . .	2	1	—	1	—
Beech BE-18 . . . . .	—	—	—	1	3
Beech BE-50 . . . . .	—	1	—	—	—
Cessna CE-310 . . . . .	—	—	1	1	—
Cessna 402 . . . . .	1	3	2	1	—
Cessna CE-421 . . . . .	—	—	—	—	1
Convair 240 . . . . .	—	1	—	—	—
Convair 340/440 . . . . .	5	7	6	6	14
Curtis CW-46 . . . . .	31	22	30	25	23
Douglas DC-3 . . . . .	23	20	12	14	104
Fairchild FC-82 . . . . .	2	2	2	2	2
Grumman G-21 . . . . .	12	11	6	6	5
Grumman G-44 . . . . .	2	1	1	1	3
Grumman G-73 . . . . .	1	1	1	1	—
Martin 202 . . . . .	1	1	—	—	—
Martin 404 . . . . .	22	21	18	15	15
Piper PA-23 . . . . .	1	—	—	—	—
<b>Single-Engine, TOTAL</b>	<b>14</b>	<b>13</b>	<b>15</b>	<b>12</b>	<b>8</b>
Turboprops . . . . .	3	—	—	—	—
Piston-Engine . . . . .	11	13	15	12	8
<b>Helicopters, TOTAL</b>	<b>14</b>	<b>14</b>	<b>13</b>	<b>10</b>	<b>7</b>
Turbine-Engine . . . . .	<u>11</u>	<u>11</u>	<u>10</u>	<u>10</u>	<u>7</u>
Sikorsky S-61 . . . . .	8	7	7	7	7
Bell BL-206 . . . . .	3	4	3	3	—
Piston-Engine . . . . .	<u>3</u>	<u>3</u>	<u>3</u>	<u>—</u>	<u>—</u>
Sikorsky S-58C . . . . .	3	3	3	—	—

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

a Includes large air taxi aircraft (gross takeoff weight 12,500 pounds and over).



**WORLD AIRLINE TRAFFIC  
SCHEDULED SERVICES**

Calendar Years 1960 to Date  
(Millions)

Year	Miles Flown	Passengers Carried	Passenger- Miles	Cargo Ton-Miles	Mail Ton-Miles
<b>Excludes U.S.S.R.</b>					
1960	1,930	106	67,500	1,400	415
1961	1,940	111	72,500	1,615	490
1962	2,015	121	80,500	1,900	555
1963	2,130	135	91,500	2,130	590
1964	2,300	155	106,000	2,575	625
1965	2,550	177	123,000	3,290	755
1966	2,780	200	142,000	3,905	1,050
1967	3,280	233	169,500	4,470	1,295
1968	3,730	261	192,500	5,425	1,610
1969	4,170	293	218,000	6,685	1,720
1970	4,360	311	237,000	7,165	1,885
1971	4,390	333	252,000	7,870	1,750
1972	4,490	368	289,000	9,060	1,660
1973	4,680	405	323,000	10,680	1,700
1974 <sup>r</sup>	4,580	423	339,000	11,665	1,680
1975 <sup>E</sup>	4,690	433	348,000	11,490	1,680
<b>Includes U.S.S.R.</b>					
1970 <sup>r</sup>	N.A.	382	286,000	8,230	2,150
1971 <sup>r</sup>	N.A.	411	307,000	9,060	1,970
1972 <sup>r</sup>	N.A.	450	348,000	10,290	1,900
1973	N.A.	489	385,000	12,015	1,970
1974 <sup>r</sup>	N.A.	514	406,000	13,060	1,970
1975 <sup>E</sup>	N.A.	529	420,000	12,990	1,990

Source: International Civil Aviation Organization, "Development of World Scheduled Revenue Traffic" (Annually).

NOTE: Excludes the People's Republic of China, and states which were not members of ICAO on December 31, 1975. Figures represent revenue traffic on international and domestic scheduled services.

<sup>r</sup> Estimate.

<sup>E</sup> Revised.

N.A. Not available.

**AIRLINE TRAFFIC  
UNITED STATES SCHEDULED AIRLINES**

Calendar Years 1960 to Date  
(Millions)

Year	Miles Flown	Passengers Carried	Passenger-Miles	Cargo Ton-Miles <sup>a</sup>	Mail Ton-Miles <sup>b</sup>
1960	998	58	38,863	880	250
1961	970	58	39,831	1,023	308
1962	1,010	63	43,760	1,388	350
1963	1,095	71	50,365	1,346	368
1964	1,189	82	58,494	1,634	383
1965	1,354	95	68,676	2,270	494
1966	1,482	109	79,889	3,048	762
1967	1,834	132	98,484	3,537	985
1968	2,146	150	113,958	3,872	1,268
1969	2,385	159	125,414	4,443	1,345
1970	2,418	170	131,710	3,862	1,484
1971	2,379	174	135,652	4,637	1,327
1972	2,376	191	152,406	5,198	1,205
1973	2,448	202	161,957	5,283	1,209
1974 <sup>r</sup>	2,258	207	162,919	5,332	1,163
1975	2,241	205	162,810	5,090	1,110

Source: Civil Aeronautics Board, Bureau of Accounts and Statistics.

NOTE: Figures represent total scheduled service excluding nonrevenue operations of U.S. International and domestic certificated route air carriers.

**a** Includes freight plus express revenue ton-miles in scheduled and nonscheduled operations.

**b** U.S. mail ton-miles plus foreign mail ton-miles in scheduled and nonscheduled operations.

**r** Revised.

**PASSENGER SERVICE**  
**U. S. SCHEDULED AIRLINES**

Calendar Years 1950 to Date

Year	Domestic		International	
	Passenger Miles Flown (Millions)	Passengers Carried (Thousands)	Passenger-Miles Flown (Millions)	Passengers Carried (Thousands)
1950	8,029.1	17,468	2,214.0	1,752
1951	10,589.7	22,711	2,613.8	2,140
1952	12,559.3	25,176	3,065.0	2,391
1953	14,793.9	28,901	3,450.8	2,745
1954	16,802.4	32,529	3,810.4	2,919
1955	19,852.1	38,221	3,398.9	3,488
1956	22,398.6	41,937	5,226.2	4,068
1957	25,378.8	45,162	5,882.0	4,259
1958	25,375.5	44,741	6,123.9	4,428
1959	29,307.6	51,000	7,064.2	4,999
1960	30,556.6	52,377	8,306.2	5,499
1961	31,062.3	52,712	8,768.5	5,699
1962	33,623.0	55,950	10,138.0	6,598
1963	38,456.6	63,925	11,905.4	7,513
1964	44,141.3	72,988	14,352.4	8,775
1965	51,887.4	84,460	16,789.0	10,195
1966	60,590.8	97,746	19,298.4	11,646
1967	75,487.3	118,669	23,259.3	13,424
1968	87,507.6	134,423	26,450.6	15,728
1969	95,945.8	142,340	29,468.3	16,848
1970	104,146.8	153,662	27,563.2	16,260
1971	106,293.9	156,098	29,357.9	17,569
1972	118,138.0	172,452	34,268.3	17,937
1973	126,317.3	183,272	35,640.0	18,936
1974 <sup>r</sup>	129,732.4	189,733	33,186.2	17,725
1975	131,728.4	188,746	31,081.7	16,316

Source: Civil Aeronautics Board, Bureau of Accounts and Statistics.

NOTE: Figures represent total scheduled passenger services excluding nonrevenue operations of certificated route air carriers.

r Revised.

**REVENUES AND EXPENSES**  
**TOTAL DOMESTIC OPERATIONS<sup>a</sup>, ALL AIR CARRIER SERVICES**  
 Calendar Years 1960 to Date  
 (Millions of Dollars)

Year	TOTAL Operating Revenues	TOTAL Operating Expenses	Operating Profit
1960	\$ 2,129	\$ 2,091	\$ 38
1961	2,245	2,244	1
1962	2,498	2,408	90
1963	2,722	2,580	142
1964	3,094	2,778	316
1965	3,608	3,165	443
1966	4,070	3,589	481
1967	4,887	4,476	411
1968	5,606	5,298	308
1969	6,438	6,156	282
1970	7,131	7,128	3
1971	7,753	7,496	257
1972	8,652	8,158	493
1973	9,694	9,200	494
1974	11,545	10,760	785
1975 <sup>E</sup>	11,925	11,798	127

Source: Civil Aeronautics Board, Bureau of Accounts and Statistics.

NOTE: The 1975 estimate excludes the domestic portion of all-cargo carriers (Airlift, Flying Tiger and Seaboard) which on a system basis in 1975 had \$372 million in operating revenues, \$374 million in operating expenses and an operating loss of \$2 million compared with \$333 million, \$335 million and a loss of \$1 million, respectively, in 1974.

a Includes domestic trunks, local service, Intra-Alaska, Intra-Hawaii, helicopter, other carriers and all-cargo carriers.

E Estimate.

**SOURCES OF OPERATING REVENUE**  
**TOTAL DOMESTIC OPERATIONS<sup>a</sup>, ALL AIR CARRIER SERVICES**  
 Calendar Years 1960 to Date  
 (Millions of Dollars)

Year	TOTAL Operating Revenues	Passenger	Mail (including subsidy)	Express and Freight	Excess Baggage	Other
1960	\$ 2,129	\$ 1,860	\$ 113	\$ 103	\$ 21	\$ 32
1961	2,245	1,951	130	115	20	29
1962	2,498	2,168	139	136	20	35
1963	2,722	2,375	143	152	17	35
1964	3,095	2,701	149	182	17	46
1965	3,608	3,142	157	220	12	77
1966	4,070	3,534	162	251	6	117
1967	4,887	4,260	170	287	7	163
1968	5,606	4,913	182	343	9	159
1969	6,438	5,662	186	401	10	179
1970	7,131	6,246	205	461	12	207
1971	7,753	6,736	227	527	13	250
1972	8,652	7,565	230	596	13	248
1973	9,694	8,379	263	694	14	344
1974	11,545	9,758	264	759	17	747
1975 <sup>E</sup>	11,925	10,123	250	696	19	837

Source: Civil Aeronautics Board, Bureau of Accounts and Statistics.

NOTE: The 1975 estimate excludes the domestic portion of all-cargo carriers (Airlift, Flying Tiger and Seaboard) which had the following data for 1974 and 1975 respectively: operating revenues \$372 and \$333 millions, mail \$28 and \$30 millions, express and freight \$262 and \$239 millions, and other \$83 and \$64 millions.

a Includes domestic trunks, local service, Intra-Alaska, Intra-Hawaii, helicopter, other carriers and all-cargo carriers.

E Estimate.

**U. S. DOMESTIC AIRLINES  
TOTAL ASSETS AND INVESTMENT IN FLIGHT EQUIPMENT**

Fiscal Years<sup>a</sup> 1960 to Date  
(Millions of Dollars)

Year	TOTAL NET ASSETS <sup>b</sup>	Value of Flight Equipment				Investment in Flight Equipment as a Percent of Total Assets
		TOTAL Gross Value	Less: Deprecia- tion	Plus: Construc- tion Work in Process	Equals: Net Value of Flight Equipment	
1960	\$ 1,760	\$ 2,174	\$ 890	\$ 90	\$ 1,374	78.1%
1961	2,099	2,719	1,062	77	1,734	82.6
1962	2,273	3,006	1,183	52	1,875	82.4
1963	2,211	3,132	1,341	27	1,818	82.2
1964	2,415	3,383	1,402	48	2,029	84.0
1965	2,816	3,844	1,505	52	2,391	84.9
1966	3,747	4,520	1,646	107	2,981	79.6
1967	5,003	5,485	1,805	153	3,833	76.6
1968	6,294	6,936	2,044	204	5,096	76.6
1969	7,107	8,003	2,334	195	5,864	82.5
1970	7,417	8,546	2,814	298	6,030	81.3
1971	7,664	9,375	3,231	203	6,347	82.8
1972	8,017	9,813	3,484	200	6,529	81.4
1973	9,692	12,140	4,423	344	8,061	83.2
1974	10,024	13,010	4,756	155	8,409	83.8

Source: Civil Aeronautics Board, Bureau of Accounts and Statistics.

NOTE: 1960 through 1972: Includes data for trunk and local service carriers only; International carriers, helicopter service and air taxi operators excluded.

1973 and 1974: Pan American Airlines is reclassified as a trunk carrier and is included in the statistics published by the Bureau of Accounts and Statistics of the Civil Aeronautics Board. 1975 information not available at time of publication.

<sup>a</sup> Fiscal Years ending June 30.

<sup>b</sup> Comprises net investment in buildings and ground equipment, flight equipment, working capital, etc.

## ACTIVE CIVIL AIRCRAFT

as of December 31  
Years 1960 to Date

Year	Active Civil Aircraft								
	TOTAL	TOTAL Air Carrier <sup>a</sup>	General Aviation Aircraft					Rotorcraft <sup>b</sup>	Other <sup>c</sup>
			TOTAL	Fixed-Wing Aircraft		Other <sup>c</sup>			
				Multi-Engine	Single-Engine				
4-place & over	3-place & less								
1960	78,760	2,211	76,549	7,243	34,829	33,472	634	371	
1961	82,853	2,221	80,632	8,401	38,206	32,800	798	427	
1962	86,287	2,166	84,121	9,186	41,120	32,341	967	507	
1963	87,267	2,179	85,088	9,695	42,657	30,977	1,171	588	
1964	90,935	2,193	88,742	10,644	45,777	30,367	1,306	648	
1965	97,741	2,299	95,442	11,977	49,789	31,364	1,503	809	
1966	107,085	2,379	104,706	13,548	52,972	35,687	1,622	877	
1967	116,781	2,595	114,186	14,651	56,865	39,675	1,899	1,096	
1968	127,164	2,927	124,237	16,760	60,977	42,830	2,350	1,320	
1969	133,814	3,008	130,806	18,111	63,703	45,001	2,557	1,434	
1970	134,539	2,796	131,743	18,291	64,759	44,884	2,255	1,554	
1971	133,869	2,721	131,148	17,855	64,464	44,792	2,352	1,685	
1972	147,695	2,685	145,010	19,849	70,998	49,448	2,787	1,928	
1973	156,207	2,667	153,540	21,929	74,831	51,386	3,143	2,251	
1974	164,160	2,658	161,502	23,418	78,924	53,008	3,610	2,542	

Source: Federal Aviation Administration.

NOTE: Before 1971, an "active aircraft" was one certificated as eligible to fly. Now an "active aircraft" must have a current registration and have been flown during the previous calendar year.

a Registered, not necessarily in operation. Includes helicopters.

b Includes autogiros; excludes air carrier helicopters.

c Includes gliders, dirigibles and balloons.

## ACTIVE AIRMAN CERTIFICATES HELD

as of December 31  
Selected Years

	1965	1972	1973	1974	1975
<u>Pilots, TOTAL</u>	<u>479,770</u>	<u>750,869</u>	<u>714,607</u>	<u>733,728</u>	<u>728,187</u>
Student	139,172	181,477	181,905	180,795	176,978
Private	196,393	321,413	298,921	305,848	305,863
Commercial	116,665	196,228	182,444	192,425	189,342
Airline	22,440	37,714	38,139	41,002	42,592
Helicopter (only)	1,392	7,987	5,968	5,647	4,932
Glider (only)	1,411	4,080	4,288	4,824	5,348
Other Pilot	2,297	1,970	2,942	3,187	3,132
<u>Non-Pilots, TOTAL</u>	<u>204,463</u>	<u>315,348</u>	<u>304,747</u>	<u>314,394</u>	<u>323,934</u>
Mechanic <sup>a</sup>	135,351	201,700	193,337	198,863	205,436
Parachute Rigger <sup>a</sup>	4,584	7,287	6,941	7,800	8,327
Ground Instructor <sup>a</sup>	31,403	48,450	46,827	49,249	51,365
Dispatcher <sup>a</sup>	4,104	5,637	5,527	5,576	5,741
Control Tower Operator	14,875	23,353	23,250	23,342	23,956
Flight Navigator	1,797	2,957	2,636	2,509	2,321
Flight Engineer	12,349	25,964	26,229	26,955	26,788
<u>Flight Instructor Certificates<sup>b</sup></u>	<u>34,904</u>	<u>37,858</u>	<u>36,795</u>	<u>42,418</u>	<u>44,777</u>
<u>Instrument Ratings<sup>b</sup></u>	<u>93,637</u>	<u>187,909</u>	<u>185,969</u>	<u>199,323</u>	<u>203,954</u>

Source: Federal Aviation Administration, Office of Management Systems.

