AEROSPACE FACTS AND FIGURES · 1967

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.

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Director • Glen Bayless
Editor • Gerald J. McAllister
Economist • Gerson Chanowitz
Senior Statistician • Teressa Smith
Writers • John J. Lee
Richard Balentine
Carroll Shurney
Consultant • Rudolf Modley
Art Director • James J. Fisher

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FOREWORD

The aerospace industry, the largest manufacturing employer in the United States, during 1966 experienced its greatest rate of growth since World War II. This 15th annual edition of *Aerospace Facts and Figures* documents statistically this growth, and relates these levels to previous years.

Prime economic indicators of the aerospace industry's health include:

- Sales reached a record $24.2 billion, an increase of 17 percent over the previous year, largest annual gain in more than a decade.
- Aerospace exports rose to a record $1.5 billion in 1966, up more than $60 million from 1965.
- Employment in the industry for 1966 averaged 1,298,000, an increase of nearly 15 percent from the previous year.
- Backlog of orders for major aerospace companies, which indicates the level of future sales, rose to $27.8 billion at the end of 1966, a gain of $7.4 billion over 1965.
- Aircraft production was the highest since 1947 with an estimated 4,000 military aircraft and 16,103 commercial transports, helicopters and general aircraft delivered in 1966. Aircraft sales rose from $9.7 billion in 1965 to almost $12 billion in 1966. Utility airplane sales, valued at manufacturers' net billing price, reached $444 million, the highest ever.

Notwithstanding the priority accorded providing military aircraft for Vietnam operations, the portion of military and space sales continued to decline slightly.

Orders for turbine-powered commercial transport aircraft scheduled for delivery within the next few years, reached almost $7 billion at the end of 1966. Foreign orders for these aircraft rose to almost $2 billion in the same period.

Another indicator of growth—capital investment in facilities and equipment—increased sharply. The value of net plant and equipment rose to $2.1 billion from $1.7 billion between 1965 and 1966. Industry expenditures for research and development rose to new highs, increasing from $445 million to $620 million between 1964 and 1965, the latest years for which data are available.

Along with the dramatic advances in the historic areas of aerospace activity, new opportunities emerged. During the year there was a growing utilization of the industry's capability in the application of aerospace technology for the solution of a wide variety of socioeconomic problems. Present applications include water and air pollution control, crime control and inter- and intra-urban ground transportation, oceanology and related programs.

The industry's present rate of growth may be overshadowed during the next decade. Forecasts of aerospace sales show levels exceeding $30 billion in the 1970s, a rise of 25 percent over 1966.

KARL G. HARR, JR.
President
Aerospace Industries Association

CONTENTS

AEROSPACE SUMMARY

Sales of aerospace industry products in 1966 reached a post World War II high of $24.2 billion. This was an increase of 17 percent over the previous year's high of $20.7 billion, and the largest annual increase in the past decade and a half.

Gains were registered in all product group areas with aircraft sales leading the advance from $9.7 billion to $12.0 billion, missile sales up $400 million to $4.1 billion and space vehicle sales reaching $5.9 billion, up $600 million.

The value of aircraft production as a proportion of total industry sales increased to 49.3 percent as compared to the previous year's share of 47.2 percent. While the increase in aircraft sales reflected the increasing needs of operations in Vietnam, 37.5 percent of such sales were to satisfy the growing demands of civil operation, commercial and utility.

In 1966, the federal government continued to be the major customer of aerospace industry products and services. Approximately 81 percent of industry sales were to the Department of Defense, National Aeronautics and Space Administration, the Atomic Energy Commission, the Federal Aviation Agency and other government agencies.

AEROSPACE SALES AND THE NATIONAL ECONOMY
Calendar Years 1960 to Date
(Dollar Figures in Billions)

Year Ending December 31	Total Gross National Product	SALES OF			AEROSPACE SALES AS PER CENT OF		
		Manufacturing Industries	Durable Goods Industry	Aerospace Industry	GNP	Manufacturing Industries	Durable Goods
1960	$503.7[r]	$369.6	$189.8	$17.3	3.4	4.7	9.1
1961	520.1[r]	370.6	186.4	18.0	3.5	4.9	9.7
1962	560.3[r]	399.7	206.2	19.2	3.5	4.8	9.3
1963	590.5[r]	417.5	217.0	20.1	3.4	4.8	9.3
1964	631.7[r]	445.6	230.8[r]	20.6[r]	3.3	4.6	9.0
1965	681.2[r]	483.3[r]	252.2[r]	20.7[r]	3.0	4.3	8.2
1966	739.6	528.4	276.1	24.2	3.3	4.6	8.8

[r] Revised.
Sources:
Manufacturing and Durable Goods Industries: Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders, Series M-3" (Monthly).
Gross National Product: Department of Commerce, "Survey of Current Business," (Monthly).
Aerospace: Aerospace Industries Association estimates, based on latest available information.

While the 1966 level of profits after taxes for all U. S. manufacturers remained at 5.6 percent, 1966 net profits of the aerospace industry declined to 3.0 percent as compared to 3.2 percent in 1965. This decreased rate is largely attributable to rising labor, material and financing costs.

The increasing demands during 1966 for aerospace products sparked the highest employment increase within the industry in recent times. In 1966 the employment average exceeded 1,298,000, a gain of 14.6 percent over 1965.

Aerospace payrolls rose from $9.5 billion to $11.2 billion, an increase of 18.2 percent. Payrolls as a percent of sales rose from 46.0 percent to 46.4 percent.

Aerospace products reflected 5.2 percent of the total value of U. S. manufactured exports in 1966. The most significant gains were posted in commercial aircraft sales abroad, up from $353 million in 1965 to $421 million in 1966.

Backlog of orders with major aerospace companies continued to mount. As of the fourth quarter of 1966 backl of orders for aerospace

goods and services rose to $27.8 billion, up $7.4 billion from 1965, and about double the level of backlog in 1961. Of the 1966 amount, 58 percent reflected backlog orders to the government (down from 67 percent in 1965) and 42 percent reflected anticipated deliveries to non-U. S. government customers (up from 33 percent in 1965).

National concern with respect to such problems as air and water pollution control, urban planning and transportation and the growing awareness as to the potential of ocean resources is resulting in expanding government-wide scientific activities and a broadening market for American industry.

In addition to federal support of research and development activities or the procurement of end-items of hardware in defense, space and nuclear energy programs, government support continues to grow appreciably in areas where applicability of aerospace industry technology and systems management expertise is being increasingly demonstrated.

Departmental financing in FY 1968 of programs involving areas of social concern is expected to increase by 43 percent over that of FY 1966. Included are programs calling for the exploitation (largely through the use of grants to states and municipalities) of new food, mineral and energy resources of the ocean; establishing, developing and improving

AEROSPACE CONTRIBUTION TO GROSS NATIONAL PRODUCT
Calendar Years 1960 to Date
(Dollar Figures in Billions)

Year	Total Gross National Product[r]	Contribution to GNP by		Aerospace Contribution as Per Cent of	
		Manufacturing Industries[r]	Aerospace Industry[r]	GNP	Manufacturing Industries[r]
1960	$503.7	$144.4	$ 8.3	1.6	5.7
1961	520.1	144.2	9.0	1.7	6.2
1962	560.3	158.8	10.6	1.9	6.7
1963	590.5	167.0	10.8	1.8	6.5
1964	631.7	179.8	10.8	1.7	6.0
1965	681.2	196.7	11.5	1.7	5.8
1966	739.6	215.0	13.6	1.8	6.3

[r] Revised.
NOTE: The contribution of an industry to Gross National Product is composed of the value added by manufacturing with adjustments for taxes and services.
Source: U. S. Department of Commerce, "Survey of Current Business" (Monthly). Aerospace Industries Association estimates, based on latest available information.

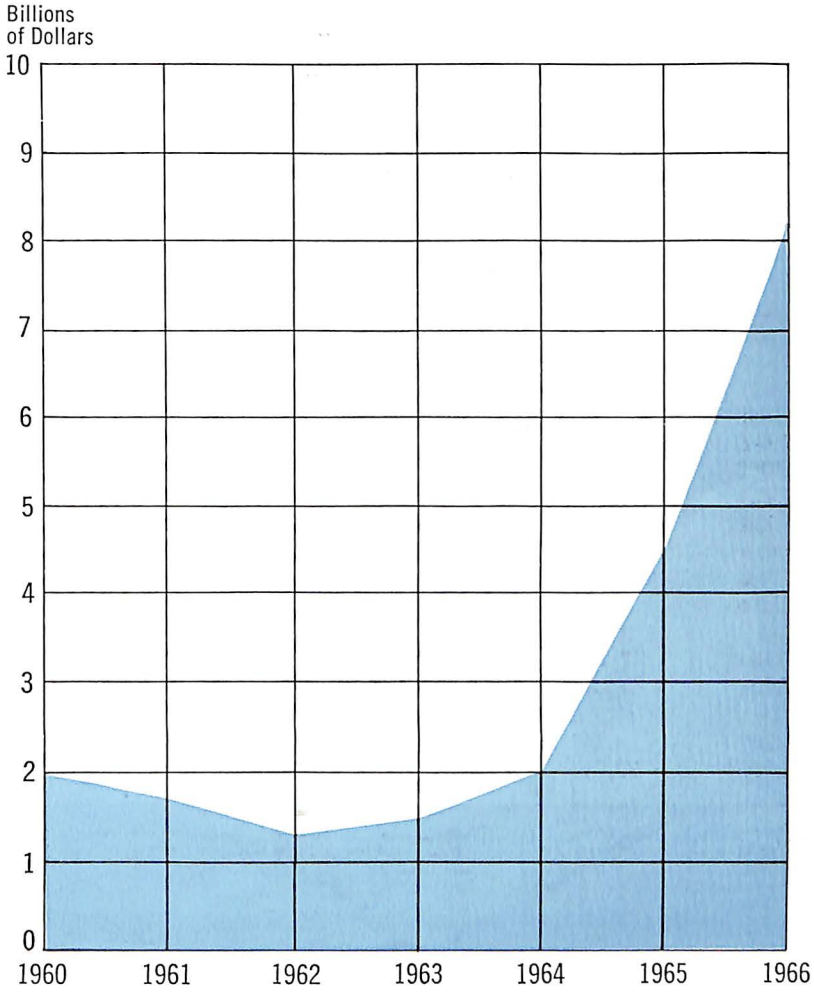
environmental control programs; the practical application of industry system management techniques or of researched and developed technology to state and community demonstration programs in urban redevelopment, sanitation, transportation, pollution control and related problems; and the stimulation of and assistance to regional, state and community agencies in the construction and equipping of facilities for either the exploitation or beneficial control of environmental and natural resources.

ESTIMATED SALES OF THE AEROSPACE INDUSTRY, BY PRODUCT GROUP
Calendar Years 1948 to Date
(Millions of Dollars)

Year Ending December 31	TOTAL SALES	Product Group			
		Aircraft	Missiles	Space Vehicles	Non-aerospace
1948	$ 1,493	$1,359	—	—	$ 134
1949	2,232	2,032	—	—	200
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	9,126	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[r]	20,594	8,911	5,242	4,720	1,721
1965[r]	20,670	9,747	3,626	5,329	1,968
1966[p]	24,229	11,951	4,052	5,903	2,323
1967[E]	26,200	13,600	4,400	5,700	2,500

NOTE: Includes military and nonmilitary sales and research, development, test and evaluation. Because of changes in source material, individual years are not always strictly comparable.
[r] Revised. Nonaerospace figures exclude nonaerospace establishments.
[p] Preliminary.
[E] Estimate.
Source: Aerospace Industries Association estimates, based on latest available information

BACKLOG OF CIVILIAN AIRCRAFT
AS OF DECEMBER 31, 1966

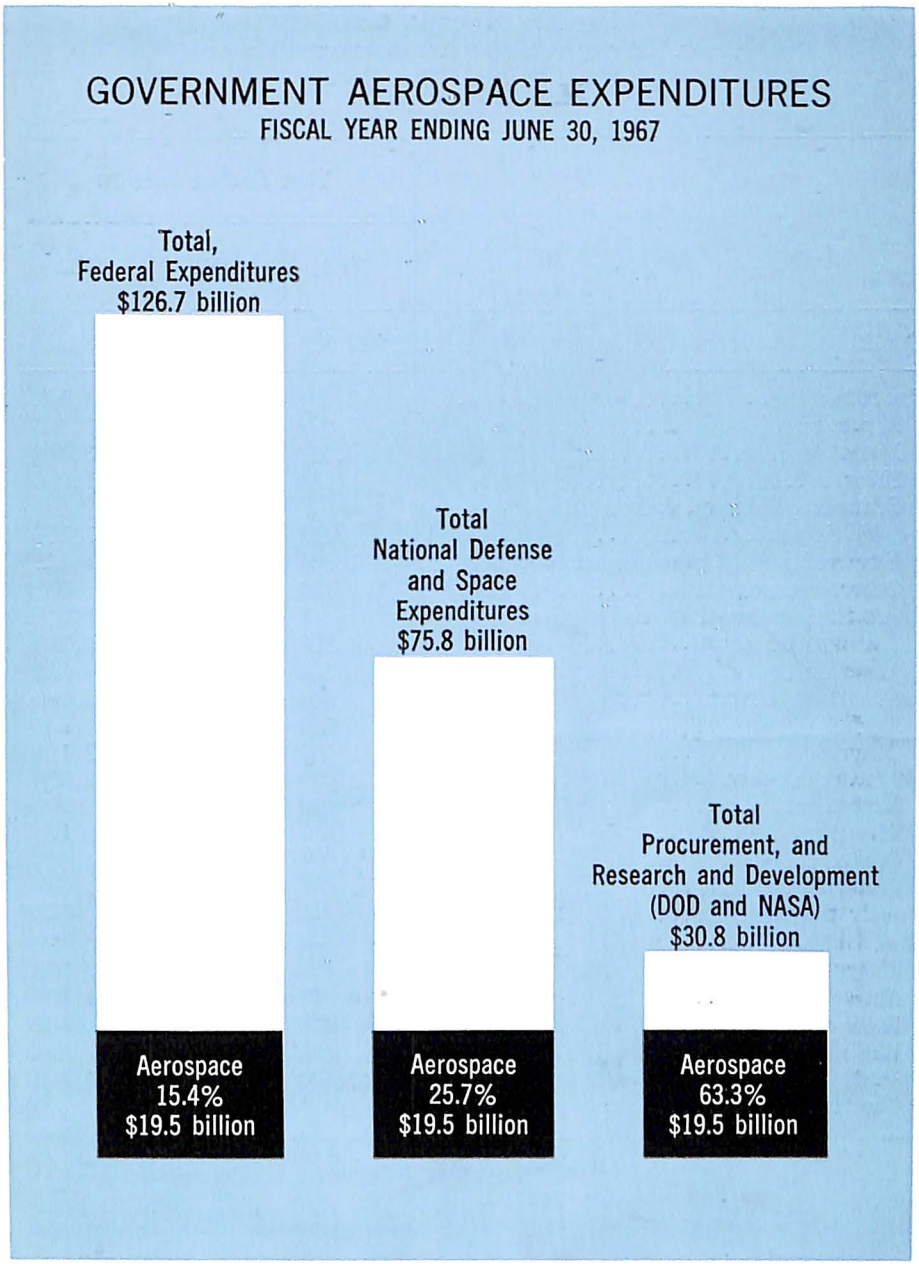


For statistical data on which this chart is based, see Backlog for Aircraft and Parts, Page 28.