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

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



**GENERAL AVIATION  
MILES AND HOURS FLOWN**  
By Type of Flying  
Calendar Years 1960 to Date

Year	TOTAL	Business		Commercial		Instructional		Personal & Other	
		Units	Per-cent	Units	Per-cent	Units	Per-cent	Units	Per-cent

**MILES FLOWN BY TYPE OF FLYING—Millions of Miles**

1960	1,769	881	50	299	17	194	11	395	22
1961	1,858	888	48	333	18	203	11	434	23
1962	1,965	935	48	367	18	256	13	407	21
1963	2,049	983	48	369	18	266	13	431	21
1964	2,181	1,047	48	393	18	284	13	457	21
1965	2,562	1,204	47	461	18	359	14	538	21
1966	3,336	1,536	46	516	16	646	19	638	19
1967	3,440	1,431	42	569	16	713	21	727	21
1968	3,701	1,406	38	666	18	814	22	815	22
1969	3,926	1,426	36	723	19	910	23	867	22
1970	3,207	1,134	35	555	17	686	22	832	26
1971	3,143	1,129	36	506	16	651	21	857	27
1972	3,317	1,144	34	581	18	692	21	900	27
1973	3,729	1,344	36	688	18	778	21	919	25
1974	4,043	1,433	35	790	20	816	20	1,004	25

**HOURS FLOWN BY TYPE OF FLYING—Thousands of Hours**

1960	13,121	5,699	44	2,365	18	1,828	14	3,229	24
1961	13,602	5,699	42	2,634	19	1,796	13	3,473	26
1962	14,500	5,431	38	3,051	21	2,385	16	3,633	25
1963	15,106	5,740	38	3,172	21	2,417	16	3,777	25
1964	15,738	5,823	37	3,305	21	2,675	17	3,935	25
1965	16,733	5,857	35	3,348	20	3,346	20	4,182	25
1966	21,023	7,057	33	3,555	17	5,674	27	4,737	23
1967	22,153	6,578	30	3,918	18	6,262	28	5,395	24
1968	24,053	6,976	29	4,810	20	6,494	27	5,773	24
1969	25,351	7,064	28	4,928	19	7,023	28	6,336	25
1970	26,030	7,204	28	4,582	18	6,791	26	7,453	28
1971	25,512	7,141	28	4,264	17	6,416	25	7,691	30
1972	26,974	7,239	27	4,831	18	6,814	25	8,090	30
1973	30,048	8,558	28	5,608	19	7,646	25	8,236	28
1974	32,475	9,140	28	6,294	19	7,972	25	9,069	28

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

**U. S. CIVIL AIRPORTS<sup>a</sup>**  
**By Length of Runway and Region**  
**December 31, 1975**

FAA Region	TOTAL	Airports by Length of Runway (in feet)		
		Under 5,000	5,000- 9,999	10,000 & Over
<b>TOTAL</b> . . . . .	<u>13,251</u>	<u>11,665</u>	<u>1,331</u>	<u>255</u>
New England . . . . .	529	447	62	20
Eastern . . . . .	1,776	1,640	109	27
Great Lakes . . . . .	2,620	2,416	171	33
Central . . . . .	1,198	1,122	68	8
Southern <sup>b</sup> . . . . .	1,474	1,259	201	14
Southwest . . . . .	2,070	1,832	217	21
Rocky Mountain . . . . .	898	753	139	6
Western . . . . .	1,090	915	155	20
Northwest . . . . .	765	683	69	13
Alaska . . . . .	769	554	124	91
Pacific . . . . .	47	39	7	1
South Pacific <sup>c</sup> . . . . .	15	5	9	1

Source: Department of Transportation, Federal Aviation Administration.

**a** Includes seaplane bases, heliports, stolports and military fields having joint civil-military use.

**b** Includes Puerto Rico (25 airports) and the Virgin Islands (4 airports).

**c** American Samoa, Guam, Saipan, and Trust Territory.



## Helicopters

Civil helicopter operations in the United States, Canada and Puerto Rico showed impressive gains in 1975, with increases in almost every category of measurement. In some cases, such as business and civil agency usage, the growth rate was of exceptional order.

The number of helicopters in service topped the 5,000 mark for the first time. By year-end 1975, civil helicopters totaled 5,222, a figure which represented a significant 8.4 percent gain over the 1974 total of 4,819.

The number of helicopter operators increased at an even greater rate. In 1975 it reached a new high of 1,891, compared with 1,536 operators in 1974; the gain amounted to 23.1 percent.

Business use of the helicopter spearheaded the year's growth, as more and more corporate users sought effective transportation time-saving through the helicopter's point-to-point travel capability. Business usage reached an all-time high in terms of both operators and numbers in service, with 833 companies/executives flying 1,056 helicopters. Compared with the previous year, this amounted to a 37 percent increase in owners and a 35.7 percent increase in helicopter units. Importance of the business market was underscored by announcements of two company-funded medium transport helicopter developments: the Bell 222 and the Sikorsky S-76.

There were similar advances in government agency usage, reflecting the helicopter's demonstrated advantages in such areas as combating crime, patrolling traffic, transporting highway accident victims, rescuing injured mountain climbers or people in danger of drowning, or search operations for lost children. The number of civil government agencies using helicopters mounted to 279 and the number of helicopters climbed to 824; the increases over the previous year's totals amounted to 37.4 and 32.3 percent, respectively.

Of particular interest is the growing acceptance of the helicopter's versatility in law enforcement operations, illustrated by a 1960-1975 comparison. In 1960, the AIA Directory of Helicopter Operators listed 10 U.S. law enforcement agencies operating 21 helicopters. The 1975 edition of the directory showed 180 law enforcement users operating 467 helicopters.

In commercial operations, helicopters are proving cost effective in mining, banking, logging and construction. In 1975, energy demands also brought expanding use of helicopters in offshore and inland oil exploration and production. Although the number of commercial operators increased 7.4 percent to a total of 779, the number of helicopters in the commercial fleet dropped 2.3 percent to 3,342. This was due to the shift toward new models of helicopters with greater range and payload, permitting fewer machines to do an equivalent job.

The sole area of decline during 1975 was in scheduled helicopter traffic. Miles flown by the scheduled helicopter airlines dropped sharply from more than a million in 1974 to 873,000, and there were similar declines in passengers boarded and passenger-miles flown.

California continued to lead the nation as the state with the greatest number of civil helicopters—556. Alaska showed the greatest percentage increase, a 21 percent gain with 206 helicopters in 1975 compared with 170 in 1974. In Louisiana, there were 375 helicopters serving the oil production platforms in the Gulf of Mexico.

The year saw continued increase in the number of heliports in the U.S., Canada and Puerto Rico. In 1975, the number grew to 3,264, up 8.3 percent over the 1974 total of 3,014. Hospital heliports numbered 564, a 15.8 percent increase over the 487 in 1974; the exceptional growth in this category is pointed up by the fact that a decade earlier there were only 34 hospital heliports.

New city ordinances in Chicago and Los Angeles focused attention on the need for more city-center, suburban and hospital heliports to permit greater utilization of the versatile civil helicopter. These ordinances required that buildings above a certain height—75 feet in Chicago and 80 in Los Angeles—be provided rooftop emergency landing facilities for helicopters.

## CIVIL HELICOPTER OPERATORS AND HELICOPTERS OPERATED IN THE UNITED STATES AND CANADA

1960 to Date

Year	TOTAL	Users		
		Commercial	Companies and Executives	Government Agencies <sup>a</sup>
<b>CIVIL HELICOPTER OPERATORS</b>				
1960	318	193	94	31
1961	406	265	106	35
1962	503	322	145	36
1963	600	405	150	45
1964	710	451	212	47
1965	860	508	299	53
1966	933	519	353	61
1967	1,023	522	427	74
1969	1,379	689	596	94
1971	1,424	672	590	162
1972	1,491	758	566	167
1973	1,532	752	599	181
1974	1,536	725	608	203
1975	1,891	779	833	279
<b>HELICOPTERS OPERATED<sup>b</sup></b>				
1960	936	705	134	97
1961	1,179	882	173	124
1962	1,319	994	213	112
1963	1,497	1,157	218	122
1964	1,767	1,333	311	123
1965	2,053	1,537	401	115
1966	2,318	1,699	475	144
1967	2,438	1,764	487	187
1969	3,433	2,390	770	273
1971	3,874	2,605	802	467
1972	4,185	2,992	745	448
1973	4,601	3,295	780	526
1974	4,819	3,418	778	623
1975	5,222	3,342	1,056	824

Source: Aerospace Industries Association, Manufacturers' and owner/operators' reports.

<sup>a</sup> Federal, state and local governments.

<sup>b</sup> Includes helicopters on order.

## HELIPORTS AND HELISTOPS IN THE UNITED STATES, CANADA, AND PUERTO RICO

By Region  
Selected Years 1970 to Date

Region	1970	1972	1973	1974	1975
TOTAL . . . . .	2,310	2,326	2,384	3,014	3,264
(elevated) . . . . .	(216)	(211)	(241)	(221)	(277)
New England . . . . .	93	87	78	106	143
Middle Atlantic . . . . .	514	571	581	741	683
East North Central . . . . .	293	281	307	359	410
West North Central . . . . .	107	109	110	111	98
South Atlantic . . . . .	192	190	204	301	352
East South Central . . . . .	47	65	64	86	107
West South Central . . . . .	205	216	217	245	337
Mountain . . . . .	157	168	176	216	241
Pacific . . . . .	593	545	551	711	788
Other <sup>a</sup> . . . . .	109	94	96	138	105

Source: Aerospace Industries Association.

NOTE: Data for 1971 are not available. Totals include proposed facilities.

a Includes Canada and Puerto Rico.

## HOSPITAL HELIPORTS IN THE UNITED STATES AND CANADA

By Region  
Selected Years 1970 to Date

Region	1970	1972	1973	1974	1975
TOTAL . . . . .	285	354	384	489	564
New England . . . . .	5	5	5	10	17
Middle Atlantic . . . . .	29	43	42	51	51
East North Central . . . . .	74	82	99	120	127
West North Central . . . . .	18	22	21	26	22
South Atlantic . . . . .	33	39	50	67	80
East South Central . . . . .	5	18	18	24	29
West South Central . . . . .	20	26	26	38	59
Mountain . . . . .	24	29	32	41	56
Pacific . . . . .	73	87	87	105	116
Canada . . . . .	4	3	4	7	7

Source: Aerospace Industries Association.

NOTE: Data for 1971 are not available. Totals include proposed facilities.

**HELICOPTER TRAFFIC**  
**UNITED STATES SCHEDULED AIRLINES**  
 Calendar Years 1960 to Date  
 (Thousands)

Year	Miles Flown	Passengers Carried	Passenger-Miles	Ton-Miles
1960	2,219	430	9,475	1,054
1961	2,157	490	8,604	963
1962	1,518	359	8,192	897
1963	1,462	458	12,510	1,317
1964	1,976	608	16,003	1,668
1965	1,984	718	18,811	1,948
1966	2,241	1,067	25,420	2,562
1967	2,660	1,220	29,670	2,960
1968	2,547	1,042	24,856	2,482
1969	1,909	737	17,074	1,703
1970	1,427	573	11,341	1,167
1971	1,048	551	8,973	917
1972	1,022	587	10,009	1,020
1973	1,085	613	10,936	1,108
1974	1,029	592	10,298	1,055
1975	873	505	8,370	868

Source: Civil Aeronautics Board, Bureau of Accounts and Statistics.

**REVENUE TON-MILE TRAFFIC CARRIED  
SCHEDULED HELICOPTER AIRLINES**

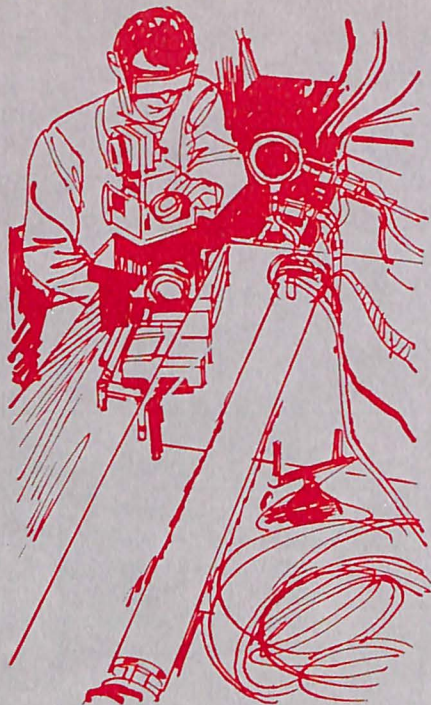
Calendar Years 1960 to Date  
(In Thousands)

Year	TOTAL TON-MILES	Passenger <sup>r</sup>	U.S. Mail	Express	Freight
1960	1,054	916	91	40	7
1961	963	822	94	40	7
1962	897	780	65	44	6
1963	1,317	1,193	74	44	6
1964	1,668	1,525	92	45	6
1965	1,948	1,794	84	60	10
1966	2,562	2,422	60	70	10
1967	2,960	2,826	61	64	9
1968	2,482	2,367	57	48	8
1969	1,704	1,627	34	37	6
1970	1,167	1,133	5	25	4
1971	917	897	4	13	3
1972	1,020	1,000	5	12	3
1973	1,108	1,094	3	8	3
1974	1,055	1,047	4	2	2
1975	868	860	5	1	2

Source: Civil Aeronautics Board, Bureau of Accounts and Statistics.  
 r Effective January 1, 1970, the certificated route air carriers no longer report excess baggage separately. Excess baggage is now combined with passenger ton-miles and passenger weight standardized at 200 lbs.



# Research and Development



Outlays of the Department of Defense for aerospace research, development, test and evaluation declined sharply in fiscal year 1975. Since DOD-funded assignments represent the great majority of all aerospace R&D contracts, industry activity in this area declined further.

In prior years of the seventies, DOD outlays for aerospace research and development ranged between \$4.2 and \$4.7 billion. Adjusted for inflation effect, this produced an industry activity curve either level or dipping slightly. But in 1975 the drop was significant. In current dollars, defense RDT&E funding was reduced by \$225 million below the previous year and the erosive effect of inflation contributed further to declining industry defense R&D workload.

DOD funding for aircraft RDT&E accounted for practically all of the reduction, dropping from \$1.9 to \$1.7 billion, while astronautics funding fell slightly and missile research increased negligibly.

As in the previous year, missile programs constituted the largest area of DOD research and development effort. The main project was Trident, a Navy development of a new sea-launched ballistic missile to be used in conjunction with a new nuclear submarine; initial Trident operational capability was scheduled for FY 1979. DOD also continued work on a new land-based ICBM, tentatively designated M-X, with greater throw-weight and much-improved survivability. M-X

was described as an option for deployment in the 1980s; in the interim, a major R&D program focused on improving the yield, accuracy and silo "hardness" of the Minuteman II/III missiles already operationally sited.

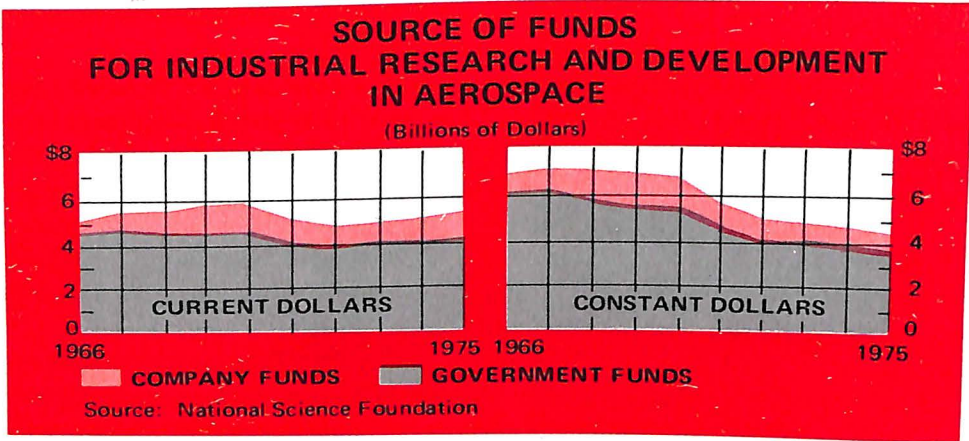
Other major missile programs, in various stages of development, included: the Air-Launched Cruise Missile and the Sea-Launched Cruise Missile, long-range strategic weapons which cruise within the atmosphere and complement the ballistic missile force; Aegis, a Navy air defense system designed to provide protection for high-value ships; SAM-D, a long-range air defense system for field armies; Roland, the Army's short-range air defense weapon; Harpoon, an anti-ship missile; the shoulder-fired Stinger air defense weapon; the Hellfire laser-guided air-to-ground missile, and the High-speed Anti-Radiation Missile (HARM).

The Air Force's B-1 strategic bomber continued to be the major development in the aircraft category. The B-1 flight test program progressed satisfactorily and a decision on production of the bomber was expected by late 1976. In advanced development and slated for large-scale production were two relatively low cost air combat fighters to operate in the 1980s as the "low end" of what DOD terms a "high-low force mix." The Air Force version is the F-16, a highly maneuverable lightweight aircraft designed to complement the F-15 air superiority fighter. The Navy counterpart is the F-18, which will team with F-14 carrier-based fighter. Not as far along as the F-16, the Navy's F-18 was to enter full-scale development status in 1976, with flight testing planned for 1978.

Among other major aircraft development programs being conducted in 1975/76 were the A-10 close air support aircraft, the EF-111A defense suppression (jamming) aircraft and the E-4 Advanced Airborne Command Post. Two important Army helicopter projects were in advanced development status: the Utility Tactical Transport Aircraft System (UTTAS) and the Advanced Attack Helicopter (AAH). In exploratory development status was a program called VPX aimed at a completely new patrol plane for the mid-1980s to counter the growing Soviet submarine threat.

Industry firms were working on a broad variety of important defense systems which do not fall within the aircraft or missile categories. Some examples: LAMPS III, a system to provide ships with information for launching missiles at targets over the radar horizon; Pave Paws, advanced phased-array radars that will upgrade the capability for detecting incoming sea-launched ballistic missiles; the airborne Precision Location Strike System; and a number of types of Remotely Piloted Vehicles.

In addition to the defense effort, industry participation in government R&D programs included contracts with the Energy Research and Development Administration in both aerospace and non-aerospace areas, the Federal Aviation Administration and NASA. Details of NASA research and development are covered under Space Programs.



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

Calendar Years 1960 to Date  
(Millions of Dollars)

Year	All Industries	Aerospace <sup>a</sup> Industry		
	TOTAL	TOTAL	Federal Government Funds	Company Funds
1960	\$ 10,509	\$ 3,514	\$ 3,150	\$ 364
1961	10,908	3,829	3,438	392
1962	11,464	4,042	3,588	454
1963	12,630	4,712	4,261	452
1964	13,512	5,078	4,621	457
1965	14,185	5,148	4,499	649
1966	15,548	5,526	4,724	802
1967	16,385	5,669	4,531	1,138
1968	17,429	5,776	4,544	1,232
1969	18,308	5,909	4,554	1,355
1970	18,062	5,245	4,032	1,213
1971	18,311	4,912	3,900	1,012
1972	19,383	4,992	4,043	948
1973 <sup>r</sup>	20,921	5,084	3,995	1,089
1974	22,369	5,311	4,139	1,171

Source: National Science Foundation.

a Includes companies primarily engaged in the manufacture of aircraft and parts, SIC Code 372, and the manufacture of ordnance and accessories, including complete guided missiles and space vehicles, SIC Code 19.

r Revised.

# INDUSTRIAL RESEARCH AND DEVELOPMENT IN AEROSPACE

By Type of Research and Fund Source  
Calendar Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL AEROSPACE	Applied Research and Development Funds			Basic Research Funds		
		TOTAL	Federal Government Contracts	Company	TOTAL	Federal Government Contracts	Company
1960	\$3,514	\$3,452	\$3,118	\$334	\$62	\$32	\$30
1961	3,829	3,789	3,417	372	40	20	20
1962	4,042	3,987	3,558	429	55	30	25
1963	4,712	4,653	4,229	424	59	31	28
1964	5,078	5,010	4,585	424	68	35	33
1965	5,148	5,074	4,457	617	74	42	32
1966	5,526	5,452	4,685	767	74	39	35
1967	5,669	5,596	4,497	1,099	73	34	39
1968	5,776	5,705	4,518	1,187	71	26	45
1969	5,909	5,842	4,529	1,313	67	25	42
1970	5,245	5,182	4,012	1,170	63	20	43
1971	4,912	4,858	3,880	978	54	20	34
1972	4,992	4,931	4,022	908	61	21	40
1973 <sup>r</sup>	5,084	5,034	3,975	1,059	50	20	30
1974	5,311	5,258	4,120	1,138	52	19	33

Source: National Science Foundation.  
r Revised.

## FEDERAL AERONAUTICS RESEARCH AND DEVELOPMENT

New Obligational Authority  
Fiscal Years 1967 to 1977<sup>E</sup>  
(Millions of Dollars)

Year	TOTAL	NASA	DOD	DOT
1967	\$ 1,613	\$ 105	\$ 1,199	\$ 309
1968	1,404	136	1,126	142
1969	1,300	169	1,161	-30 <sup>a</sup>
1970	1,882	199	1,641	42
1971	1,990	210	1,707	73
1972	2,295	236	1,964	95
1973	2,187	313	1,799	75
1974	2,030	278	1,678	74
1975	2,015	314	1,627	74
1976 <sup>E</sup>	2,346	323	1,940	83
Tr.Qtr. <sup>E</sup>	549	79	448	22
1977 <sup>E</sup>	2,732	364	2,274	94

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

NOTE: Tr. Qtr. - Transition Quarter. For an explanation of the change in the Federal Government's Fiscal Year and the Transition Quarter, see page 22.

a Unobligated balances for SST research and development, rescinded in 1969.  
E Estimate.

**FEDERAL OUTLAYS FOR RESEARCH AND DEVELOPMENT**  
**Fiscal Years<sup>a</sup> 1960 to Date**  
**(Millions of Dollars)**

Year	TOTAL	DOD	NASA	AEC	Other
1960	\$ 7,738	\$ 5,654	\$ 401	\$ 986	\$ 697
1961	9,278	6,618	744	1,111	805
1962	10,379	6,812	1,257	1,284	1,026
1963	12,000	6,849	2,552	1,335	1,264
1964	14,694	7,517	4,171	1,505	1,501
1965	14,875	6,728	5,093	1,520	1,534
1966	16,002	6,735	5,933	1,462	1,872
1967	16,842	7,680	5,426	1,467	2,269
1968	16,865	8,148	4,724	1,593	2,400
1969	16,207	7,858	4,251	1,654	2,444
1970	15,632	7,568	3,753	1,616	2,695
1971	15,050	7,541	3,382	1,303	2,824
1972	16,629	8,275	3,422	1,552	3,380
1973	17,407	8,574	3,315	1,623	3,895
Year	TOTAL	DOD	NASA	ERDA	Other
1974	18,239	8,956	3,256	1,825	4,202
1975	19,525	9,341	3,266	2,277	4,641
1976 <sup>E</sup>	21,273	9,653	3,517	2,841	5,262
Tr. Qtr. <sup>E</sup>	5,628	2,580	908	762	1,378
1977 <sup>E</sup>	23,514	10,941	3,676	3,496	5,401

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

NOTE: Includes military personnel, procurement, civil functions and some other items not included in other tables. Includes R&D facilities and administrative operating costs. AEC research and development programs transferred to ERDA with 1974 reorganization.

a For an explanation of the Transition Quarter (Tr. Qtr.) and the change in the Federal Government's Fiscal Year, see page 22.

E Estimate.

**DEPARTMENT OF DEFENSE**  
**OUTLAYS FOR RESEARCH, DEVELOPMENT, TEST AND EVALUATION**  
 By Agency  
 Fiscal Years 1960 to Date  
 (Millions of Dollars)

Year	TOTAL	Air Force	Navy	Army	Other
1960	\$ 4,710	\$ 2,348	\$ 1,129	\$ 1,021	\$ 212
1961	6,131	3,300	1,435	1,207	189
1962	6,319	3,493	1,364	1,280	180
1963	6,376	3,301	1,429	1,355	291
1964	7,021	3,722	1,578	1,338	383
1965	6,236	3,146	1,294	1,344	452
1966	6,259	2,948	1,407	1,412	492
1967	7,160	3,229	1,791	1,634	506
1968	7,747	3,800	2,003	1,434	510
1969	7,457	3,386	2,045	1,521	505
1970	7,166	2,937	2,084	1,665	480
1971	7,303	2,809	2,405	1,569	520
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 <sup>E</sup>	9,107	3,417	3,145	1,948	597
Tr. Qtr. <sup>E</sup>	2,471	1,270	588	493	120
1977 <sup>E</sup>	10,435	3,434	4,007	2,287	707

Source: Department of Defense, Budget, Fiscal Year 1977.

NOTE: For RDT&E for aircraft, missiles and astronautics, see page 99.

For an explanation of the Transition Quarter (Tr. Qtr.) and the change in the Federal Government's Fiscal Year, see page 22.

<sup>E</sup> Estimate.

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

By Function  
Fiscal Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL All RDT&E Functions	Aerospace				Other
		TOTAL	Aircraft	Missiles	Astro- nautics	
1960	\$ 4,710	\$ 3,203	\$ 632	\$ 2,059	\$ 512	\$ 1,507
1961	6,131	4,090	547	3,025	518	2,041
1962	6,319	4,150	624	2,777	749	2,169
1963	6,376	3,731	544	2,241	946	2,645
1964	7,021	4,575	939	2,352	1,284	2,446
1965	6,236	3,839	1,017	1,901	921	2,397
1966	6,259	3,707	976	1,801	930	2,552
1967	7,160	4,533	1,048	2,502	983	2,627
1968	7,746	5,076	1,367	2,488	1,221	2,670
1969	7,459	4,600	1,031	2,410	1,159	2,859
1970	7,166	4,188	1,239	2,196	753	2,978
1971	7,303	4,226	1,699	2,008	519	3,077
1972	7,881	4,691	2,066	2,157	468	3,190
1973	8,157	4,586	2,036	2,038	512	3,571
1974	8,582	4,614	1,893	2,160	561	3,968
1975	8,866	4,389	1,698	2,176	515	4,477
1976 <sup>E</sup>	9,107	N.A.	N.A.	N.A.	N.A.	N.A.
Tr. Qtr. <sup>E</sup>	2,471	N.A.	N.A.	N.A.	N.A.	N.A.
1977 <sup>E</sup>	10,435	N.A.	N.A.	N.A.	N.A.	N.A.

Source: Department of Defense, Budget Press Briefing, OASD (Comptroller), January 21, 1976.

NOTE: For an explanation of the Transition Quarter (Tr. Qtr.) and the change in the Federal Government's Fiscal Year, see page 22.

<sup>E</sup> Estimate.

N.A. Not available.

**MILITARY AIRCRAFT PROGRAMS  
RESEARCH, DEVELOPMENT, TEST AND EVALUATION<sup>a</sup>**

By Agency, Type and Model  
Fiscal Years 1976, Transition Quarter and 1977  
(Millions of Dollars)

Agency, Type and Model	1976 <sup>E</sup>	Transition Quarter <sup>E</sup>	1977 <sup>E</sup>
<b>AIR FORCE</b>			
B-1 Bomber . . . . .	\$ 596.5	\$ 129.0	\$ 482.7
A-10 Close Air Support . . . . .	51.5	1.0	12.9
F-15 Eagle . . . . .	35.0	—	51.0
F-16 Air Combat Fighter . . . . .	215.7	69.7	259.1
Adv. Tanker Cargo Aircraft . . . . .	5.2	1.4	8.0
E-3A AWACS . . . . .	188.2	35.1	109.6
Adv. Medium STOL Transport . . . . .	84.9	11.4	29.3
EF-111A Electronic Warfare Aircraft . . . . .	4.8	5.0	36.8
C-5 . . . . .	22.3	10.4	22.6
E-4, AABNCP . . . . .	42.0	7.8	79.0
<b>NAVY</b>			
A-4M Skyhawk . . . . .	4.5	0.3	3.0
A-6E Intruder . . . . .	4.1	—	5.6
A-7E Corsair II . . . . .	6.8	0.5	0.2
CH-53E Sea Stallion . . . . .	10.5	1.0	14.0
US-3A COD . . . . .	5.5	1.4	1.0
V/STOL . . . . .	22.0	5.5	44.0
LAMPS Helicopter . . . . .	26.3	2.0	83.2
F-18 . . . . .	110.3	22.6	346.9
<b>ARMY</b>			
AH-1G/S Cobra TOW . . . . .	3.7	0.8	7.5
UTTAS . . . . .	91.9	18.7	75.5
Adv. Scout Helicopter . . . . .	5.0	7.0	26.0
Adv. Attack Helicopter . . . . .	55.5	11.0	112.1
CH-47 . . . . .	10.0	2.3	25.9

Source: "Program Acquisition Costs by Weapon System," Department of Defense Budget for Fiscal Year 1977.

NOTE: For an explanation of the Transition Quarter and the change in Fiscal Years, see page 22.

<sup>a</sup> Total Obligational Authority.

<sup>E</sup> Estimate.



# Foreign Trade



Coming off a heavy deficit in 1974, the United States overall trade balance experienced a sharp turnaround in 1975. For 1975, the U.S. recorded a record trade surplus of \$9.6 billion.

The turnaround was compounded of a number of factors, among them lower demand for imports in general, an increase in export dollar volume, reduced oil imports, and a more rapid increase in export prices than in import prices.

The inflation effect is evident in export statistics. Volume — tonnages, barrels, units, etc.—actually declined by three percent, but export dollar values increased by nine percent.

Imports dropped markedly in the first six months of 1975, due to recession-induced liquidation of stocks. After mid-year, as the U.S. economy strengthened, there were significant increases in volume of both petroleum and non-petroleum imports. The amount of oil shipped to the United States in 1975 dropped two percent below the 1974 figure. Imports as a whole declined 12.5 percent in

volume, while prices of imports rose 8.5 percent. In terms of value, imports fell four percent.

The fact that export volume declined at a much lower rate than imports was attributed in large measure to a high level of shipments of long lead time capital goods. Another factor was a substantial increase in shipments of agricultural commodities to the Soviet Union. As in previous years, the performance of the aerospace industry in foreign trade constituted a significant contribution to the U.S. surplus. The aerospace trade balance topped \$7 billion, more than \$700 million greater than the 1974 figure, which was itself a record. In dollar value, the 1975 aerospace trade balance was equivalent to 73.4 percent of the total U.S. trade balance.

Aerospace exports reached a new high of \$7.8 billion, which compared with \$7.1 billion in 1974. Following the pattern of recent years, exports of civil aviation equipment accounted for the bulk of foreign sales. Shipments of civil aviation products, including aircraft, engines, accessories and other equipment, amounted to \$5.3 billion in 1975, or approximately 70 percent of all aerospace exports.

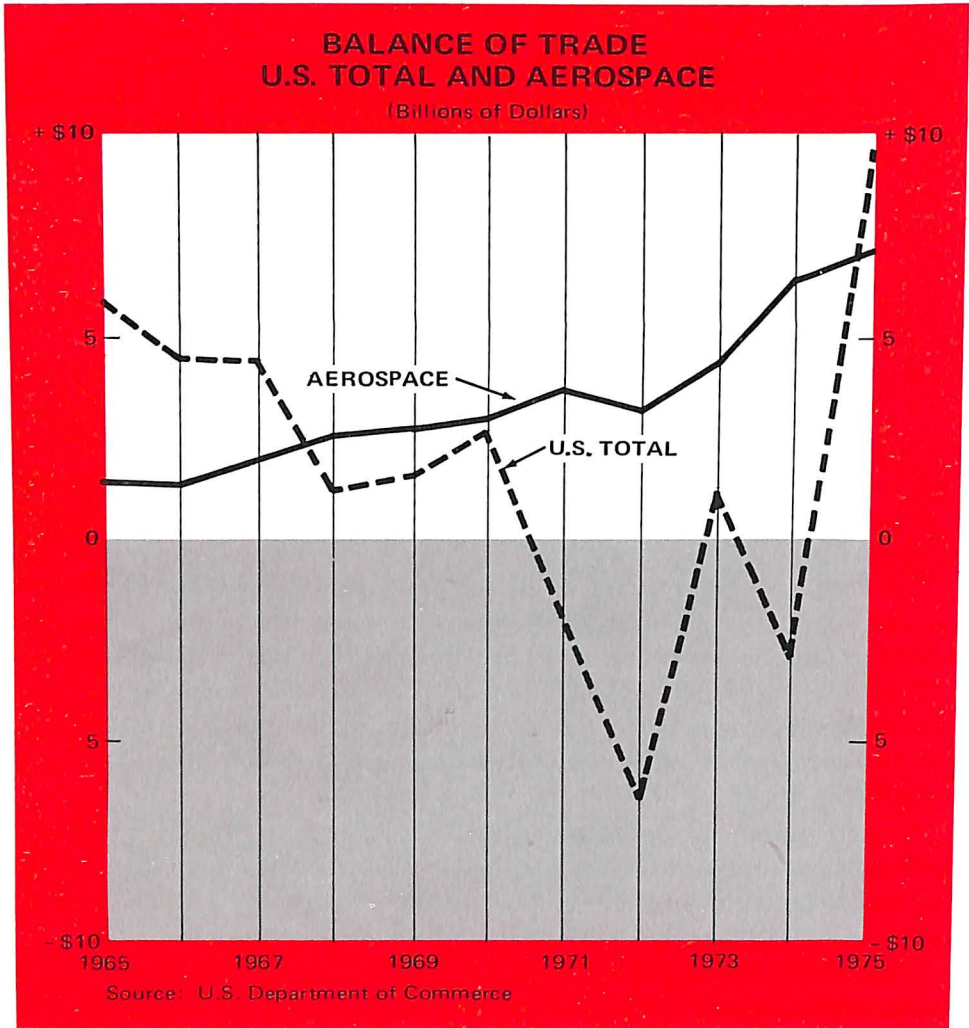
Once again the major factor within the civil category was sales of large commercial transports. Although they declined in comparison with previous year figures, transport sales abroad remained strong at \$2.4 billion, which compares with \$2.7 billion in 1974. Despite the reduction, the 1975 value for transport sales to foreign operators was the second highest in history. In terms of units, the decline was more evident; unit deliveries in 1975 amounted to 182, down from 227 in 1974.