ESTIMATED SALES OF THE AEROSPACE INDUSTRY, BY CUSTOMER
(Millions of Dollars)
Calendar Years 1948 to Date

Year Ending December 31	TOTAL SALES	Aerospace Products and Services			Non-aerospace Products and Services
		Government		Non-government	
		Department of Defense	NASA and Other		
1948	$ 1,493	$ 1,182	—	$ 177	$ 134
1949	2,232	1,802	—	230	200
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[r]	20,594	13,218	3,635	2,020	1,721
1965[r]	20,670	11,396	4,490	2,816	1,968
1966[p]	24,229	13,284	4,959	3,663	2,323
1967[E]	26,200	15,000	4,700	4,000	2,500

NOTE: Includes military and nonmilitary sales and research, development, test and evaluation. Because of changes in source material, individual years are not always strictly comparable.
[r] Revised. Nonaerospace figures exclude nonaerospace establishments.
[p] Preliminary.
[E] Estimate.
Source: Aerospace Industries Association estimates, based on latest available information.



For statistical data on which this chart is based, see Federal Expenditures, Page 15, and Department of Defense Expenditures, Page 13.

DEPARTMENT OF DEFENSE
TOTAL EXPENDITURES BY APPROPRIATION GROUP
Fiscal Years, 1960 to Date
(Millions of Dollars)

	Year Ending June 30		
	1960	1961	1962
TOTAL	$42,824	$44,676	$48,205
PROCUREMENT	13,334	13,095	14,532
AIRCRAFT	6,272	5,898	6,400
MISSILES	3,027	2,972	3,442
Ships	1,744	1,801	1,906
Ordnance, Vehicles, & Related Equipment	443	675	1,137
Electronics and Communications	1,093	1,042	1,139
Other procurement	755	707	508
RESEARCH, DEVELOPMENT, TEST, AND EVALUATION	4,710	6,131	6,319
AIRCRAFT	632	547	624
MISSILES	2,059	3,025	2,777
ASTRONAUTICS	512	518	749
Other	1,507	2,041	2,169
MILITARY ASSISTANCE	1,609	1,449	1,390
AIRCRAFT	224	265	206
MISSILES	287	154	161
Other	1,098	1,030	1,023
Military Construction	1,626	1,605	1,347
Family Housing	—	—	—
Civil Defense	—	—	90
Military Personnel	11,738	12,085	13,032
Active Forces	10,390	10,651	11,530
Reserve Forces	654	648	607
Retired Pay	694	786	894
Operations and Maintenance	10,223	10,611	11,594
Other	(416)	(300)	(99)

(*Continued on next page*)

DEPARTMENT OF DEFENSE
TOTAL EXPENDITURES BY APPROPRIATION GROUP—*Continued*
Fiscal Years, 1960 to Date
(Millions of Dollars)

Year Ending June 30

1963	1964	1965	1966	1967 [E]	1968 [E]
$49,973	$51,245	$47,401	$55,377	$67,950	$73,100
16,632	15,351	11,839	14,339	18,465	21,632
6,309	6,053	5,200	6,635	8,010	9,003
3,817	3,577	2,096	2,069	1,990	2,213
2,522	2,078	1,713	1,479	1,450	1,575
1,665	1,597	1,073	1,697	3,935	5,204
1,427	1,264	897	983	1,129	1,159
892	782	861	1,473	1,951	2,479
6,376	7,021	6,236	6,259	6,700	7,200
544	939	1,017	976	1,099	1,156
2,241	2,352	1,901	1,801	2,189	2,388
946	1,284	921	930	937	1,046
2,645	2,446	2,397	2,552	2,475	2,610
1,721	1,485	1,229	968	1,000	800
262	218	278	212[a]	195[a]	N.A.
183		80	87[a]	20[a]	N.A.
1,276	1,276	871	1,024[a]	N.A.	N.A.
1,144	1,026	1,007	1,334	1,600	1,600
427	580	619	647	570	582
203	107	93	86	97	100
13,000	14,195	14,771	16,753	20,200	21,823
11,386	12,312	12,662	14,407	17,465	18,903
599	674	725	755	935	910
1,015	1,209	1,384	1,591	1,800	2,010
11,874	11,932	12,349	14,710	18,600	19,017
(1,404)	(452)	(741)	281	718	346

[E] Estimate.
[a] Aerospace Industries Association estimate.
N.A.—Not available.
NOTE: Data in parentheses are minus figures.
Source: Department of Defense, Reports "FAD 397, 557" January 24, 1967.

BACKLOG OF MAJOR AEROSPACE COMPANIES,
BY PRODUCT GROUP
1960 to Date
(Millions of Dollars)

As of December 31	GRAND TOTAL	TOTAL		Aircraft and Engines		Missiles & Space Incl. Propulsion	Other Aerospace		Nonaerospace
		U.S. Govt.	Other	U.S. Govt.	Other		U.S. Govt.	Other	
1960	12,496	N.A.	N.A.	5,357	2,379	N.A.	N.A.	N.A.	4,760
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	4,224	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	13,696	6,689	6,072	5,316	5,480	1,294	562	1,661
1966	27,800	16,044	11,756	8,832	9,713	4,636	1,586	864	2,169

N.A.—Not available.
NOTE: These figures differ from total industry sales (pages 8 and 10) because they include only about 50-60 companies. Some nonaerospace establishments are included in nonaerospace figures.
Source: Bureau of the Census, "Current Industrial Reports," Series M37D.

SALES OF MAJOR AEROSPACE COMPANIES,
BY PRODUCT GROUP
Calendar Years, 1960 to Date
(Millions of Dollars)

Year ending December 31	GRAND TOTAL	TOTAL		Aircraft and Engines		Missiles & Space Incl. Propulsion	Other Aerospace		Nonaerospace
		U.S. Govt.	Other	U.S. Govt.	Other		U.S. Govt.	Other	
1960	10,997	N.A.	N.A.	4,246	2,183	N.A.	N.A.	N.A.	4,568
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	20,208	14,519	4,689	5,437	3,262	6,253	1,745	871	2,640

N.A.—Not available.
NOTE: These figures differ from total industry sales (pages 8 and 10) because they include only about 50-60 companies. Some nonaerospace establishments are included in nonaerospace figures.
Source: Bureau of the Census, "Current Industrial Reports," Series M37D.

FEDERAL EXPENDITURES FOR SELECTED FUNCTIONS AND FOR AEROSPACE PRODUCTS AND SERVICES
Fiscal Years, 1948 to Date

Year Ending June 30	Federal Expenditures (Millions of Dollars)				Aerospace as Per Cent of	
	TOTAL FEDERAL	Total, National Defense	NASA Space Activities	TOTAL AEROSPACE PRODUCTS AND SERVICES	Total Federal	Total National Defense and NASA
1948	$33,791	$11,983	N.A.	$ 891	2.6%	7.4%
1949	40,057	13,988	N.A.	1,474	3.7	10.5
1950	39,617	13,009	N.A.	2,130	5.4	16.4
1951	44,058	22,444	N.A.	2,878	6.5	12.8
1952	65,408	45,963	N.A.	6,075	9.3	13.2
1953	74,120	50,442	$ 79	9,204	12.4	18.2
1954	67,537	46,986	90	11,194	16.6	23.8
1955	64,389	40,695	74	10,470	16.3	25.7
1956	66,224	40,723	71	10,544	15.9	25.8
1957	68,966	43,368	76	12,506	18.1	28.8
1958	71,369	44,234	89	13,160	18.4	29.7
1959	80,342	46,483	145	13,330	16.6	28.6
1960	76,539	45,691	401	13,269	17.3	28.8
1961	81,515	47,494	744	13,866	17.0	28.7
1962	87,787	51,103	1,257	15,295	17.4	29.2
1963	92,642	52,755	2,552	16,214	17.5	29.3
1964	97,684	54,181	4,171	17,940	18.4	30.7
1965	96,507	50,163	5,093	15,697	16.3	28.4
1966	106,978	57,718	5,933	17,771	16.6	27.9
1967[E]	126,729	70,222	5,600	19,545	15.4	25.8
1968[E]	135,033	75,487	5,300	20,946	15.5	25.9

NOTE: "National Defense" includes the military budget of the Department of Defense and Atomic Energy Commission. Amounts from Trust Funds are not included. "Space Activities" includes research and development activities and administrative operations and construction of facilities of NASA. NASA construction is not included in "Total aerospace products and services," nor is military assistance.