Exports of military equipment totaled \$2.5 billion, up from \$1.8 billion in 1974. Aircraft, particularly fighter aircraft, accounted for more than half of the total. Shipments of complete military aircraft came to \$1.3 billion, an increase of \$200 million over 1974.

Deliveries to foreign nations of missiles and rockets, including spare parts and accessories, amounted to \$300 million. While this was almost double the 1974 sales volume the figure represented a very small portion—less than four percent—of overall aerospace exports.

Aerospace imports approximated the levels of the preceding two years. At \$747 million in 1975, they amounted to less than 10 percent of export sales. The major component of the imports was aircraft parts, accounting for \$326 million.

222



## TOTAL AND AEROSPACE BALANCE OF TRADE

Calendar Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL U.S. Trade Balance <sup>a</sup>	Aerospace			Aerospace Trade Balance as Percent of U.S. Total
		Trade Balance	Exports	Imports	
1960	\$ 5,369	\$ 1,665	\$ 1,726	\$ 61	31.0%
1961	6,096	1,501	1,653	152	24.6
1962 <sup>r</sup>	4,180	1,795	1,923	128	42.9
1963 <sup>r</sup>	6,061	1,532	1,627	95	21.7
1964 <sup>r</sup>	7,555	1,518	1,608	90	20.1
1965 <sup>r</sup>	5,875	1,459	1,618	159	24.8
1966	4,524	1,370	1,673	303	30.3
1967	4,409	1,961	2,248	287	44.4
1968	1,133	2,661	2,994	333	234.9
1969 <sup>r</sup>	1,599	2,831	3,138	307	177.0
1970	2,834	3,097	3,405	308	109.3
1971	-2,024 <sup>b</sup>	3,830	4,203	373	(c)
1972	-6,351	3,230	3,795	565	(c)
1973	1,222	4,360	5,142	782	356.8
1974 <sup>r</sup>	-2,996	6,350	7,095	745	(c)
1975	9,642	7,074	7,821	747	73.4

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country," Report FT 410; "U.S. Imports, General and Consumption, Schedule A, Commodity and Country," Report FT 135; "Highlights of U.S. Export and Import Trade," FT 990 (All are monthly publications).

a U.S. Balance of Trade is the difference between exports of domestic merchandise, including Department of Defense shipments, and imports for consumption, (customs value base).

b First negative U.S. Balance of Trade since 1888.

c Not applicable.

r Revised.

## EXPORTS OF U. S. AEROSPACE PRODUCTS

Calendar Years 1971 to Date  
(Millions of Dollars)

	1971	1972	1973	1974 <sup>r</sup>	1975
<b>GRAND TOTAL</b> . . . . .	\$4,202.9	\$3,794.5	\$5,141.9	\$7,094.8	\$7,821.4
<b>TOTAL CIVILIAN</b> . . . . .	3,079.9	2,953.7	3,788.4	5,273.4	5,350.9
<b>Complete Aircraft, TOTAL</b> . . . . .	<u>1,913.8</u>	<u>1,614.5</u>	<u>2,314.9</u>	<u>3,366.0</u>	<u>3,230.2</u>
Transports . . . . .	1,542.0	1,119.1	1,663.7	2,654.6	2,424.3
General Aviation <sup>a</sup> . . . . .	113.9	140.3	206.4	296.9	311.8
Rotary Wing . . . . .	45.7	50.3	83.3	109.6	104.7
Other, Including Used . . . . .	212.2	304.8	361.5	304.9	389.4
<b>Engines, TOTAL</b> . . . . .	<u>148.5</u>	<u>184.3</u>	<u>175.7</u>	<u>228.9</u>	<u>231.1</u>
Jet & Gas Turbine . . . . .	128.6	158.6	144.8	195.1	185.9
Internal Combustion . . . . .	19.9	25.7	30.9	33.8	45.2
<b>Parts, Accessories &amp; Equipment for Aircraft and Engines, Including Spares, TOTAL</b> . . . . .	<u>1,017.6</u>	<u>1,154.9</u>	<u>1,297.8</u>	<u>1,678.5</u>	<u>1,889.6</u>
Engine Spares & Accessories . . . . .	226.8	268.2	367.9	474.1	491.9
Other Spares & Equipment . . . . .	790.8	886.7	929.9	1,204.4	1,397.7
<b>TOTAL MILITARY</b> . . . . .	1,123.0	840.8	1,353.5	1,821.4	2,470.5
<b>Complete Aircraft, TOTAL</b> . . . . .	<u>633.3</u>	<u>383.4</u>	<u>790.8</u>	<u>1,101.2</u>	<u>1,306.4</u>
Transports . . . . .	80.7	124.6	131.2	190.3	235.0
General Aviation . . . . .	0.5	1.4	1.0	0.8	0.2
Rotary Wing . . . . .	43.8	53.1	37.6	50.1	123.3
Fighters & Bombers . . . . .	477.7	186.5	588.4	845.2	905.3
Trainers . . . . .	12.0	14.4	12.1	6.0	5.1
Other, Including Used . . . . .	18.6	3.4	20.5	8.8	37.5
<b>Engines, TOTAL</b> . . . . .	<u>48.2</u>	<u>56.5</u>	<u>45.8</u>	<u>49.5</u>	<u>94.2</u>
Jet & Gas Turbine . . . . .	29.7	44.6	35.7	36.0	82.7
Missile Turbine . . . . .	12.6	5.1	2.9	2.1	2.6
Internal Combustion . . . . .	5.9	6.8	7.2	11.4	8.9
<b>Parts, Accessories &amp; Equipment, Including Spares, TOTAL</b> . . . . .	<u>321.6</u>	<u>299.8</u>	<u>415.1</u>	<u>514.5</u>	<u>770.6</u>
Engine Spares & Accessories . . . . .	58.3	78.5	97.4	120.2	205.3
Other Spares & Equipment . . . . .	263.3	221.3	317.7	394.3	565.3
<b>Rockets, Guided Missiles &amp; Parts, TOTAL</b> . . . . .	<u>119.9</u>	<u>101.1</u>	<u>101.8</u>	<u>156.2</u>	<u>299.3</u>
Complete Rockets & Guided Missiles . . . . .	26.1	18.0	31.8	37.4	46.9
Parts & Accessories for Rockets & Guided Missiles . . . . .	93.8	83.1	70.0	118.8	252.4

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country," Report FT 410 (Monthly).

a Includes transports under 33,000 pounds.

r Revised.

## U. S. AEROSPACE IMPORTS

Calendar Years 1960 to Date  
(Thousands of Dollars)

Year	TOTAL	Aircraft <sup>a</sup>	Aircraft Engines	Aircraft Parts <sup>b</sup>
1960	\$ 60,901	\$ 6,841	\$ 7,388	\$ 46,672
1961	151,667	82,821	17,485	51,361
1962	128,204	54,280	9,707	64,217
1963	95,290	26,831	4,675	63,784
1964	90,062	21,505	6,573	61,984
1965	158,837	73,406	20,149	65,282
1966	303,264	162,645	32,774	107,845
1967	286,968	61,136	30,750	195,082
1968	333,469	110,817	37,913	184,739
1969	306,625	104,375	30,540	171,710
1970	308,334	48,297	33,686	226,351
1971	372,698	78,613	35,996	258,089
1972	564,989	101,170	155,127	308,692
1973	781,664	203,038	221,452	357,174
1974	744,538	124,006	235,743	384,789
1975	747,442	192,277	229,491	325,674

Source: Bureau of the Census, "U.S. Imports, General and Consumption, Schedule A, Commodity and Country," Reports FT 110, 125, 135 (Monthly).

<sup>a</sup> Aircraft includes new and used airplanes, seaplanes and amphibians.

<sup>b</sup> Aircraft parts not elsewhere specified.

**EXPORTS OF MILITARY AIRCRAFT**  
Calendar Years 1971 to Date

	1971	1972	1973	1974	1975
<b>NUMBER OF AIRCRAFT</b>					
<b>TOTAL</b> . . . . .	<u>788</u>	<u>561</u>	<u>608</u>	<u>736</u>	<u>951</u>
Bombers, Land & Carrier Type . . .	19	4	68	90	3
Fighters, Land & Carrier Type . . .	259	106	208	309	475
Trainers . . . . .	55	127	62	40	51
Utility, Personal & Liaison Aircraft .	12	42	19	15	2
Cargo Transports . . . . .	34	48	45	47	51
Passenger Transports . . . . .	15	27	—	—	—
Rotary Wing Aircraft . . . . .	126	138	79	73	116
New Aircraft, NEC . . . . .	162	45	97	140	237
Used or Rebuilt Aircraft . . . . .	6	21	24	19	16
Airships & Balloons . . . . .	100	3	6	3	—
<b>VALUE—Millions of dollars</b>					
<b>TOTAL</b> . . . . .	<u>\$ 633.3</u>	<u>\$ 383.4</u>	<u>\$ 790.8</u>	<u>\$1,101.2</u>	<u>\$1,306.4</u>
Bombers, Land & Carrier Type . . .	15.1	3.1	69.6	105.4	1.3
Fighters, Land & Carrier Type . . .	462.6	183.4	518.8	739.8	904.0
Trainers . . . . .	12.0	14.4	12.1	6.0	5.1
Utility, Personal & Liaison Aircraft .	0.5	1.4	1.0	0.8	0.2
Cargo Transports . . . . .	76.5	122.9	131.2	190.3	235.0
Passenger Transports . . . . .	4.2	1.7	—	—	—
Rotary Wing Aircraft . . . . .	43.8	53.1	37.6	50.1	123.3
New Aircraft, NEC . . . . .	18.5	0.9	19.4	6.9	33.2
Used or Rebuilt Aircraft . . . . .	0.1	2.4	1.0	1.8	4.3
Airships & Balloons . . . . .	(a)	0.1	0.1	0.1	—

Source: Bureau of the Census, "U.S; Exports, Schedule B, Commodity and Country," Report FT 410 (Monthly).  
 a Less than \$0.05 million.  
 N.A. Not available.  
 NEC Not elsewhere classified.

**EXPORT-IMPORT BANK**  
**GROSS AUTHORIZATIONS OF CREDITS AND GUARANTEES**

Fiscal Years<sup>a</sup> 1961 to Date  
(Millions of Dollars)

Year	TOTAL Credits <sup>b</sup>	Credits in Support of Commercial Aircraft Exports			
		TOTAL	Percent of TOTAL Credits	Jets	Other
1961	\$ 1,405	\$ 94.3	6.7%	\$ 93.8	\$ 0.5
1962	1,294	4.2	0.3	3.7	0.5
1963	679	3.0	0.4	—	3.0
1964	778	32.6	4.2	32.6	—
1965	852	1.4	0.2	1.4	—
1966	1,149	99.3	8.6	94.4	4.9
1967	2,723	806.3	29.6	789.1	17.2
1968	2,526	336.8	13.3	336.8	—
1969	1,296	204.7	15.8	197.5	7.2
1970	2,209	636.2	28.8	598.2	38.0
1971	2,362	490.4	20.8	484.2	6.2
1972	3,285	479.6	14.6	475.4	4.2
1973	4,053	722.4	17.8	689.7	32.7
1974	4,905	946.2	19.3	894.6	51.6
1975	3,812	737.3	19.3	691.2	41.1

Year	TOTAL Guarantees <sup>c</sup>	Guarantees in Support of Commercial Aircraft Exports			
		TOTAL	Percent of TOTAL Guarantees	Jets	Other
1961	\$ 9	\$ —	— %	\$ —	\$ —
1962	237	47.2	19.9	46.9	0.3
1963	219	17.3	7.9	15.7	1.6
1964	217	47.4	21.8	46.6	0.8
1965	283	92.2	32.6	85.5	6.7
1966	300	32.8	10.9	27.9	4.9
1967	193	4.9	2.5	2.2	2.7
1968	290	63.6	21.9	50.0	13.6
1969	397	113.4	28.6	111.2	2.2
1970	612	100.2	16.4	79.2	21.0
1971	1,420	397.3	28.0	363.6	33.7
1972	1,743	202.7	11.6	175.9	26.8
1973	1,988	243.3	12.2	189.6	53.7
1974	1,594	157.7	9.9	133.0	24.7
1975	1,574	96.7	6.1	64.0	32.7

Source: Export-Import Bank of the United States.

<sup>a</sup> Fiscal Years ending June 30.

<sup>b</sup> "Credit" is a commitment of direct financing by the Export-Import Bank.

<sup>c</sup> "Guarantee" by the Export-Import Bank of principal and interest on a loan made by another institution such as a commercial bank.



**EXPORTS OF CIVIL TRANSPORT AIRCRAFT**

Calendar Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL		Under 33,000 Pounds Airframe Weight		33,000 Pounds and Over Airframe Weight	
	Number	Value	Number	Value	Number	Value
1960	159	\$ 480.1	67	\$ 15.8	92	\$ 464.3
1961	119	262.5	68	11.2	51	251.3
1962	172	259.2	122	13.8	50	245.4
1963	181	190.9	151	18.1	30	172.8
1964	225	211.1	193	29.1	32	182.0
1965	76	351.8	16	4.9	60	346.9
1966	82	420.8	6	0.1	76	420.7
1967	134	611.4	13	4.4	121	607.0
1968	240	1,200.2	19	9.9	221	1,190.1
1969	182	946.9	17	25.5	165	921.4
1970	184	1,283.1	19	6.8	165	1,276.3
1971	173	1,566.5	25	24.5	148	1,542.0
1972	148	1,129.1	43	10.0	105	1,119.1
1973	149	1,669.5	21	5.8	128	1,663.7
1974 <sup>r</sup>	241	2,664.2	14	9.6	227	2,654.6
1975	188	2,429.3	6	5.0	182	2,424.3

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country,"  
Report FT 410 (Monthly).  
r Revised.

## EXPORTS OF CIVIL HELICOPTERS

Calendar Years 1966 to Date  
(Millions of Dollars)

Year	TOTAL		Under 2,000 Pounds		2,000 Pounds and Over	
	Number	Value	Number	Value	Number	Value
1966	161	\$ 11.5	119	\$ 5.1	42	\$ 6.4
1967	223	25.2	166	9.9	57	15.3
1968	242	32.9	169	11.9	73	21.0
1969	252	29.1	212	12.7	40	16.4
1970	332	26.9	284	17.1	48	9.8
1971	298	45.7	230	17.9	68	27.8
1972	256	50.3	184	17.1	72	33.2
1973	428	83.3	317	33.1	111	50.2
1974	395	109.6	267	29.7	128	79.9
1975	336	104.7	210	27.5	126	77.2

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country," Report FT 410 (Monthly).

## EXPORTS OF GENERAL AVIATION AIRCRAFT

Calendar Years 1965 to Date  
(Millions of Dollars)

Year	TOTAL		Single Engine		Multi-Engine			
					Under 3000 Lbs.		3000 Lbs. & Over	
	Number	Value	Number	Value	Number	Value	Number	Value
1965	2,457	\$ 68.8	2,031	\$ 30.6	184	\$ 8.4	242	\$ 29.8
1966	2,985	89.1	2,387	35.2	261	13.4	337	40.5
1967	3,125	91.2	2,554	36.9	198	9.5	373	44.8
1968	2,890	101.3	2,295	36.1	163	8.5	432	56.7
1969	2,461	125.6	1,761	35.0	211	11.9	489	78.7
1970	2,037	112.5	1,493	31.5	142	8.7	402	72.3
1971	1,566	89.4	1,199	26.1	80	5.1	287	58.2
1972	2,072	130.3	1,546	34.6	92	5.0	434	90.7
1973	3,163	200.6	2,392	53.2	149	8.4	622	139.0
1974	4,263	287.2	3,367	81.4	116	6.4	780	199.4
1975	3,268	306.8	2,460	70.8	168	11.3	640	224.7

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country," Report FT 410 (Monthly).

NOTE: Excludes transports under 33,000 lbs., airframe weight.

**EXPORTS OF USED AIRCRAFT**

Calendar Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL		Civil		Military	
	Number	Value	Number	Value	Number	Value
1960	634	\$ 26.2	564	\$ 25.7	70	\$ 0.5
1961	618	35.1	494	33.9	124	1.2
1962	511	37.5	382	36.6	129	0.9
1963	423	16.6	356	16.4	67	0.2
1964	489	30.7	288	27.9	201	2.8
1965	474	39.7	407	39.0	67	0.7
1966	397	45.7	364	30.7	33	15.0
1967	391	85.5	362	60.2	29	25.3
1968	304	75.5	290	68.7	14	6.8
1969	382	137.7	379	137.7	3	(a)
1970	361	106.1	358	104.0	3	2.1
1971	419	205.3	413	205.2	6	0.1
1972	471	301.4	450	299.0	21	2.4
1973	621	358.5	597	357.5	24	1.0
1974	709	301.1	690	299.3	19	1.8
1975	597	391.3	581	387.0	16	4.3

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country," Report FT 410 (Monthly).

a Less than \$0.05 million.

## EXPORTS OF NEW AND USED CIVIL AIRCRAFT ENGINES

Calendar Years 1960 to Date  
(Millions of Dollars)

Year	TOTAL		Jet and Gas Turbine		Internal Combustion	
	Number	Value	Number	Value	Number	Value
1960	3,725	\$ 70.7	480	\$ 47.5	3,245	\$ 23.2
1961	3,640	75.3	364	53.6	3,276	21.7
1962	3,690	63.0	341	44.8	3,349	18.2
1963	3,143	45.1	253	25.7	2,890	19.4
1964	4,062	46.7	247	25.0	3,815	21.7
1965	3,330	56.2	372	38.8	2,958	17.4
1966	4,006	77.0	564	49.3	3,442	27.7
1967	4,236	101.2	756	69.6	3,480	31.6
1968	3,279	115.6	866	92.4	2,413	23.2
1969	4,178	102.4	759	82.0	3,419	20.4
1970	3,790	117.6	634	98.4	3,156	19.2
1971	3,530	148.5	707	128.6	2,823	19.9
1972	3,823	184.3	592	158.6	3,231	25.7
1973	5,017	175.7	641	144.8	4,376	30.9
1974 <sup>r</sup>	4,924	228.8	801	195.0	4,123	33.8
1975	4,678	231.0	876	185.9	3,802	45.1

Source: Bureau of the Census, "U.S. Exports, Schedule B, Commodity and Country," Report FT 410 (Monthly).  
r Revised.

## EXPORTS OF HELICOPTERS

By Selected U. S. Manufacturers  
Calendar Years 1971 to Date

	1971	1972	1973	1974	1975
<b>NUMBER EXPORTED</b>					
<b>TOTAL</b> . . . . .	<u>244</u>	<u>259</u>	<u>413</u>	<u>420</u>	<u>437</u>
Canada & Greenland . . . .	75	75	68	67	67
Latin America . . . . .	33	63	82	103	80
Europe . . . . .	49	58	126	121	103
Middle East . . . . .	2	—	2	28	58
Asia . . . . .	55	34	86	61	72
Oceania . . . . .	11	12	27	31	19
Africa . . . . .	14	7	22	9	21
Countries not identified . .	5	10	—	—	17
<b>VALUE—Millions of Dollars<sup>a</sup></b>					
<b>TOTAL</b> . . . . .	<u>\$ 62.9</u>	<u>\$ 73.7</u>	<u>\$ 84.8</u>	<u>\$ 123.7</u>	<u>\$ 219.9</u>
Canada & Greenland . . . .	9.8	11.2	11.2	13.1	20.4
Latin America . . . . .	5.0	14.2	23.8	24.5	35.9
Europe . . . . .	18.3	23.8	32.0	63.4	58.7
Middle East . . . . .	1.1	—	0.1	4.9	40.4
Asia . . . . .	11.0	8.5	12.7	14.2	21.9
Oceania . . . . .	1.8	0.6	1.7	2.5	3.7
Africa . . . . .	6.2	0.7	3.3	1.1	2.2
Countries not identified . .	9.7	14.7	—	—	36.7

Source: Aerospace Industries Association, company reports from Bell, Boeing-Vertol, Entrom, Hiller, Hughes and Sikorsky.

a Manufacturers' Net Billing Price.

## EXPORTS OF GENERAL AVIATION AIRCRAFT

By Selected U. S. Manufacturers  
Calendar Years 1970 to Date

	1970	1971	1972	1973	1974	1975
<b>NUMBER EXPORTED</b>						
<b>TOTAL . . . . .</b>	2,169	1,845	2,233	3,531	4,248	3,512
Canada & Greenland.	187	238	283	429	514	610
Latin America . . . .	678	545	616	1,125	1,583	1,206
Europe . . . . .	822	709	892	1,268	1,177	925
Asia . . . . .	116	66	88	121	153	172
Oceania . . . . .	156	82	132	219	450	237
Africa . . . . .	210	205	222	269	371	362
<b>VALUE (Millions of Dollars)<sup>a</sup></b>						
<b>TOTAL . . . . .</b>	\$ 99.3	\$ 78.5	\$ 129.9	\$ 230.3	\$ 286.4	\$ 318.6
Canada & Greenland.	7.5	N.A.	11.3	19.7	23.2	26.0
Latin America . . . .	30.7	N.A.	42.9	69.1	99.1	102.4
Europe . . . . .	37.4	N.A.	47.6	89.1	92.9	90.4
Asia . . . . .	7.1	N.A.	9.2	10.0	21.6	34.5
Oceania . . . . .	5.9	N.A.	5.3	17.1	21.0	18.9
Africa . . . . .	10.7	N.A.	13.6	25.3	28.6	46.4

Source: General Aviation Manufacturers' Association.

NOTE: Data are based on exports reported by Beech, Bellanca, Cessna, Gates Learjet, Grumman American Aviation, Lake, Maule, Mooney, Piper, Rockwell and Swearingen of new civil aircraft under 20,000 pounds empty airframe weight.

a Manufacturers' Net Billing Price.

# Employment



Employment in the aerospace industry dropped in 1975 to a level of 942,000, down from 965,000 in 1974. The drop represents a resumption of a general employment decline under way since 1968.

The decline had been interrupted by employment increases in 1973 and 1974 which proved to be temporary fluctuations caused by a spurt in commercial aircraft production while other activity was being reduced. When commercial aircraft production fell off in 1975, the employment curve resumed its downward trend. The decline was expected to continue through 1976.

Aerospace employment was moving more or less counter to the national employment experience. In the nation as a whole, employment reached a recession low in March 1975, when the work force totaled 84.1 million and the unemployment rate reached 8.9 percent. The situation improved considerably in the latter half of 1975 and by year-end there were 85.6 million people working and the unemployment rate was down to 8.3 percent. The improvement continued

through the first quarter of 1976, when the number of persons with jobs reached 86.7 million and the unemployment rate was down to 7.5 percent.

In contrast, aerospace employment declined in the second half of 1975 and the decline continued in 1976 while the nation as a whole was moving in the opposite direction. An Aerospace Research Center employment survey predicted a drop to about the 900,000 level by the end of 1976. It listed as some of the reasons for this continuing erosion of the high technology manpower base a slackening of demand for commercial jetliners, uncertainties in export markets, and a relatively low level of Federal commitment to new or replacement military aircraft.

Analysis of the 1975 force reduction shows that the employment drop was largely in the aircraft production sector, which accounted for 18,000 of the 23,000 decline. Within the aircraft production category, the major drop was in airframe workers—more than 14,000. Labor engaged in aircraft engines and parts manufacture was reduced by 6,600 and there was a 3,300-worker increase in the aircraft parts and equipment category.

The number of production workers as a percentage of the total industry labor force dipped slightly, from just under 50 percent down to 48 percent. The average work force of 942,000 included 455,000 production workers, 273,000 of them engaged in aircraft production.

Aerospace industry scientists and engineers working in research and development programs dropped an even 4,000 during 1975. The year-end total of 66,800 was the lowest since 1959, reflecting the continuing decline in *real* R&D effort despite apparent gains in R&D sales volume. In 1968, the industry's peak year in terms of constant dollar sales, the industry had employed more than 101,000 scientists and engineers in research and development programs. The figure has dropped in every year since the peak.

The number of R&D-assigned scientists and engineers in 1975 amounted to 18.7 percent of the national total (there were 357,500 R&D-engaged scientists and engineers in the U.S. as a whole). This percentage further reflects the declining state of aerospace R&D. In the sixties, when both the military services and the National Aeronautics and Space Administration reached exceptionally high levels of research and development activity, the aerospace industry employed almost 30 percent of all U.S. scientists and engineers. In the general industry decline that followed, aerospace scientists and engineers dropped below 25 percent by the start of the seventies, then to 20 percent. For the past two years, the scientist/engineer ratio has been below the 20 percent level; the 1975 figure compares with 19.8 at the end of the previous year.



## AEROSPACE INDUSTRY EMPLOYMENT

(Thousands of Employees)



Source: Aerospace Industries Association

## AEROSPACE EMPLOYMENT

Calendar Years 1961 to Date  
(Thousands of Employees)

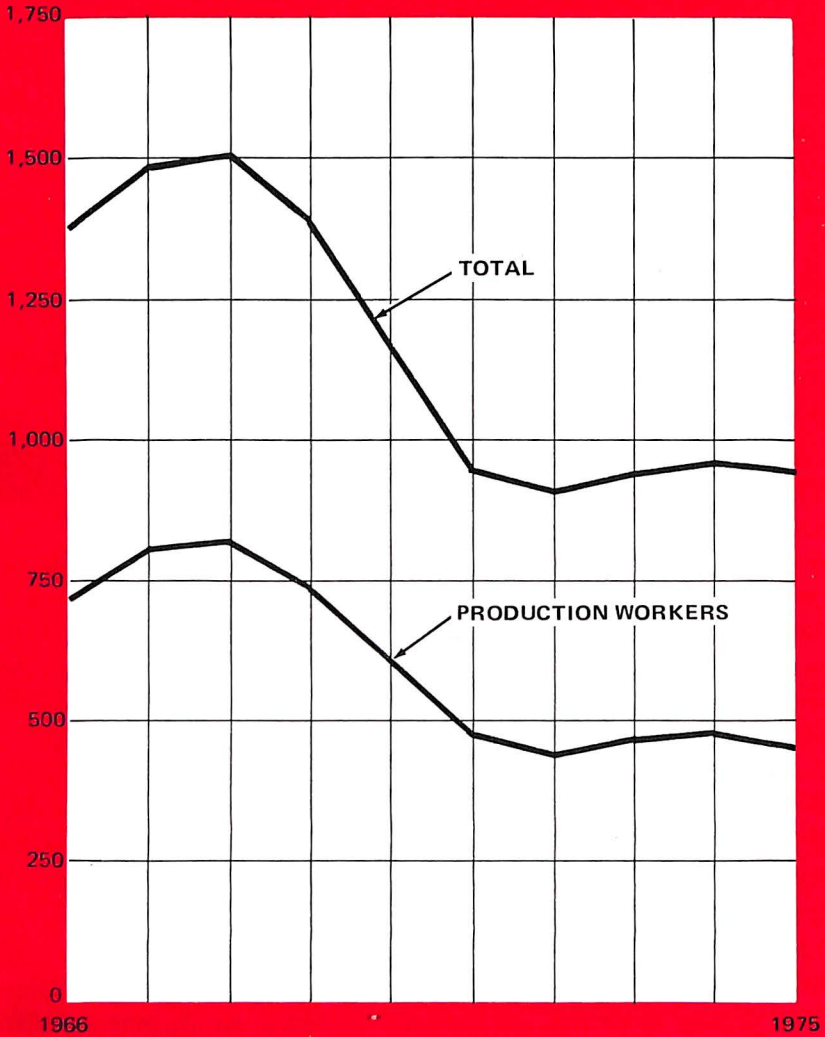
Year	TOTAL	Aircraft	Missiles & Space	Communi- cations Equipment	Other
<b>TOTAL EMPLOYMENT</b>					
1961	1,178	610	152	160	256
1962	1,270	638	165	193	274
1963	1,267	639	173	183	272
1964	1,209	605	166	171	267
1965	1,175	624	155	145	251
1966	1,375	753	159	166	297
1967	1,484	834	157	179	314
1968	1,502	852	150	184	316
1969	1,402	804	124	179	295
1970	1,166	669	98	152	247
1971	951	531	88	129	203
1972	922	501	90	132	199
1973	948	514	95	134	205
1974	965	532	91	132	210
1975	942	514	90	136	202
<b>PRODUCTION WORKERS</b>					
1961	612	348	56	75	133
1962	635	349	58	90	138
1963	625	351	55	82	137
1964	600	339	54	74	133
1965	597	356	51	62	128
1966	731	446	55	73	157
1967	804	502	55	78	169
1968	807	506	52	80	169
1969	746	464	41	86	155
1970	604	369	31	77	127
1971	480	285	26	66	103
1972	453	271	27	57	98
1973	475	281	31	59	104
1974	478	291	24	58	105
1975	455	273	25	58	99

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

NOTE: Aerospace employment as shown is the sum of the estimated monthly average employment in the aircraft and missile and space industries (SIC 372 and 1925) plus estimated aerospace employment in the communications industry (SIC 3662) and estimated aerospace employment in the instruments and certain other industries (SIC 3811, 3821, 28, 35, 73, 89, etc.). Currently published data for the aircraft industry (SIC 372) include substantial missile and spacecraft employment. Thus, aircraft employment is actually lower, missile and space employment higher, than shown.

### AEROSPACE INDUSTRY EMPLOYMENT

(Thousands of Employees)



Source: Aerospace Industries Association

## AEROSPACE EMPLOYMENT

Calendar Years 1961 to Date  
(Thousands of Employees)

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1961	1,178	610	152	160	256
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1964	600	339	54	74	133
1965	597	356	51	62	128
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Source: Bureau of Labor Statistics "Employment and Earnings" (Monthly); Aerospace Industries Association estimates.

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**EMPLOYMENT OF SCIENTISTS AND ENGINEERS  
FOR RESEARCH AND DEVELOPMENT**

**Total and Aerospace  
1960 to Date**

Year	TOTAL	Aerospace	Aerospace as a Percent of Total
<b>AS OF DECEMBER 31</b>			
1960	292,000	72,400	24.8%
1961	312,100	78,500	25.2
1962	312,000	79,400	25.4
1963	327,300	90,700	27.7
1964	340,200	101,100	29.7
1965	343,600	99,200	28.9
1966	353,200	99,300	28.1
1967	367,200	100,400	27.3
1968	376,700	101,100	26.8
1969	387,100	99,900	25.8
1970	384,100	92,600	24.1
1971	366,800	78,300	21.3
1972	349,900	71,200	20.3
1973	356,600	72,300	20.3
1974 <sup>r</sup>	358,200	70,800	19.8
1975	357,500	66,800	18.7

Source: National Science Foundation.

NOTE: Scientists and engineers working less than full time have been included in terms of their full time equivalent number.

<sup>r</sup> Revised.

## LABOR TURNOVER RATES IN THE AEROSPACE INDUSTRY

Calendar Years 1961 to Date  
(Rates per 100 Employees per Year)

Year	Complete Missiles and Spacecraft	Aircraft			
		TOTAL	Airframes	Engines and Engine Parts	Other Parts & Equipment
<b>ACCESSIONS</b>					
1961	37.0	32.6	31.3	28.9	43.2
1962	37.2	35.2	32.9	30.5	49.3
1963	29.9	28.9	28.6	24.3	39.5
1964	23.5	24.7	23.0	20.2	38.6
1965	32.6	38.7	38.5	32.2	51.9
1966	44.1	48.6	47.3	43.2	61.0
1967	43.5	37.4	36.6	32.5	46.6
1968	40.7	28.1	27.1	22.9	39.8
1969	27.4	23.4	20.8	24.6	31.5
1970	19.3	16.1	13.9	15.1	26.2
1971	21.6	20.4	21.6	13.2	27.6
1972	31.2	24.0	22.8	21.6	33.6
1973	24.0	27.6	24.0	22.8	43.2
1974	24.0	25.2	24.0	19.2	38.4
1975	18.0	16.8	16.8	12.0	20.4
<b>SEPARATIONS</b>					
1961	27.2	30.9	29.3	24.8	44.9
1962	31.6	31.3	29.0	23.9	47.9
1963	31.5	29.4	27.9	25.0	42.9
1964	39.1	31.0	28.9	28.0	42.9
1965	28.7	26.9	22.8	28.4	39.6
1966	30.8	31.5	28.1	31.0	46.9
1967	34.0	32.2	27.9	34.1	43.9
1968	45.4	32.3	30.2	31.3	41.1
1969	46.6	33.2	30.8	32.2	42.4
1970	48.7	41.7	43.8	32.1	47.4
1971	37.2	36.0	32.4	34.8	50.4
1972	26.4	25.2	22.8	19.2	38.4
1973	32.4	25.2	24.0	20.4	37.2
1974	30.0	22.8	20.4	20.4	33.6
1975	26.4	26.4	26.4	22.8	32.4

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

## WORK STOPPAGES IN THE AIRCRAFT AND PARTS INDUSTRY

Calendar Years 1961 to Date

Year	Number of Strikes	Number of Workers Involved	Man-Days Idle in Year
1961	14	2,440	35,000
1962	19	23,000	555,000
1963	12	7,510	53,700
1964	19	20,300	160,000
1965	22	74,900	946,000
1966	23	38,000	204,000
1967	22	28,800	161,000
1968	46	45,500	594,300
1969	26	76,400	1,564,600
1970	12	6,800	552,500
1971	24	17,200	465,500
1972	18	20,800	148,100
1973	13	4,531	99,145
1974	27	16,800	370,000

Source: Department of Labor, Bureau of Labor Statistics, Division of Wages and Industrial Relations.