N.A.—Not available.

[E] Estimate.

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

DEPARTMENT OF DEFENSE
AEROSPACE EXPENDITURES
Fiscal Years 1960 to Date
(Millions of Dollars)

Year Ending June 30	DOD Aerospace Expenditures	Procurement		Research, Development, Test, and Evaluation
		Military Functions	Military Assistance[a]	
1960	$13,013	$ 9,299	$511	$3,203
1961	13,379	8,870	419	4,090
1962	14,359	9,842	367	4,150
1963	14,302	10,126	445	3,731
1964	14,423	9,630	218	4,575
1965	11,487	7,290	358	3,839
1966	12,709	8,704	298	3,707
1967[E]	14,440	10,000	215	4,225
1968[E]	15,806	11,216	N.A.	4,590

[E] Estimate.
[a]Data on Military Assistance shown in this table are not included in most other tables on Department of Defense expenditures in this book.
Sources: Department of Defense Reports "FAD 526, 527," January 24, 1966 and Department of Defense "Military Assistance Facts" annually.

DEPARTMENT OF DEFENSE
DIRECT OBLIGATIONS FOR AEROSPACE ACTIVITIES
Fiscal Years 1960 to Date
(Millions of Dollars)

Year Ending June 30	TOTAL	Aircraft	Missiles	Astronautics
1960	$11,624	$ 6,513	$4,672	$ 439
1961	11,098	5,667	4,911	520
1962	13,017	6,591	5,604	822
1963	14,112	6,499	6,415	1,198
1964	13,567	6,254	5,822	1,491
1965	12,464	7,025	4,550	889
1966	14,132	9,310	3,846	976
1967[E]	16,722	11,142	4,558	1,022
1968[E]	16,177	10,090	5,026	1,061

[E] Estimate.
Source: Department of Defense, Reports "FAD 557, 558," January 24, 1967.

ACTIVE MILITARY FORCES OF THE UNITED STATES
1961 to Date

	Actual		Estimated	
	June 30, 1961	June 30, 1966	June 30, 1967	June 30, 1968
Military personnel (in thousands):				
Army	858	1,199	1,454	1,520
Navy	627	745	753	762
Marine Corps	177	262	281	295
Air Force	820	886	899	887
Total, Department of Defense	2,482	3,092	3,387	3,464
Selected military forces:				
Strategic forces:				
Intercontinental ballistic missile (squadrons):				
Minuteman	—	17	20	20
Titan	—	6	6	6
Atlas	4	—	—	—
Polaris submarines/missiles (in commission)	5	37/592	41/656	41/656
Strategic bombers (wings):				
B-52	13	13	12	11
B-58	1	2	2	2
B-47	20	—	—	—
Manned fighter interceptor squadrons	42	33	30	26
Interceptor missile squadrons (BOMARC)	7	6	6	6
Army air defense missile battalions	49½	18	18	18
General purpose forces:				
Army divisions (combat ready)	11	17	17	17
Army special forces groups	3	—	—	—
Army maneuver battalions	—	191	198	198
Army aviation units	—	160	193	218
Warships (in commission):				
Attack carriers	15	15	15	15
Antisubmarine warfare carriers	9	8	8	8
Nuclear attack submarines	13	22	32	44
Other	328	328	323	303
Amphibious assault ships (in commission)	110	159	157	158
Carrier air groups (attack and ASW)	28	27	27	27
Marine Corps divisions/aircraft wings	3	4/3	4/3	4/3
Air Force tactical forces squadrons	93	130	136	135
Airlift and sealift forces:				
Airlift aircraft (squadrons):				
C-130 through C-141	16	42	44	45
C-118 through C-124	35	16	12	8
Troopships, cargo ships, and tankers	101	121	124	124
Active aircraft inventory (all programs):				
Army	5,564	8,098	9,528	11,578
Navy	8,793	8,260	8,552	8,878
Air Force	16,905	14,196	14,230	14,012
Helicopters included in total	—	(7,317)	(8,932)	(11,132)
Commissioned ships in fleet (all programs)	819	909	941	938

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

EMPLOYMENT IN ALL MANUFACTURING, DURABLE GOODS, AND AEROSPACE INDUSTRIES
Calendar Years 1959 to Date
(Thousands of Employees)

Annual Average	All Manufacturing Industries	Durable Goods Industries	Aerospace Industry		
			Total	As Per Cent of	
				Manufacturing	Durable Goods
1959	16,675	9,373	1,128	6.8%	12.0%
1960	16,796	9,459	1,074	6.1	10.8
1961	16,326	9,070	1,096	6.7	12.1
1962	16,853	9,480	1,177	7.0	12.4
1963	16,995	9,616	1,174	6.9	12.2
1964	17,274	9,816	1,117	6.5	11.4
1965	18,032	10,386	1,133	6.3	10.9
1966	19,081	11,186	1,298	6.8	11.6

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

ESTIMATED EMPLOYMENT AND PAYROLL IN THE AEROSPACE INDUSTRY
Calendar Years 1959 to Date

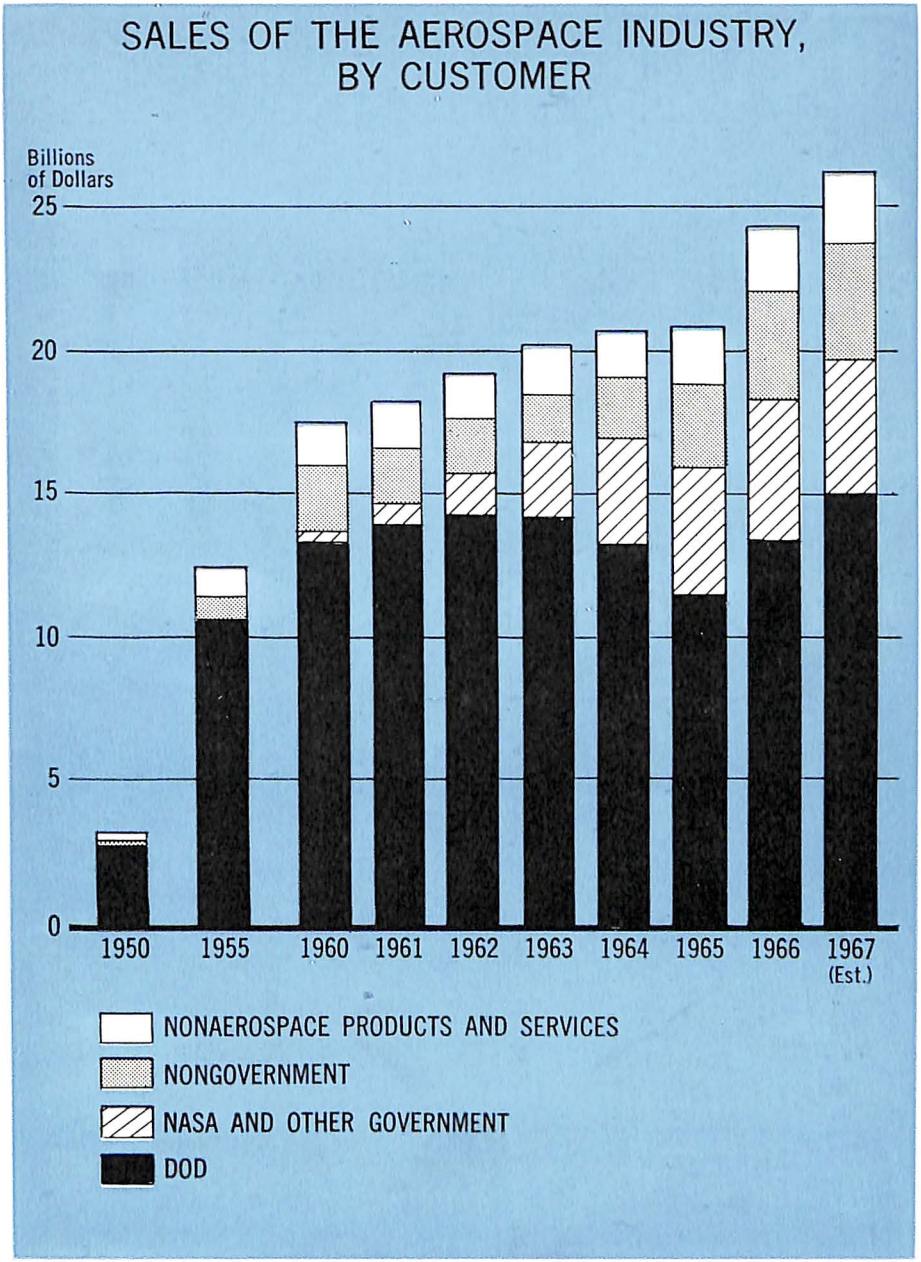
Year Ending December 31	Annual Average Aerospace Employment			Annual Average Aerospace Payroll			Aerospace as Per Cent of Total	
	TOTAL	Salaried	Production Worker	TOTAL	Salaried	Production Worker	Manufacturing Employment	Manufacturing Payroll
	(Thousands of Employees)			(Millions of Dollars)				
1959	1,128	455	673	$7,427	$3,692	$3,735	6.8%	8.5%
1960	1,074	467	607	7,317	3,835	3,482	6.1	8.2
1961	1,096	499	597	7,809	4,257	3,552	6.7	8.7
1962	1,177	558	619	8,889	5,045	3,844	7.0	9.2
1963	1,174	594	580	9,102	5,421	3,681	6.9	9.0
1964	1,117	565	552	8,897	5,326	3,571	6.5	8.3
1965	1,133	562	571	9,502	5,429	4,073	6.2	8.2
1966	1,298	612	686	11,235	6,061	5,174	6.8	8.8