NOTE: The "aircraft and parts industry" to which this table applies includes substantial missile and spacecraft employment. It represents approximately 60 per cent of total aerospace employment.

## WORK-INJURY RATES<sup>a</sup>, AEROSPACE AND ALL MANUFACTURING

Calendar Years 1961 to Date

Year	All Manufacturing	Aircraft and Parts	Guided Missiles and Spacecraft <sup>b</sup>
1961	11.8	3.5	N.A.
1962	11.9	3.3	N.A.
1963	11.9	3.3	N.A.
1964	12.3	3.4	N.A.
1965	12.8	3.3	N.A.
1966	13.6	4.7	N.A.
1967	14.0	4.3	N.A.
1968	14.0	3.9	N.A.
1969	14.8	4.3	N.A.
1970	15.2	4.5	N.A.
1971	16.6	N.A.	N.A.
1972	15.6	8.0	4.7
1973	15.3	7.4	4.5
1974	14.6	7.2	4.2

Source: Department of Labor, Bureau of Labor Statistics.

a Defined as the number of injuries per 100 man-years of work; prior to 1971, "Injury Frequency Rates" were defined as the number of disabling injuries per million employee-hours worked.

b Data not available for guided missiles and spacecraft prior 1972.

N.A. Not available.

## EMPLOYMENT IN THE AIRCRAFT AND PARTS INDUSTRY

Calendar Years 1961 to Date  
(Thousands of Employees)

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Other Aircraft Parts and Equipment
<b>TOTAL EMPLOYMENT</b>				
1961	609.7	317.1	186.6	106.0
1962	638.4	334.7	198.9	104.9
1963	639.2	335.9	200.7	102.6
1964	605.4	319.2	189.1	97.1
1965	624.2	333.3	187.9	103.1
1966	753.3	417.3	208.1	127.8
1967	833.6	468.2	221.0	144.4
1968	852.0	487.8	216.4	147.8
1969	804.4	456.7	205.0	142.7
1970	668.7	369.6	179.9	119.2
1971	530.8	287.7	150.6	92.6
1972	501.1	272.2	138.5	90.5
1973	514.0	274.6	144.8	94.5
1974	532.0	289.3	146.2	96.5
1975	514.4	275.0	139.6	99.8
<b>PRODUCTION WORKERS</b>				
1961	347.7	175.9	103.9	67.9
1962	349.1	175.1	108.5	65.6
1963	350.8	176.9	107.2	66.7
1964	338.6	175.7	99.2	63.7
1965	356.3	184.7	102.7	69.0
1966	446.4	239.8	119.4	87.2
1967	501.5	272.9	129.4	99.2
1968	505.5	280.9	123.9	100.7
1969	464.0	255.1	114.1	94.8
1970	369.3	197.0	95.0	77.3
1971	284.5	147.1	79.0	58.4
1972	271.2	139.5	73.5	58.2
1973	280.8	140.6	79.1	61.1
1974	290.5	147.4	80.3	62.8
1975	273.4	133.6	76.8	62.9

Source: Bureau of Labor Statistics, "Employment and Earnings" (Monthly).  
 NOTE: The above figures include substantial missile and spacecraft employment in recent years. They do not, however, represent total aerospace employment, estimates for which appear in preceding tables in this chapter.



## EARNINGS IN AIRCRAFT AND PARTS PLANTS

Production Workers Only  
(Includes Overtime Premiums)  
Calendar Years 1961 to Date

Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Other Aircraft Parts and Equipment
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## AVERAGE HOURLY EARNINGS

1961	\$ 2.77	\$ 2.78	\$ 2.81	\$ 2.70
1962	2.87	2.87	2.91	2.80
1963	2.95	2.95	2.99	2.89
1964	3.02	3.00	3.09	2.98
1965	3.14	2.15	3.17	3.08
1966	3.31	3.34	3.32	3.21
1967	3.45	3.49	3.42	3.35
1968	3.62	3.64	3.65	3.53
1969	3.86	3.90	3.87	3.76
1970	4.11	4.17	4.10	3.99
1971	4.35	4.41	4.38	4.16
1972	4.70	4.78	4.76	4.43
1973	5.01	5.13	5.06	4.66
1974	5.40	5.57	5.43	5.01
1975	5.99	6.20	6.03	5.52

## AVERAGE WEEKLY EARNINGS

1961	\$ 114.68	\$ 114.26	\$ 116.62	\$ 113.40
1962	119.97	119.97	120.77	118.72
1963	122.43	121.84	123.49	122.54
1964	125.03	123.30	127.31	126.35
1965	131.88	131.36	133.46	132.13
1966	143.32	142.95	144.09	142.85
1967	146.97	147.28	145.35	146.73
1968	152.04	152.88	151.11	151.44
1969	161.35	163.41	158.28	159.05
1970	168.51	170.97	166.05	166.78
1971	175.82	178.76	173.53	170.98
1972	193.44	197.66	193.17	183.10
1973	207.50	210.84	211.09	196.19
1974	218.70	219.46	223.72	210.92
1975	246.19	250.48	249.64	231.29

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

NOTE: The production workers surveyed include substantial missile and spacecraft employment. See NOTE page 119.

**EMPLOYMENT ON NATIONAL AERONAUTICS  
AND SPACE ADMINISTRATION PROGRAMS**

1960 to Date

Year	TOTAL	NASA Employees	Contractor Employees <sup>E</sup>
<b>AS OF JUNE 30</b>			
1960	46,768	10,268	36,500
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 <sup>E</sup>	131,016	24,316	106,700
<b>AS OF SEPTEMBER 30</b>			
1977 <sup>E</sup>	121,016	23,816	97,200

Source: NASA, Briefing on the Budget of the United States, January 21, 1976.

<sup>E</sup> Estimate.

# Finance



The aerospace industry recorded a net profit after taxes of 2.9 percent on sales in 1975, a figure identical to that of the preceding two years. It marked continuance of a problematical trend: six consecutive years in which profits remained below the three percent level. The aerospace industry profit percentage compared in 1975 with an average of 4.5 percent for all manufacturing industries.

In dollar terms, aerospace profit amounted to \$925 million, a current-dollar increase of \$59 million. Adjusted for inflation, however, the 1975 profit fell slightly below that of the preceding years.

Consistently low profit margins continued to be a principal matter of concern and a contributor to the broader problem of capital formation in a high technology industry which requires large amounts of capital to finance its programs. Ideally, the industry should generate the requisite capital from two internal sources: profits and depreciation allowances. But, in addition to low profits, the industry also suffers from inadequate depreciation. This was pointed up in an Aerospace Research Center (ARC) study detailing the impact of inflation on depreciation allowances.

The problem stems from the fact that U.S. procurement regulations and tax laws do not recognize the erosive effects of inflation with regard to depreciation.

Theoretically, depreciation allows recovery of funds to replace equipment at the end of its useful life. In practice, the government allows only the original cost of the equipment—not the cost necessary to replace it. Since replacement cost is considerably higher than original cost in times of high inflation, the net result is that depreciation allowances do not generate sufficient funds to finance replacements.

The enormity of the depreciation problem is underlined in the ARC study, which found that the industry's capital formation potential was eroded by more than \$1.6 billion over the 10-year span 1965-74. Projecting for the next decade, and assuming annual inflation rates from five to 10 percent, the study concluded that the effect of the "depreciation discrepancy" on aerospace industry capital formation "will be very severe, to the extent of anywhere between \$4.8 billion and \$8.5 billion."

The study recommended changes in accounting regulations and tax laws "to incorporate recognition of this fact: that, in times of inflation, reacquisition costs of capital stock, rather than nominal costs, should be the basis on which depreciation is calculated. In the absence of such regulatory reform, distortions in capital formation and allocation will continue to undermine the capital base of the U.S. free market economy—and on an increasing scale."

The geographic distribution of military hardware contracts remained approximately the same as in 1974. The Pacific Coast area continued to dominate in all three program categories—aircraft, missile/space systems and electronics/communications. The Middle Atlantic region edged out New England for second place in aircraft contracts and maintained its 1974 second place position in electronics/communications. New England was second in the missiles/space category.

In defense research and development contracts awarded to business firms, Pacific Coast companies accounted for half of all the awards. Distantly second at 13 percent was the Middle Atlantic region and the South Atlantic area was third with 10.4 percent.

Among the major defense contractors in fiscal year 1975, Lockheed returned to first place after a one-year absence; Lockheed had been Number One for five straight years until supplanted by General Dynamics in 1974. Boeing jumped from seventh to second place and United Technologies advanced from ninth to third. Rounding out the top 10 were, in order: McDonnell Douglas, Grumman Aerospace, General Dynamics, General Electric, Litton Industries, Hughes Aircraft and Rockwell International.

Rockwell led NASA's contractors in fiscal 1975 in terms of net value of prime contracts awarded. Second place went to Martin Marietta and third to McDonnell Douglas. The rest of the top 10 included: General Dynamics, Bendix, General Electric, IBM, Lockheed Electronics, Boeing and RCA.

**INCOME ACCOUNTS  
AEROSPACE COMPANIES**  
Calendar Years 1971 to Date  
(Millions of Dollars)

	1971	1972	1973	1974 <sup>r</sup>	1975
Net Sales . . . . .	\$ 23,566	\$ 24,838	\$ 29,494	\$ 29,565	\$ 31,373
Net Profit from Operations . . . . .	893	1,254	1,619	1,678	1,619
Total Income before Federal Income Taxes . . . . .	761	1,103	1,449	1,328	1,355
Provision for Federal Income Taxes . . . . .	338	494	593	537	530
As a Percent of Total Income	44.4%	44.8%	40.9%	40.4%	39.1%
Net Profit after Taxes	423	609	855	866	925
As a Percent of Net Sales . . . . .	1.8%	2.4%	2.9%	2.9%	2.9%
Net Profit Retained in Business . . . . .	181	340	571	562	626

Source: Federal Trade Commission, "Quarterly Financial Report for Manufacturing Corporations."

NOTE: Does not include data for companies which produce aerospace products but are classified in other than industry group 372.

r Revised.

**BALANCE SHEET COMPARISONS  
AEROSPACE COMPANIES**

Calendar Years 1971 to Date  
(Millions of Dollars)

	1971	1972	1973	1974 <sup>r</sup>	1975
<b>Assets:</b>					
Current Assets					
Cash . . . . .	\$ 844	\$ 685	\$ 643	\$ 564	\$ 548
U.S. Government Securities . . . . .	4	11	80	14	88
Other Securities . . . . .	—	—	—	197	206
Total Cash and U.S. Government Securities . . . . .	\$ 848	\$ 696	\$ 723	\$ 773	\$ 842
Receivables (total) . . . . .	3,400	3,276	3,621	3,225	3,263
Inventories (gross) . . . . .	10,589	10,918	11,559	12,180	12,872
Other current assets . . . . .	458	608	525	436	527
Total Current Assets . . . . .	\$ 15,295	\$ 15,498	\$ 16,428	\$ 16,614	\$ 17,504
Total Net Plant . . . . .	4,296	4,108	4,376	4,077	4,326
Other Non-Current Assets . . . . .	2,789	2,998	3,173	3,157	3,243
<b>Total Assets . . . . .</b>	<b>\$ 22,379</b>	<b>\$ 22,604</b>	<b>\$ 23,976</b>	<b>\$ 23,848</b>	<b>\$ 25,073</b>
<b>Liabilities:</b>					
Current Liabilities					
Short Term Loans . . . . .	\$ 1,152	\$ 649	\$ 934	\$ 1,114	\$ 523
Advances by U.S. Govt. . . . .	2,837	2,210	2,456	2,821	3,804
Trade accounts and notes payable . . . . .	1,860	2,048	2,111	2,171	2,029
Income taxes accrued . . . . .	463	638	720	821	788
Installments due on long term debts . . . . .	325	272	359	382	291
Other current liabilities . . . . .	3,870	4,048	4,223	4,104	4,158
Total Current Liabilities . . . . .	\$ 10,507	\$ 9,865	\$ 10,803	\$ 11,413	\$ 11,593
Long Term Debt . . . . .	4,004	4,351	4,159	3,753	4,337
Other Non-Current Liabilities . . . . .	551	571	540	403	479
<b>Total Liabilities . . . . .</b>	<b>\$ 15,062</b>	<b>\$ 14,787</b>	<b>\$ 15,502</b>	<b>\$ 15,569</b>	<b>\$ 16,409</b>
<b>Stockholders' Equity:</b>					
Capital Stock . . . . .	\$ 2,541	\$ 2,763	\$ 2,758	\$ 3,033	\$ 3,083
Earned Surplus and Reserves . . . . .	4,776	5,053	5,717	5,246	5,580
<b>Total Net Worth . . . . .</b>	<b>\$ 7,317</b>	<b>\$ 7,816</b>	<b>\$ 8,475</b>	<b>\$ 8,279</b>	<b>\$ 8,663</b>
<b>Total Liabilities and Stockholders' Equity . . . . .</b>	<b>\$ 22,379</b>	<b>\$ 22,604</b>	<b>\$ 23,976</b>	<b>\$ 23,848</b>	<b>\$ 25,073</b>
Net Working Capital . . . . .	\$ 4,788	\$ 5,633	\$ 5,625	\$ 5,201	\$ 5,911

Source: Federal Trade Commission, "Quarterly Financial Report for Manufacturing Corporations."

NOTE: Includes 72 companies classified in industry group 372 which filed reports with the Securities and Exchange Commission.

r Revised.

## NEW PLANT AND EQUIPMENT EXPENDITURES

Calendar Years 1960 to Date  
(Billions of Dollars)

Year	All Industries	All Manufacturing Industries	Durable Goods	Aerospace
1960	\$ 36.75	\$ 15.09	\$ 7.23	\$ 0.34
1961	35.91	14.33	6.31	0.30
1962	38.39	15.06	6.79	0.40
1963	40.77	16.22	7.53	0.45
1964	46.97	19.34	9.28	0.42
1965	54.42	23.44	11.50	0.46
1966	63.51	28.20	14.96	0.92
1967	65.47	28.51	14.06	0.93
1968	67.76	28.37	14.12	0.86
1969	75.56	31.68	15.96	0.83
1970	79.71	31.95	15.80	0.55
1971	81.21	29.99	14.15	0.38
1972	88.44	31.35	15.64	0.43
1973	99.74	38.01	19.25	0.53
1974	112.40	46.01	22.62	0.80
1975	112.78	47.95	21.84	0.92
1976 <sup>E</sup>	120.06	51.85	22.93	0.80

Source: 1960-1967: U.S. Department of Commerce, Survey of Current Business, Jan. 1970; 1968-1971: U.S. Department of Commerce, Securities and Exchange Commission, Joint Statistical Report; 1972-to-date: U.S. Department of Commerce, Bureau of Economic Analysis, BEA 74-14, BEA 75-15, BEA 76-16.

<sup>E</sup> Estimate, based on a BEA survey conducted in January and February 1976.  
r Revised.

**MILITARY PRIME CONTRACT AWARDS OF \$10,000 OR MORE  
FOR SELECTED MAJOR MILITARY HARD GOODS**

By Geographic Region  
Fiscal Years<sup>a</sup> 1973, 1974, 1975

Program and Region	Millions of Dollars			Percent of Program Total		
	1973	1974	1975	1973	1974	1975
<b>AIRCRAFT—TOTAL</b> . . .	<b>\$ 7,442</b>	<b>\$ 7,283</b>	<b>\$ 8,547</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
New England . . . . .	867	1,456	1,641	11.6	20.0	19.2
Middle Atlantic . . . .	1,239	1,148	1,771	16.7	15.8	20.7
East North Central . .	638	594	702	8.6	8.2	8.2
West North Central . .	1,132	1,289	1,069	15.2	17.7	12.5
South Atlantic . . . .	509	378	600	6.8	5.2	7.0
East South Central . .	69	74	61	0.9	1.0	0.7
West South Central . .	1,189	699	698	16.0	9.6	8.2
Mountain . . . . .	77	71	88	1.0	1.0	1.0
Pacific <sup>b</sup> . . . . .	1,721	1,575	1,917	23.1	21.6	22.4
<b>MISSILE &amp; SPACE SYSTEMS—TOTAL</b> . . .	<b>\$ 4,891</b>	<b>\$ 4,654</b>	<b>\$ 5,313</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
New England . . . . .	702	718	711	14.3	15.4	13.4
Middle Atlantic . . . .	618	538	370	12.6	11.6	7.0
East North Central . .	138	219	112	2.8	4.7	2.1
West North Central . .	69	117	389	1.4	2.5	7.3
South Atlantic . . . .	468	399	442	9.6	8.6	8.3
East South Central . .	69	72	82	1.4	1.5	1.5
West South Central . .	65	32	80	1.3	0.7	1.5
Mountain . . . . .	411	425	550	8.4	9.1	10.4
Pacific <sup>b</sup> . . . . .	2,352	2,134	2,577	48.1	45.8	48.5
<b>ELECTRONICS &amp; COMMUNICATIONS EQUIPMENT—TOTAL</b> . .	<b>\$ 3,889</b>	<b>\$ 4,184</b>	<b>\$ 5,286</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
New England . . . . .	461	487	576	11.8	11.6	10.9
Middle Atlantic . . . .	941	790	920	24.2	18.9	17.4
East North Central . .	238	280	287	6.1	6.7	5.4
West North Central . .	158	149	252	4.1	3.6	4.8
South Atlantic . . . .	585	661	879	15.0	15.8	16.6
East South Central . .	27	28	39	0.7	0.7	0.7
West South Central . .	203	219	240	5.2	5.2	4.5
Mountain . . . . .	146	142	160	3.8	3.4	3.0
Pacific <sup>b</sup> . . . . .	1,130	1,429	1,932	29.0	34.2	36.5

Source: Department of Defense, Office of the Secretary of Defense, Directorate for Information Operations, "Military Prime Contract Awards by Region and State, Fiscal Years 1973, 1974, 1975."

a Fiscal Years ending June 30.

b Includes Alaska and Hawaii.



**MILITARY PRIME CONTRACT AWARDS OF \$10,000 OR MORE  
FOR RESEARCH, DEVELOPMENT, TEST AND EVALUATION**

By Region and Type of Contractors  
Fiscal Year<sup>a</sup> 1975

REGION	TOTAL	Type of Contractor		
		Educational Institutions	Other Non-Profit Institutions <sup>b</sup>	Business Firms
<b>TOTAL—Millions of Dollars . . .</b>	<b>\$ 6,222</b>	<b>\$ 352</b>	<b>\$ 308</b>	<b>\$ 5,562</b>
New England . . . . .	775	111	118	546
Middle Atlantic . . . . .	770	33	12	725
East North Central . . . . .	351	19	19	313
West North Central . . . . .	191	2	2	187
South Atlantic . . . . .	726	111	35	580
East South Central . . . . .	110	4	2	104
West South Central . . . . .	247	12	6	229
Mountain . . . . .	127	18	1	108
Pacific <sup>c</sup> . . . . .	2,924	42	112	2,770
<b>PERCENT OF TOTAL . . . . .</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
New England . . . . .	12.5%	31.7%	38.2%	9.8%
Middle Atlantic . . . . .	12.4	9.4	3.8	13.0
East North Central . . . . .	5.6	5.3	6.2	5.6
West North Central . . . . .	3.1	0.7	0.6	3.4
South Atlantic . . . . .	11.7	31.5	11.5	10.4
East South Central . . . . .	1.8	1.2	0.7	1.9
West South Central . . . . .	4.0	3.4	2.0	4.1
Mountain . . . . .	2.0	5.0	0.4	1.9
Pacific <sup>c</sup> . . . . .	47.0	11.9	36.5	49.8

Source: Department of Defense, Office of the Secretary of Defense, Directorate for Information Operations "Military Prime Contract Awards by Region and State, Fiscal Years 1972, 1973, 1974, 1975."

<sup>a</sup> Fiscal Year ending June 30.

<sup>b</sup> Includes contracts with other government agencies.

<sup>c</sup> Includes Alaska and Hawaii.

**DEPARTMENT OF DEFENSE  
MAJOR CONTRACTORS**

Listed by rank according to net value of military prime  
contracts awarded during Fiscal Year<sup>a</sup> 1975  
(Millions of Dollars)

	1971	1972	1973	1974	1975
<b>U.S. TOTAL, ALL CONTRACTS . .</b>	<b>\$29,752</b>	<b>\$33,362</b>	<b>\$31,627</b>	<b>\$34,357</b>	<b>\$39,501</b>
Lockheed Aircraft Corp. . . . .	1,511	1,705	1,659	1,464	2,080
Boeing Company . . . . .	732	1,171	1,229	1,076	1,561
United Technologies Corp. . . . .	733	996	741	1,212	1,407
McDonnell Douglas Corp. . . . .	897	1,700	1,143	1,309	1,398
Grumman Aerospace Corp. . . . .	1,098	1,120	909	687	1,343
General Dynamics Corp. . . . .	1,489	1,289	707	1,853	1,289
General Electric Co. . . . .	1,041	1,259	1,416	1,211	1,264
Litton Industries, Inc. . . . .	516	616	424	926	1,038
Hughes Aircraft Co. . . . .	516	688	547	825	1,026
Rockwell International Corp. . . . .	478	703	704	819	732
Raytheon Co. . . . .	455	507	680	740	681
Northrop Corp. . . . .	151	370	446	491	620
Textron Inc. . . . .	325	242	747	418	546
American Telephone & Telegraph Co. . . . .	1,200	1,122	775	691	510
Sperry Rand Corp. . . . .	359	414	447	393	437
General Motors Corp. . . . .	344	256	249	300	390
LTV Corp. . . . .	725	449	347	269	366
IBM Corp. . . . .	316	260	302	252	360
EXXON Corp. . . . .	187	209	238	340	330
Martin Marietta Corp. . . . .	187	256	225	246	320
Westinghouse Electric Corp. . . . .	437	387	505	461	314
Standard Oil of California . . . . .	125	146	132	267	301
Honewell Inc. . . . .	237	334	272	281	292
TRW Inc. . . . .	177	146	177	203	292
RCA Corp. . . . .	251	275	254	243	286
Chrysler Corp. . . . .	155	94	152	412	283
Philco-Ford Corp. . . . .	218	197	214	175	260
Tenneco Inc. . . . .	917	505	214	264	242
Teledyne Inc. . . . .	216	180	188	228	236
Inter'l Telephone & Telegraph Corp.	233	258	249	237	233

Source: Department of Defense, "100 Companies and Their Subsidiary Corporations Listed According to Net Value of Military Prime Contract Awards," (Annually).

<sup>a</sup> Fiscal Years ending June 30.

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Major Contractors  
By Rank According to Net Value  
of NASA Prime Contracts Awarded  
Fiscal Year 1975  
(Millions of Dollars)

Company	1971	1972	1973	1974	1975
<b>TOTAL Awards to Business Firms.</b>	<b>\$ 2,280</b>	<b>\$ 2,143</b>	<b>\$ 2,064</b>	<b>\$ 2,119</b>	<b>\$ 2,255</b>
Rockwell International Corp. . . . .	173	175	318	487	682
Martin Marietta Corp. . . . .	108	208	192	202	130
McDonnell Douglas Corp. . . . .	303	343	272	156	125
General Dynamics Corp. . . . .	51	87	80	80	85
Bendix Corp. . . . .	121	88	79	80	76
General Electric Co. . . . .	161	115	87	65	70
Int'l Business Machines Corp. . . . .	72	72	61	48	54
Lockheed Electronics Co., Inc. . . . .	27	24	29	35	46
Boeing Company . . . . .	114	94	76	60	44
RCA Corp. . . . .	94	57	38	35	40
United Technologies Corp. . . . .	28	16	25	40	36
TRW, Inc. . . . .	62	33	28	21	34
Aeronutronic Ford Corp. . . . .	23	36	38	36	29
Thiokol Corp. . . . .	4	3	4	17	29
Computer Sciences Corp. . . . .	17	23	25	27	27
Hughes Aircraft Co. . . . .	21	22	21	18	26
Sperry Rand Corp. . . . .	32	34	27	22	22
LTV Aerospace Corp. . . . .	15	22	20	17	19
Northrop Services, Inc. . . . .	2	5	17	16	17
Textron, Inc. . . . .	5	5	3	10	15
Grumman Aerospace Corp. . . . .	114	29	12	11	14
Planning Research Corp. . . . .	(a)	2	2	4	14
Control Data Corp. . . . .	4	9	5	8	13
Teledyne Industries, Inc. . . . .	7	6	10	12	12
Chrysler Corp. . . . .	15	24	28	16	11
American Sciences & Engineering Computer Sciences—Technicolor Assoc. (JV) . . . . .	8 (a)	7 (a)	9 2	7 9	11 10
Federal Electric Corp. . . . .	22	24	25	21	10
Singer Company . . . . .	14	10	7	4	9
Frank Briscoe Co., Inc. . . . .	(a)	(a)	(a)	(a)	9

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

a Not in list of major contractors for indicated year.

# Glossary

- Accessions**, the total number of permanent and temporary additions to the employment roll, including both new and rehired employees (see **Labor Turnover**).
- 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.
- Air Carriers**, the commercial system of air transportation. Consists of scheduled domestic and (U.S.) international air carriers, supplemental and other carriers.
- 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 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 engines, accessories 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 or 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 objects through space.
- Average Hourly Earnings**, see **Earnings**.
- Average Weekly Earnings**, see **Earnings**.
- Average Weekly Hours**, average hours for which pay was received; different from standard or scheduled hours.
- 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. (Some agencies still use the term **New Obligational Authority** when referring to **Budget Authority**.)
- Constant Dollars**, see **Deflators**.
- Deflators (Constant Dollars)**, used to reduce a price level to that comparable with the price level at a given different time. The Gross National Product in constant dollars is arrived at by dividing components of the current dollar figures by appropriate price indexes. Several hundred price indexes are combined to "deflate" the current dollar series. Seasonal variations are eliminated from the price series used.
- 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 **Research**).
- DOD**, Department of Defense.
- DOT**, Department of Transportation.
- Durable Goods Industry**, comprises major manufacturing industry groups with Standard Industrial Classification Codes 19, 24, 25, and 32 through 39. All other major manufacturing industry groups in SIC Codes 19 through 39 are considered as nondurable goods manufacturing industry groups.
- Earnings**, the actual return to the worker for a stated period of time while rates are the amounts stipulated for a given unit of work or time. Irregular bonuses, retroactive

## AEROSPACE FACTS AND FIGURES 1976/77

items, payments of various welfare benefits, payroll taxes paid by employers are excluded.

**Average Hourly Earnings**, on a "gross" basis, reflecting not only changes in basic hours 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 on an incentive plan.

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

**ERDA**, Energy, Research and Development Administration. ERDA was formed in 1974 to bring together activities previously scattered among several agencies. The major elements covered are nuclear energy, fossil energy, solar and geothermal energy, conservation through increased efficiency, and environmental controls.

**Establishment**, the basis for reporting to the Census of Manufactures. It is an operating facility in a single location. Where one facility engages in different lines of activity it is required to submit separate reports if the plant records permit such a separation and if the activities are substantial in size.

**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.

**FAA**, Federal Aviation Administration (formerly the Federal Aviation Agency), part of the Department of Transportation.

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

**FAD**, Financial Analysis Division, OASD (Comptroller), Department of Defense.

**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. 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.

**FY**, see Fiscal Year.

**General Aviation**, all civil flying except that of the trunk, regional and supplemental airlines.

**GNP** (Gross National Product), the market value of the total output of goods and services produced by the Nation's economy before deduction of depreciation charges and other allowances for business and institutional consumption of durable goods. It includes the purchase of goods and services by consumers and government, gross private domestic investment, and net exports. Beginning with 1960, the estimates include data for Alaska and Hawaii.

**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—a vertical and/or short take-off and landing aircraft.

**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, hanger, waiting room, fueling and maintenance equipment.

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

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

**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. Import values are in general based on the market value or price in the foreign country at the time of exportation of such merchandise. These values include 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 exclude import duties, insurance, ocean 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 Expense."

**Other Income and Expense**, 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.

**Labor Turnover**, the gross movement of wage and salary workers into and out of employed status with respect to individual establishments. This movement, which relates to a calendar month or year, is divided into two broad types: **Accessions** (new hires and rehires), **Separations** (terminations of employment initiated by either employer or employee). Each type of action is accumulated for a calendar month or year and expressed as a rate per 100 employees. The data relate to all employees, full- or part-time, permanent or temporary.

**Accessions**, the total number of permanent and temporary additions to the employment roll, including both new and rehired employees.

**New Hires**, temporary or permanent additions to the employment roll of persons who have never before been employed in the establishment.

**Other Accessions**, not published separately, but included in total accessions; all additions to the employment roll which are not classified as new hires.

**Separations**, terminations of employment during the calendar month or year, classified according to cause: quits, layoffs, and other separations, as defined below:

**Quits**, terminations of employment initiated by employees, failure to report after being hired, and unauthorized absences.

**Layoffs**, suspensions without pay lasting or expected to last more than seven consecutive calendar days, initiated by the employer without prejudice to the worker.

**Other Separations**, terminations of employment because of discharge, permanent disability, death, retirement, etc.

**Man-Hours**, in measuring labor input, take into account both the number of production workers and their actual hours of work. The Bureau of labor statistics covers all hours paid for, whether worked or not, when the employee was at the plant. One man-hour thus means one hour of a person's time.

**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.

**Military Assistance**, see **Mutual Security Program**.

- Missile**, a weapon which travels through space, guided along its flight path at the moment of its launching, but thereafter subjected to various external forces that affect the accuracy and speed with which it flies toward the target.
- Mutual Security Program**, designed by the U.S. Government to maintain the domestic security, promote foreign policy, and provide for the general welfare of the U.S.; based on the Mutual Security Act of 1954.
- NASA**, National Aeronautics and Space Administration.
- N.A.T.O.**, North Atlantic Treaty Organization.
- Net Assets**, see **Assets, Net**.
- Net Income**, see **Income**.
- New Obligational Authority** (Federal Budget), see **Budget Authority**.
- Net Operating Profit**, see **Income**.
- Net Profit on Sales**, see **Income**.
- Net Sales**, see **Sales**.
- New Hires**, see **Labor Turnover**.
- Non-Aerospace Products and Services**, includes all non-aircraft, non-space vehicle, and non-missile products and services and all basic research produced or performed by those companies and/or establishments whose principal business is the development and/or production of aircraft, aircraft engines, missile and spacecraft engines, missiles and/or spacecraft.
- 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.
- Other Aerospace Products and Services**, all conversions, modifications, site activation, other aerospace products (including drones) and services, and receipts for applied research and development on items such as drones, etc.
- Outlays**, checks issued, interest accrued on the public debt, or other payments made, net of refunds and reimbursements. (Some agencies still use the term **Expenditures** when referring to **Outlays**.)
- Overtime**, see **Hours, Overtime**.
- Payroll**, includes the gross earnings paid in the calendar year to all employees on the payroll of operating manufacturing establishments. Includes all forms of compensation 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.
- Passenger-Mile**, one passenger moved one mile.
- Procurement**, the process whereby the executive agencies of the federal government acquire goods and services from enterprises other than the federal government.
- Profit**, see **Income**.
- Production Workers**, include working foremen and all non-supervisory workers (including leadmen and trainees) engaged in fabricating, processing, assembling, inspection, receiving, storage, handling, janitorial and watchman services, product development, auxiliary production, for plant's own use and record keeping and services closely associated with the above production operations.
- Quits**, see **Labor Turnover**.
- R&D**, Research and Development.
- Research**, basic, is that portion of the total research and development effort whose primary aim is extending the fundamental understanding of man and nature. It is systematic, intensive study directed towards the fuller scientific knowledge of the subject studied.
- Development**, the systematic use of scientific knowledge directed towards the production of useful materials, devices, systems, or methods including design and development of prototypes and processes.

- RDT&E** (Department of Defense), research, development, test and evaluation.
- 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., by airfoils rotating or revolving about an axis (see **Helicopter**).
- Sales**, net of returns, allowances, and discounts; the dollar value of shipments less returns and allowances, including dealer's commission, if any, which have passed through the sales account.
- Satellite**, a body that rotates about another body, such as the moon revolving around the earth, or a man-made object rotating about any body such as the sun, earth, or moon.
- Separation**, see **Labor Turnover**.
- 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 Federal Trade Commission's "Quarterly Financial Report for Manufacturing Corporations."
- STOL**, short takeoff and landing aircraft.
- Test** (Department of Defense), an experiment designed to assess progress in attainment or accomplishment of development objectives (see **RDT&E**).
- Thrust**, the driving force exerted by an engine, particularly an aircraft or missile engine, in propelling the vehicle to which it is attached.
- Ton-Mile**, one ton moved one mile.
- Total Obligational Authority**, the sum of budget authority granted or requested from the Congress in a given year, plus unused budget authority from prior years.
- Trade Balance**, see **Merchandise Trade Balance**.
- Transition Quarter**, the three-month interval from July 1, 1976 to September 30, 1976. Beginning with the 1977 budget, the fiscal year (FY) will run from October 1 through September 30. To facilitate the conversion, this transition period has been provided between FY 1976 and FY 1977 as a separate accounting period belonging to neither year. The budget will continue to be submitted near the beginning of each session of Congress. The change is being made to allow Congress additional time to review the President's budget. Public Law 93-554 extends the availability of appropriations until September 30 of FY 1976 (and, of course, for each subsequent year). It does not permit obligation in 1976 of budget authority provided for the **Transition Quarter**.
- Turbine, Turbo**, a mechanical device or engine that spins in reaction to a fluid flow that passes through or over it. Frequently used in "turbo-prop" or "turbo-jet".
- U.K.**, United Kingdom.
- U.S.**, United States of America.
- USA**, United States Army.
- USAF**, United States Air Force.
- USN**, United States Navy.
- USSR**, Union of Soviet Socialist Republics.
- Utility Aircraft**, an aircraft designed for general purpose work.
- V/STOL**, vertical takeoff and landing aircraft.
- Wages**, the payroll (see **Payroll**) of production and related workers.