Sources:
Manufacturing Employment: Bureau of Labor Statistics "Employment and Earnings" (Monthly).
Manufacturing Payroll: Bureau of Employment Security-Office of Business Economics estimates.
Aerospace Employment and Payroll: Aerospace Industries Association, based on latest available information.

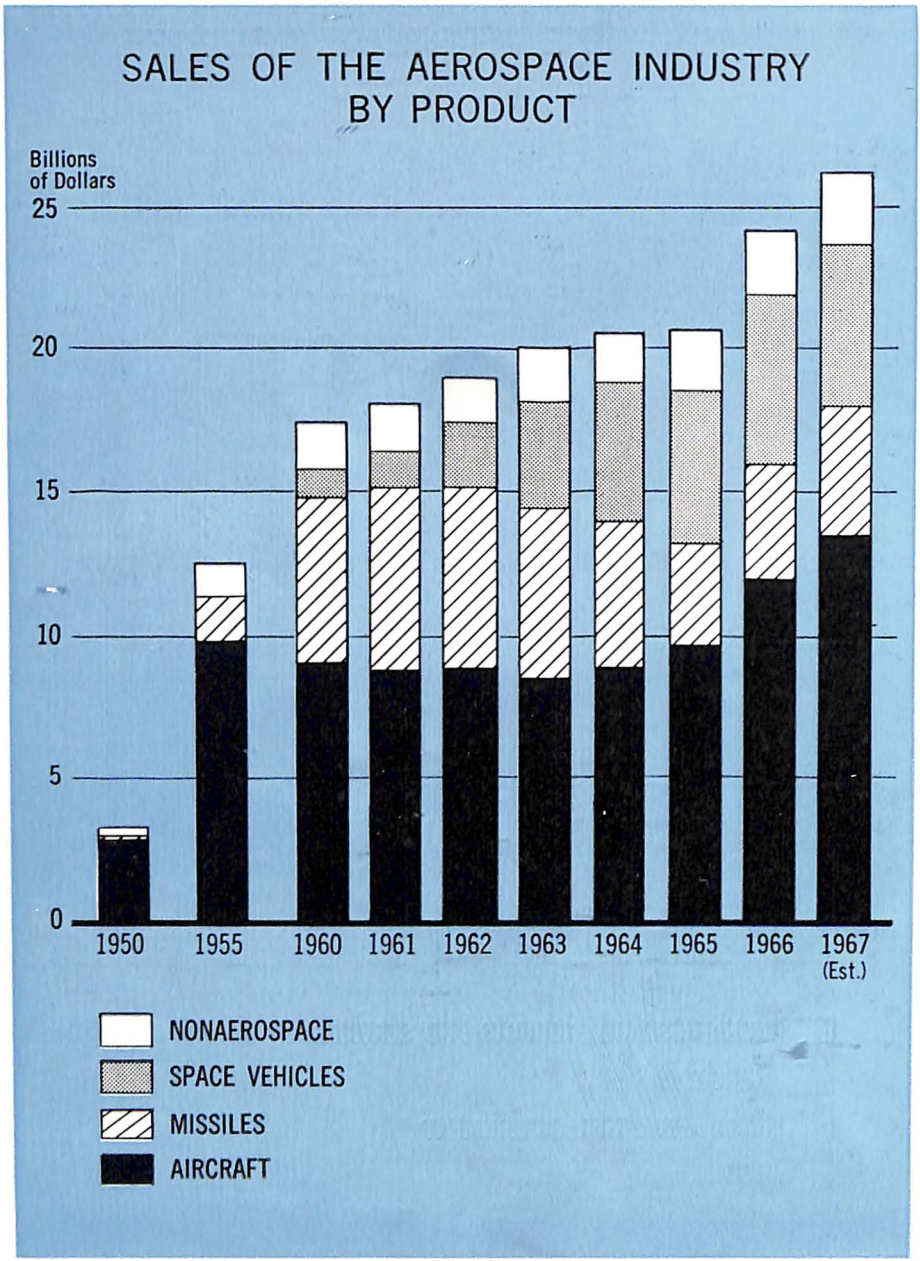
U. S. Exports and Exports of Aerospace Products
Calendar Years 1948 to Date
(Millions of Dollars)

Year Ending December 31	Total U. S. Exports of Merchandise[a]	Exports of Aerospace Products			
		Total	Commercial Transports	Other Aerospace Products	Per Cent of Total U. S. Exports
1948	$12,532	$ 154	$ 37	$ 117	1.2%
1949	11,936	283	22	261	2.4
1950	10,142	242	40	202	2.4
1951	14,879	301	13	288	2.0
1952	15,049	603	18	585	4.0
1953	15,652	881	79	802	5.6
1954	14,981	619	93	526	4.1
1955	15,419	728	81	647	4.7
1956	18,940	1,059	133	926	5.6
1957	20,671	1,028	179	849	5.0
1958	17,745	972	147	826	5.5
1959	17,438	770	108	662	4.4
1960	20,349	1,330	480	850	6.5
1961	20,717	1,210	268	942	5.8
1962	21,359	1,436	255	1,181	6.7
1963	22,922	1,240	191	1,049	4.7
1964	25,987	1,212	211	1,001	5.4
1965	27,300	1,474	353	1,121	5.4
1966	29,412	1,536	421	1,115	5.2

[a] Excluding re-exports and shipments of military aircraft under the Mutual Security Program.
Source: Bureau of the Census, "U. S. Exports of Domestic & Foreign Merchandise, Report FT 410" (Monthly).



For statistical data on which this table is based, see Estimated Sales, Page 10.



For statistical data on which this chart is based, see Estimated Sales, Page 8.

Aircraft in Operation on World Civil Airlines, Number and Percentage Manufactured in the United States
Calendar Years 1958 to Date

Year Ending December 31	Total Aircraft in Operation	Number Manufactured in the United States	Per Cent Manufactured In the United States
1958	3,402	2,819	82.9%
1959	3,479	2,868	82.4
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	2,319	73.9
1965	3,461	2,548	73.6

Note: Based on reports by members of the International Air Transport Association.
Source: International Air Transport Association.

Net Profit After Taxes as a Per Cent of Sales for Manufacturing Corporations
Calendar Years 1957 to Date

Year	All Manufacturing Corporations (except Newspapers)	Non-Durable Goods	Durable Goods	Aerospace
1957	4.8%	4.9%	4.8%	2.9%
1958	4.2	4.4	3.9	2.4
1959	4.8	4.9	4.8	1.6
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

Source: Securities & Exchange Commission—Federal Trade Commission, "Quarterly Financial Report for Manufacturing Corporations."

DIRECT FEDERAL OBLIGATIONS
FOR AEROSPACE PRODUCTS AND SERVICES
1960 to Date
(Millions of Dollars)

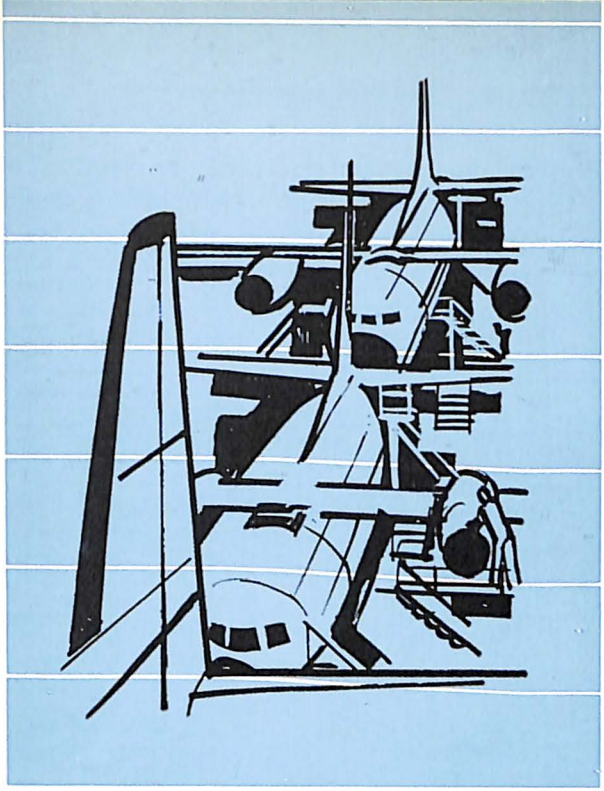
Year Ending June 30	TOTAL	Department of Defense	National Aeronautics and Space Administration
1960	$11,939	$11,624	$ 315
1961	11,751	11,098	653
1962	14,321	13,017	1,304
1963	16,628	14,112	2,516
1964	17,443	13,567	3,876
1965	16,257	11,913	4,344
1966	19,212	14,132	5,080
1967[E]	21,730	16,722	5,008
1968[E]	21,232	16,177	5,055

[E] Estimate.
Source: Department of Defense, Reports "FAD 557, 558," January 24, 1967; National Aeronautics and Space Administration; The Budget of the United States (Annually). NASA excludes construction of facilities.

FEDERAL PROGRAMS FOR RESOURCES MANAGEMENT
Fiscal Years 1966 to 1968
(Millions of Dollars)

	Year ending June 30		
	1966	1967	1968
TOTAL	$758.3	$905.4	$1,104.2
Marine Science and Technology	333.4	409.1	462.3
Air Pollution	26.6	35.6	64.1
Environmental Engineering and Sanitation	13.8	22.0	42.6
Urban Planning	26.8	33.0	80.0
Urban Transportation	135.5	130.7	125.0
Water Pollution Control	204.0	253.8	331.9
High Speed Ground Transportation	18.2	21.2	18.3

NOTE: Data represent primarily adjusted appropriations and new obligational authority.
Source: "The Budget of the United States Government" (Annually).



AIRCRAFT PRODUCTION

Aircraft production and sales—commercial and military—continued to increase at a significant rate during 1966.

Rising demands from U. S. domestic and foreign airlines for U. S. commercial passenger and cargo transports, increasing U. S. military requirements for aircraft, principally for Vietnam operations, and a heightened market for general aviation aircraft provided the impetus. In all, 20,103 aircraft were produced, as compared to the previous post-World War II and 1965 production high of 15,939 aircraft.

Although the value of 1966 sales of aircraft, engines and parts to the U. S. government remained predominant, the share of sales to other customers, principally commercial and foreign governments, continued to advance. The total value of sales as reported by 58 aerospace companies in 1966 amounted to $8.7 billion, an increase of 23 percent over that of 1965. Of this amount, $5.4 billion were sales to the U. S. government and $3.3 billion to commercial purchasers and foreign governments.

By the end of 1966, the backlog of unfilled orders for aircraft, aircraft engines, propellers and parts reached the highest level since the figures have been computed—$18.5 billion.

Manufacturers of general aviation airplanes reached new production and sales records during 1966 with the delivery of 15,747 airplanes having manufacturers' net billing price estimated at more than $444 million, an increase of 39 percent over the previous year.

AIRCRAFT SALES AND BACKLOG, REPORTED BY MAJOR MANUFACTURERS OF COMPLETE AIRCRAFT, AIRCRAFT ENGINES, PROPELLERS, AND PARTS
Calendar Years 1948 to Date
(Millions of Dollars)

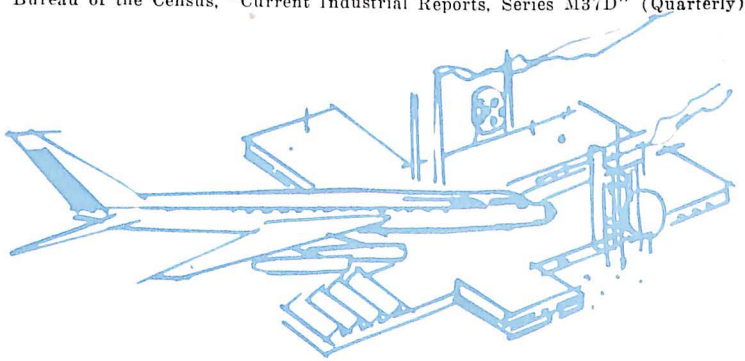
Year Ending December 31	Aircraft, Aircraft Engines, Propellers, and Parts	
	Net Sales During Year	Backlog December 31
1948	$1,061[a]	$ 2,983
1949	1,668	2,853
1950	2,116	4,717
1951	2,872	11,898
1952	5,654	16,692
1953	7,754	15,928
1954	7,471	13,755
1955	7,231	13,864
1956	7,689	16,000
1957	9,482	12,363
1958	8,661	10,182
1959	7,206	8,082
1960	6,527	7,791
1961	5,842	7,214
1962	5,898	6,528
1963	5,613	6,722
1964	6,428	7,799
1965	7,057	11,387
1966	8,699	18,545

[a] Three quarters only.
NOTE: 1948 to 1960 based on reports from about 48 companies—all companies known to be engaged in the manufacture of complete aircraft, aircraft engines, and aircraft propellers. After 1960, based on reports from about 60 aerospace companies.
Source: Bureau of the Census, "Current Industrial Reports, Series M37D," (Quarterly).