# Index

## A

- ACCESSIONS, 121
- ACTIVE CIVIL AIRCRAFT, 82
- AERONAUTICS, 95
- AEROSPACE INDUSTRY,
  - Average Earnings, 124
  - Backlog, 14
  - Balance of Trade, 105
  - Comparison with All Manufacturing and Durable Goods, 12, 13, 15, 16, 17, 130
  - Employment, 16, 17, 116ff
  - Exports, 19, 105ff
  - Finance, 126ff
  - Imports, 105, 107
  - Payroll, 17
  - Profits, 15, 128
  - Research and Development, 94, 95
  - Sales, 9, 11, 12, 13, 14
- AFRICA, 114, 115
- AIR CARGO, 76, 77, 80, 90
- AIR CARRIERS, See Airlines
- AIR FORCE,
  - Aircraft Acceptances, 42, 43
  - Aircraft Procurement, 39, 40
  - Major Missile Systems, 53, 54, 55
  - Missile Procurement, 51, 52
  - RDT&E, 97, 99, 100
- AIR TRANSPORTATION, 71ff, See Also Individual Subjects
- AIRCRAFT, 29ff
  - Active Civil, 82
  - Airlines, 71ff
  - Backlog, 14, 33
  - Budget Authority, 22
  - Civil, 31, 34, 35, 36, 37
  - Employment, 119, 123
  - Engines, See Engines
  - Exports, 102ff
  - Federal Research and Development, 95
  - Flyaway Cost, Military, 41, 42, 44, 45
  - Foreign Airlines, 73
  - Imports, 107
  - Military, 31, 41, 108
  - Military Prime Contract Awards, 101, 131, 132
  - On Order, 36
  - Outlays, DOD, 23, 24
  - Procurement, DOD, 24, 39, 40
  - Production, 31, 34, 35, 36, 37, 41
  - RDT&E, DOD, 24, 98, 99, 101
  - Sales, 9, 14, 33
  - Transports, 20, 34, 36, 73, 110
  - Weapon System Cost, Military, 42, 44
- AIRLINES,
  - Domestic, 74, 77, 78
  - Finances, 79, 80, 81
  - Flight Equipment, 20, 73, 74, 81

- Foreign, 73
- Miles Flown, 76, 77, 78
- Passenger, Miles, 76, 77, 78
- Traffic, 76, 77
- U.S. Fleet, 74, 75
- AIRMAN CERTIFICATES, 83
- AIRPORTS, 85
- APPLIED RESEARCH AND DEVELOPMENT, 95
- ARMY,
  - Aircraft Acceptances, 45
  - Aircraft Procurement, 39, 40
  - Major Missile Systems, 53, 54, 55
  - Missile Procurement, 51, 52
  - RDT&E, 97, 99, 100
- ASIA, 114, 115
- ASSETS,
  - Aerospace Industry, 129
  - Airlines, 81
- ASTRONAUTICS,
  - Budget Authority, 22
  - Outlays, 23
  - RDT&E, 24, 98
- ASTRONAUTS, 58, 59, 60, 62
- ATOMIC ENERGY COMMISSION, 67, 96
- AUSTRALIA, 63

## B

- BACKLOG,
  - Aerospace, 14
  - Aircraft, 14, 33
  - Engines, 33, 49
  - Missiles, 14, 48, 49
  - Space, 14, 65
- BALANCE OF TRADE, 105
- BALANCE SHEET, AEROSPACE COMPANIES, 129
- BASIC RESEARCH FUNDS, 95
- BOMBERS,
  - Exports, 106
  - Flyaway Costs, 41
  - Production, 41
  - Strategic Bomber Squadrons, 28
- BUDGET AUTHORITY, FEDERAL,
  - Aerospace, 22
  - Research and Development
- BUSINESS FLYING, 84, 88

## C

- CANADA, 63, 114, 115
- CAPITAL SPENDING, 130
- CERTIFICATED PILOTS, 83
- CIVIL AIRPORTS, 85
- COMMERCIAL FLYING, 84, 88

COMMUNICATIONS EQUIPMENT,  
     Contract Awards, 101, 131  
     Employment, 119  
 COMMUNICATIONS SATELLITES, 60 61  
 CONSTANT DOLLARS, 13  
 CONTRACT AWARDS,  
     DOD, 101, 131, 132, 133  
     NASA, 134  
 CREDITS, 109  
**D**  
 DEFENSE CONTRACTORS, 133  
 DEFLATORS, 13  
 DELIVERIES, See Production  
 DEPARTMENT OF DEFENSE,  
     Active Forces, 28  
     Aerospace Sales, 11, 23, 26, 27  
     Aircraft  
         Budget Authority, 22  
         Flyaway Cost, 41, 42, 44, 45  
         Outlays, 22, 23, 24  
         Procurement, 24, 39, 40  
         Production, 31, 41  
         RDT&E, 24, 98, 99, 101  
     Aeronautics R&D, 95  
     Astronautics, 22, 23, 24  
     Budget Authority, 22  
     Contractors, 133  
     Military Assistance, 24  
     Military Prime Contract Awards, 101  
         131, 132, 133  
     Missiles  
         Budget Authority, 22  
         Outlays, 23, 24, 50  
         Procurement, 24, 50, 51, 52  
         RDT&E, 24, 50, 98, 100, 101  
         Systems, 53, 54, 55  
     Outlays,  
         Aerospace, 23, 24, 26, 27  
         Aircraft, 23, 24, 39  
         Astronautics, 23, 24  
         Functional Title, 24  
         Missiles, 23, 24, 50, 51  
         Personnel, 24  
         RDT&E, 24, 98, 99, 100  
         Space Activities, 67  
     Personnel, 24, 28  
     Procurement, 24  
     R&D, 95  
     RDT&E, 24  
 DEPARTMENT OF TRANSPORTATION,  
     Aeronautics R&D, 95  
 DURABLE GOODS INDUSTRY,  
     Employment, 16  
     New Plant and Equipment Expenditures,  
         130  
     Profits, 15  
     Sales, 12, 13

**E**  
 EARNINGS,  
     Companies, 15, 128  
     Employees, 124  
 ELECTRONICS,  
     Prime Contract Awards, 131  
 EMPLOYMENT, 116ff  
     All Manufacturing, 16  
     Durable Goods, 16  
     NASA, 125  
     Scientists and Engineers, R&D, 120  
 ENGINES,  
     Aircraft, 33  
     Backlog, 33  
     Civil, 38  
     Employment, 121, 123  
     Exports, 106, 113  
     Imports, 107  
     Missiles and Space Vehicles, 49  
     Piston, 38  
     Production, 38  
     Sales, 33  
     Turbojet, 38  
     Turboprop, 38  
 ERDA, 67, 96  
 EUROPE, 114, 115  
 EUROPEAN SPACE RESEARCH  
     ORGANIZATION (ESRO), 63  
 EXPORT-IMPORT BANK, 109  
 EXPORTS, 102ff  
     Aerospace, 19, 105ff  
     Balance of Trade, 105  
     Civil, 19, 106  
     Engines, 106, 113  
     General Aviation, 106, 111, 115  
     Helicopters, 106, 111, 114  
     Military, 19, 106, 108  
     Transports, 19, 106, 110  
     U.S. Exports, 19  
     Used Aircraft, 106, 108, 112  
**F**  
 FEDERAL (U.S. GOVERNMENT)  
     Aerospace Sales, 11, 26  
     Backlog, 14  
     Budget Authority, 22  
     Outlays, 21, 23  
     Research and Development, 94, 95, 96  
     Space, 67  
 FIGHTER AIRCRAFT,  
     Exports, 106, 108  
     Flyaway Costs, 41, 42, 44, 45  
     Production, 41, 42, 43, 44, 45  
     Squadrons, 28  
 FINANCES,  
     Airlines, 79, 80, 81  
     Government, See Outlays and Federal  
     Industry, 15, 126ff

FLIGHT EQUIPMENT, 73, 74, 81  
 FLYING HOURS, GENERAL AVIATION, 84  
 FOREIGN TRADE, 19, 102ff  
 FRANCE, 63  
 FUNDS, RESEARCH, 94, 95

**G**  
 GEOGRAPHIC DISTRIBUTION,  
     Airports, 85  
     Contract Awards, 131, 132  
     Exports, 114, 115  
     Heliports, 89  
     Hospital Heliports, 89  
 GERMANY, 63  
 GENERAL AVIATION,  
     Active Civil Aircraft, 82  
     Exports, 106, 111, 115  
     Hours Flown, 84  
     Miles Flown, 84  
     Shipments, 34, 37  
 GOVERNMENT, See Federal  
 GROSS NATIONAL PRODUCT, 12, 13, 21  
     Deflator Series, 13  
 GUARANTEE, 109

**H**  
 HELICOPTERS, 86ff  
     Active Civil, 88  
     Exports, 106, 108, 111, 114  
     Flyaway Cost, Military, 41, 42, 44, 45  
     Military, 40, 41, 42, 43, 44, 45, 99  
     Operators, 88  
     Production, 34, 35, 41, 42, 43, 44, 45  
     Traffic, 90, 91  
     U.S. Airlines, 75  
     World Civil Airlines, 73  
 HELIPOINTS, 89  
 HELISTOPS, 89  
 HOURS FLOWN, GENERAL AVIATION, 84  
 HOURS IN SPACE, 58, 59, 62

**I**  
 IMPORTS,  
     Aerospace, 105, 107  
     Balance of Trade, 105  
 INCOME ACCOUNTS, 128  
 INDUSTRIAL RESEARCH & DEVELOPMENT, 94, 95  
 INJURY RATES,  
 INSTRUCTIONAL FLYING, 84  
 INVENTORY,  
     Aerospace Companies, 129  
     Airline Flight Equipment, 73, 74, 75  
 INVESTMENTS IN FLIGHT EQUIPMENT, 81  
 ITALY, 63

**J**  
 JAPAN, 63

**L**  
 LABOR, See Employment, 116ff  
 LATIN AMERICA, 114, 115  
 LIABILITIES, Corporate, 129

**M**  
 MAJOR CONTRACTORS, 133, 134  
 MANPOWER, See Employment, 116ff  
 MANUFACTURING INDUSTRIES,  
     Employment, 16, 17  
     New Plant and Equipment Expenditures, 130  
     Net Profits, 15  
     Payroll, 17  
     Sales, 12, 13  
     Work Injury Rates, 122  
 METEOROLOGICAL SATELLITES, 60, 61  
 MILITARY ASSISTANCE, 24  
 MILITARY EXPORTS, 19, 106, 108  
 MILITARY PRIME CONTRACT AWARDS, 101, 131, 132, 133, 134  
 MISSILES, 46ff  
     Backlog, 48, 49  
     Budget Authority, 22  
     Employment, 119  
     Engines, 49  
     Exports, 106  
     Major Missile Systems, 53, 54, 55  
     Military Prime Contract Awards, 101  
     Outlays, DOD, 23, 24, 50  
     Procurement, 24, 50, 52  
     RDT&E, DOD, 24, 50, 101  
     Sales, 9, 48, 49  
     Strategic Forces, 28

**N**  
 NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,  
     Aeronautics, R&D, 95  
     Aerospace Sales, 11  
     Budget Authority, 22, 70  
     Construction of Facilities, 69, 70  
     Contractors, 134  
     Employment, 125  
     Outlays, 23, 26, 67, 69  
     Research and Development, 68, 69, 70  
     R&D Management, 69, 70  
 NATIONAL DEFENSE, 26  
 NATO, 63  
 NAVY,  
     Aircraft Acceptances, 44  
     Aircraft Flyaway Cost, 44  
     Aircraft Procurement, 39, 40  
     Helicopter Production, 44  
     Major Missile Systems, 53, 54, 55

- Missile Procurement, 51, 52
- RDT&E, 97, 99, 100
- NETHERLANDS, 63
- NET PROFIT, 15, 128
- NET WORTH, 129
- NEW OBLIGATIONAL AUTHORITY, See Budget Authority
- NEW PLANT AND EQUIPMENT EXPENDITURES, 130
- NON-AEROSPACE,
  - Backlog, 14
  - Sales, 9, 11, 14
- NON-DURABLE GOODS INDUSTRY, 15
- O**
- OBLIGATIONAL AUTHORITY, See Budget Authority
- OCEANIA, 114, 115
- ORDERS, JET TRANSPORTS, 36
- OUTLAYS,
  - Aircraft, 23, 24, 25, 39
  - Astronautics, 23, 24, 25
  - Atomic Energy Commission, 67, 96
  - Department of Defense, 21, 23, 24, 25
  - Federal, 21
  - Missiles, 23, 24, 25, 50, 51, 98
  - NASA, 23, 67, 68, 96
  - National Defense, 26
  - Space, 67
- P**
- PASSENGER-MILES, 76, 77, 78, 90
- PASSENGERS CARRIED, 76, 77, 78, 90
- PAYROLL, 17
- PEOPLES'S REPUBLIC OF CHINA, 63
- PILOTS, 83
- PLANES, See Aircraft
- PLANT AND EQUIPMENT EXPENDITURES, 130
- PLEASURE FLYING, 84
- PROCUREMENT, DOD,
  - Aerospace Products and Services, 11, 23, 27
  - Aircraft, 24, 25, 39, 40
  - Missiles, 24, 25, 50, 51, 52
  - Total, 24
- PRODUCTION,
  - Aircraft, 29ff
  - Aircraft Engines, 38
  - General Aviation Aircraft, 34, 37
  - Helicopters, 34, 35
  - Military Aircraft, 31, 41, 42, 43, 44, 45
  - Transport Aircraft, 34, 36
- PRODUCTION WORKERS,
  - Earnings, 124
  - Employment, 119, 123
- PROFITS, 15, 79, 128
- R**
- RDT&E, See Research, Development, Test and Evaluation,
- RESEARCH, APPLIED AND BASIC, 95
- RESEARCH AND DEVELOPMENT, 92ff
  - Aeronautics, 95
  - Atomic Energy Commission, 96
  - DOD, 95, 96
  - ERDA, 96
  - Federal Funds, 94, 95, 96
  - Industrial, 94, 95
  - NASA, 95, 96
  - Scientists and Engineers, 120
- RESEARCH AND PROGRAM MANAGEMENT, NASA, 68, 69
- RESEARCH, DEVELOPMENT, TEST & EVALUATION, DOD
  - Aerospace, 98
  - Aircraft, 24, 98, 99
  - Astronautics, 24, 98
  - By Agency, 97
  - Contract Awards, 101, 132
  - Missiles, 24, 50, 98, 100
  - Outlays, 24, 25, 27
  - Total, 24, 25, 98, 101
- ROCKETS, See Missiles
- ROTARY WING, See Helicopters
- S**
- SALES,
  - Aerospace, 9, 11, 12, 128
    - By Customer, 11
    - By Product, 9
    - Products and Services, 11
  - Aircraft, 9, 33, 34, 41
  - Durable Goods, 12
  - Engines, 33, 49
  - Manufacturing Industries, 12
  - Missiles, 9, 48
  - Non-Aerospace, 9, 11, 14
  - Space, 9
- SATELLITES, 60, 61
- SCIENTISTS AND ENGINEERS, 120
- SEPARATION, 121
- SPACE, 56ff
  - Backlog, 65
  - Employment, 125
  - Launchings, 60, 61, 63
  - Manned Space Flights, 58, 59, 62
  - Outlays, Federal, 67
  - Research and Development, 67, 96
  - Sales, 9, 65
  - Space Probes, 60, 61
  - Space Launch Vehicles, 64
- SPAIN, 63
- STOCKHOLDERS' EQUITY, 129
- STRIKES, See Work Stoppages, 122
- STUDENT PILOTS, 83

**T**

TAXES, 128

TRAINERS, MILITARY,

Exports, 106, 108

Flyaway Costs, 41, 42, 44

Production, 41, 42, 44

TRANSPORTATION, 71ff

TRANSPORTS,

Civil, 31, 34

Exports, 19, 106, 108, 109, 110

Flyaway Costs, Military, 41, 42, 44, 45

On Order, 36

Production, 34, 36, 41

U.S. Airline Fleet, 74, 75

World Civil Airlines, 20, 73

TURNOVER, LABOR, 121

**U**

UNITED KINGDOM, 63

UNITED STATES, 63

USAF, See Air Force

U.S. AIRLINES,

Assets, 81

Finances, 79, 80, 81

Fleet, 73, 74, 75

Flight Equipment, 81

Net Investment, 81

Operating Revenues, 79, 80

Traffic, 76, 77, 78

USN, See Navy

USSR, 62, 63

UTILITY AIRCRAFT, See General Aviation

**V**VERTICAL LIFT AIRCRAFT, See  
Helicopters**W**

WAGES, 124

WEAPON SYSTEM COST, AIRCRAFT, 42,  
44

WEST GERMANY, 63

WORK INJURY RATES, 122

WORK STOPPAGES, 122

WORLD AIRLINES, 73, 76



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