AIRCRAFT SALES BY MAJOR MANUFACTURERS OF COMPLETE AIRCRAFT, AIRCRAFT ENGINES, PROPELLERS AND PARTS
Calendar Years 1948 to Date
(Millions of Dollars)

Year Ending Dec 31	Total Aircraft Sales			Aircraft & Parts		Aircraft Engines & Parts		Aircraft Propellers & Parts	
	TOTAL	U.S. Government	Other	U.S. Government	Other	U.S. Government	Other	U.S. Government	Other
1948[a]	$1,061	$ 884	$ 177	$ 626	$ 122	$ 222	$ 43	$ 36	$12
1949	1,668	1,438	230	927	171	461	47	50	12
1950	2,116	1,878	238	1,255	161	561	64	62	13
1951	2,872	2,525	347	1,657	226	779	100	89	21
1952	5,654	5,004	650	3,442	455	1,440	169	122	26
1953	7,754	7,026	734	4,661	518	2,189	189	176	27
1954	7,471	6,649	822	4,626	600	1,872	190	151	32
1955	7,231	6,445	786	4,605	559	1,728	205	112	22
1956	7,689	6,523	1,166	4,704	814	1,718	317	101	35
1957	9,482	7,884	1,598	5,607	1,165	2,137	390	140	43
1958	8,661	7,289	1,372	5,305	1,014	1,858	321	126	37
1959	7,206	5,395	1,841	4,063	1,395	1,268	408	64	38
1960	6,527	4,319	2,208	3,333	1,766	913	417	73	25
1961	5,842	3,966	1,876	2,945	1,442	1,021	434	[b]	[b]
1962	5,898	4,126	1,772	2,998	1,389	1,130	383	[b]	[b]
1963	5,613	4,154	1,459	2,986	1,055	1,168	404	[b]	[b]
1964	6,428	4,571	1,857	3,506	1,409	1,065	448	[b]	[b]
1965	7,057	4,525	2,532	3,393	1,950	1,132	582	[b]	[b]
1966	8,699	5,437	3,262	4,086	2,543	1,351	719	[b]	[b]

[a] Total for the last three quarters of 1948 only.
[b] Included in "Aircraft and Parts."
NOTE: 1948 to 1960 based on reports from about 48 companies—all companies known to be engaged in the manufacture of complete aircraft, aircraft, engines, and aircraft propellers. After 1960, based on reports from about 60 aerospace companies.
Source: Bureau of the Census, "Current Industrial Reports, Series M37D" (Quarterly).



AIRCRAFT BACKLOG OF ORDERS REPORTED BY MAJOR MANUFACTURERS OF COMPLETE AIRCRAFT, AIRCRAFT ENGINES, PROPELLERS AND PARTS
1948 to Date
(Millions of Dollars)

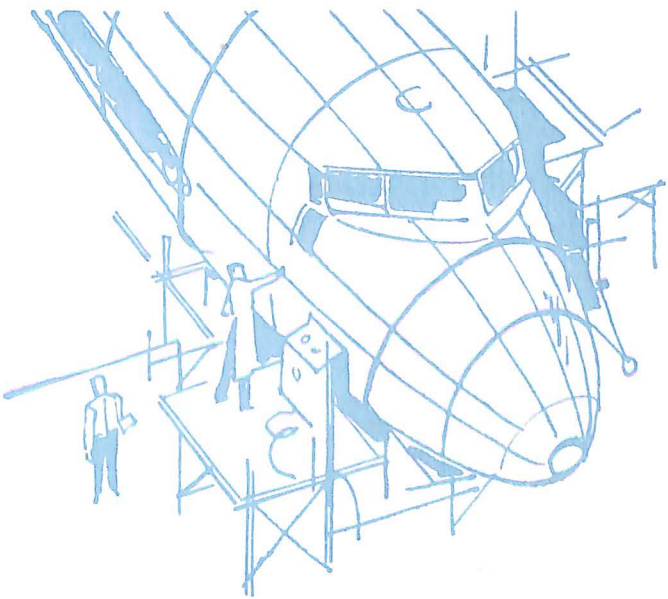
Dec. 31	Total Aircraft Backlog			Aircraft & Parts		Aircraft Engines & Parts		Aircraft Propellers & Parts	
	TOTAL	U.S. Government	Other	U.S. Government	Other	U.S. Government	Other	U.S. Government	Other
1948	$ 2,983	$ 2,817	$ 166	$1,962	$ 132	$ 759	$ 27	$ 96	$ 7
1949	2,853	2,708	145	1,913	100	710	39	85	6
1950	4,717	4,287	430	2,759	343	1,399	71	129	16
1951	11,898	10,899	999	7,336	790	3,350	181	213	28
1952	16,692	15,626	1,066	10,367	855	4,992	180	267	31
1953	15,928	14,984	944	10,840	764	3,953	153	191	27
1954	13,755	12,835	920	9,868	771	2,806	123	161	26
1955	13,864	11,553	2,311	8,717	1,956	2,730	331	106	24
1956	16,000	12,299	3,701	8,837	2,907	3,316	749	146	45
1957	12,363	8,942	3,421	6,437	2,799	2,379	590	126	32
1958	10,182	6,933	3,249	5,407	2,688	1,479	539	47	22
1959	8,082	5,442	2,640	4,419	2,231	985	400	48	9
1960	7,791	5,406	2,385	4,101	2,031	1,256	348	49	6
1961	7,214	5,084	2,130	3,996	1,673	1,088	457	[a]	[a]
1962	6,528	4,864	1,664	3,687	1,301	1,177	363	[a]	[a]
1963	6,722	4,825	1,897	3,844	1,467	1,081	430	[a]	[a]
1964	7,799	5,283	2,516	4,291	1,988	992	528	[a]	[a]
1965	11,387	6,071	5,316	4,425	4,460	1,646	856	[a]	[a]
1966	18,545	8,832	9,713	6,514	8,137	2,318	1,576	[a]	[a]

NOTE: 1948 to 1960 based on reports from about 48 companies—all companies known to be engaged in the manufacture of complete aircraft, aircraft, engines, and aircraft propellers.
After 1960, based on reports from about 60 aerospace companies.
[a] Included in "Aircraft and Parts."
Source: Bureau of the Census, "Current Industrial Reports, Series M37D" (Quarterly).

DEPARTMENT OF DEFENSE
EXPENDITURES FOR AIRCRAFT PROCUREMENT, BY AGENCY
Fiscal Years 1951 to Date
(Millions of Dollars)

Year Ending June 30	Total Defense Department	Air Force	Navy	Army
1951	$2,412	$1,812	$ 594	$ 7
1952	4,888	3,633	1,205	51
1953	8,189	N.A.	N.A.	N.A.
1954	9,080	N.A.	N.A.	N.A.
1955	8,804	N.A.	N.A.	N.A.
1956	7,835	N.A.	N.A.	N.A.
1957	8,647	N.A.	N.A.	N.A.
1958	8,793	N.A.	N.A.	N.A.
1959	7,730	N.A.	N.A.	N.A.
1960	6,272	4,414	1,765	93
1961	5,898	3,926	1,832	141
1962	6,400	4,387	2,102	170
1963	6,309	3,746	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[E]	8,010	4,600	2,495	915
1968[E]	9,003	5,030	2,966	1,007

N.A.—Not available.
[E] Estimate.
Source: Department of Defense, Report "FAD 557," January 24, 1967.



U. S. AIRCRAFT PRODUCTION
Calendar Years 1909 to Date
(Number of Aircraft)

Year Ending December 31	TOTAL	Military	Civil
1909	N.A.	1	N.A.
1910	N.A.	—	N.A.
1911	N.A.	11	N.A.
1912	45	16	29
1913	43	14	29
1914	49	15	34
1915	178	26	152
1916	411	142	269
1917	2,148	2,013	135
1918	14,020	13,991	29
1919	780	682	98
1920	328	256	72
1921	437	389	48
1922	263	226	37
1923	743	687	56
1924	377	317	60
1925	789	447	342
1926	1,186	532	654
1927	1,995	621	1,374
1928	4,346	1,219	3,127
1929	6,193	677	5,516
1930	3,437	747	2,690
1931	2,800	812	1,988
1932	1,396	593	803
1933	1,324	466	858
1934	1,615	437	1,178
1935	1,710	459	1,251
1936	3,010	1,141	1,869
1937	3,773	949	2,824
1938	3,623	1,800	1,823

(Continued on next page)

AIRCRAFT PRODUCTION
1909 TO DATE (cont'd)
(Number of Aircraft)

Year Ending December 31	TOTAL	Military	Civil
1939	5,856	2,195	3,661
1940	12,813	6,028	6,785
1941	26,289	19,445	6,844
1942	47,675	47,675	—
1943	85,433	85,433	—
1944	95,272	95,272	—
1945	48,912	46,865	2,047
1946	36,418	1,417	35,001
1947	17,739	2,122	15,617
1948	9,838	2,536	7,302
1949	6,137	2,592	3,545
1950	6,200	2,680	3,520
1951	7,532	5,055	2,477
1952	10,640	7,131	3,509
1953	13,112	8,978	4,134
1954	11,478	8,089	3,389
1955	11,484	6,664	4,820
1956	12,408	5,203	7,205
1957	11,943	5,198	6,745
1958	10,938	4,078	6,860
1959	11,076	2,834	8,242
1960	10,237	2,056	8,181
1961	9,054	1,582	7,472
1962	9,308	1,975	7,333
1963	10,125	1,970	8,155
1964	12,492	2,439	10,053
1965	15,939[E]	3,500[E]	12,439
1966	20,103[E]	4,000[E]	16,103

NOTE: 1950 to date excludes aircraft produced for the Military Assistance Program.
[E] Estimate.
N.A.—Not available.
Sources: Aerospace Industries Association, "Aerospace Facts and Figures" (Annually).
Department of Commerce, Bureau of the Census, "Current Industrial Reports, Series M37G" (Monthly).
Department of Defense.

MILITARY AIRCRAFT PRODUCED: NUMBER, FLYAWAY VALUE, AND AIRFRAME WEIGHT
Calendar Years 1950 to Date

Year Ending December 31	TYPE OF AIRCRAFT						
	TOTAL	Bomber	Fighter	Transport	Trainer	Helicopter	Other
NUMBER							
1950	2,680	560	1,477	176	351	60	56
1951	5,055	502	1,937	271	558	349	1,438
1952	7,131	1,193	2,117	479	1,363	961	1,018
1953	8,978	1,156	3,958	713	1,510	873	768
1954	8,089	1,806	3,511	626	1,403	373	370
1955	6,664	1,353	3,128	513	1,111	410	149
1956	5,203	1,164	1,916	362	778	644	339
1957	5,198	873	2,073	224	819	659	550
1958	4,078	676	1,482	271	560	641	448
1959	2,834	511	922	215	564	451	171
1960	2,056	471	595	142	268	488	92
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
FLYAWAY VALUE[a] (Millions of Dollars)							
1950	1,141.3	546.4	339.7	178.5	47.7	6.3	22.7
1951	1,684.3	690.5	559.1	278.5	78.2	29.6	48.4
1952	3,162.0	1,334.7	751.7	647.9	256.1	101.4	70.2
1953	4,722.9	1,799.2	1,672.5	791.5	253.6	124.4	81.7
1954	5,715.0	2,405.4	2,087.0	854.4	261.3	82.0	24.9
1955	4,927.9	2.013.8	1,907.4	652.7	166.4	169.2	18.4
1956	5,075.3	2,202.9	1,987.4	537.0	115.5	184.6	47.9
1957	5,284.9	2,163.4	2,086.5	676.2	169.5	156.6	32.7
1958	5,365.3	2,157.2	2,106.6	781.9	139.4	156.0	24.2
1959	5,101.0	2,066.1	1,829.5	759.4	216.1	163.1	66.8
1960	3,384.4	1,560.7	1,109.1	415.5	130.0	172.9	50.2
1961	4,497.4	2,570.0	1,054.6	385.2	199.7	228.2	54.7
1962	3,816.1	1,629.5	1,005.2	674.3	193.7	249.6	63.8
1963	2,876.1	798.3	931.0	587.2	181.5	337.3	40.8
1964	3,080.2	801.7	1,156.6	623.6	121.5	356.1	20.7

(*Continued on next page*)

MILITARY AIRCRAFT PRODUCED: NUMBER, FLYAWAY VALUE, AND AIRFRAME WEIGHT—*Continued*

Calendar Years 1950 to Date

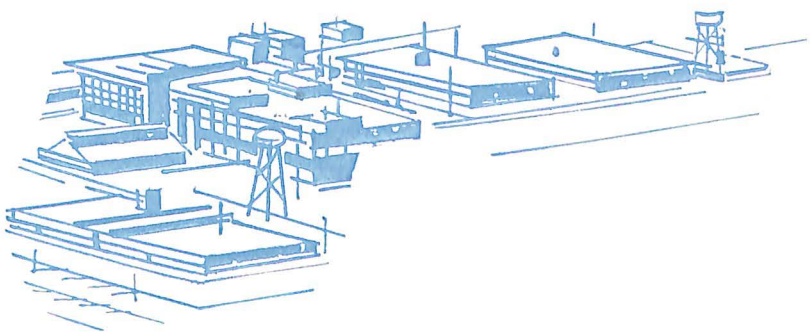
Year Ending December 31	TYPE OF AIRCRAFT						
	TOTAL	Bomber	Fighter	Transport	Trainer	Helicopter	Other
AIRFRAME WEIGHT (Millions of Pounds)							
1950	35.9	16.4	10.2	6.7	1.9	[b]	0.7
1951	50.2	17.0	15.7	11.5	3.1	[b]	2.0
1952	107.3	36.7	31.7	24.6	9.5	[b]	4.8
1953	138.0	44.1	40.7	36.5	11.3	[b]	5.4
1954	130.4	51.8	35.4	31.1	9.6	[b]	2.5
1955	114.3	39.9	43.2	20.9	7.4	[b]	2.9
1956	90.0	38.6	30.6	13.1	3.3	[b]	4.4
1957	79.4	32.7	28.7	9.3	4.2	[b]	4.5
1958	66.1	25.2	18.0	15.9	3.1	[b]	3.9
1959	51.8	18.6	12.9	14.6	3.5	[b]	2.2
1960	35.8	13.6	9.1	9.7	1.1	[b]	2.3
1961	29.6	11.9	6.1	8.3	0.9	[b]	2.4
1962	35.6	10.3	7.4	13.2	1.3	[b]	3.4
1963	32.1	4.1	8.2	14.5	1.3	[b]	4.0
1964	38.7	5.6	12.4	15.1	1.1	[b]	4.5

NOTE: Data exclude gliders and targets.

[a] Values up to 1961, are based on unit prices in latest production contracts and do not include values of spares, spare parts, and other support equipment. Since 1961, data include spares, spare parts and support equipment that are procured with the basic aircraft. They are estimated at 20 to 25 per cent of basic aircraft value.

[b] Airframe weight of helicopters is included in the "other" category.

Source: Department of Defense. Data released with a two year lag for security reasons.



NUMBER OF MILITARY AIRCRAFT, MISSILES, AND OTHER ITEMS PROGRAMMED, 1967 AND 1968, BY SERVICE

Major Item	Year Ending June 30			
	1967			1968
	Total	Enacted Funds	Supplemental	
AIRCRAFT				
Army	2,697	1,807	890	1,479
Navy and Marine Corps	1,047	560	487	680
Air Force	1,028	821	207	1,250
Total—All Services	4,772	3,188	1,514	3,407
Helicopters	2,766	1,903	863	1,588
Other aircraft	2,006	1,285	721	1,821
MISSILES				
Army	34.715	34,715	—	26,237
Navy and Marine Corps	8,164	6,172	1,992	12,815
Air Force	4,777	4,777	—	5,273
Total—All Services	47,656	45,664	1,992	44,325
SHIPS—Navy				
New Construction	57	57	—	34
Conversions	8	8	—	21
Total—Ships	65	65	—	55
TRACKED COMBAT VEHICLES				
Army	5,829	4,437	1,392	4,797
Marine Corps	151	144	7	—
Total—Tracked Combat Vehicles	5,980	4,581	1,399	4,797

Source: Department of Defense, OASD (Comptroller), January 24, 1967.

PRODUCTION OF COMMERCIAL TRANSPORT AIRCRAFT
1958 to Date
(Fixed Wing, Multiple Engine)

Company and Aircraft	1958	1959	1960	1961	1962	1963	1964	1965	1966
TOTAL[a]	216	262	245	198[r]	134[r]	100[r]	163[r]	233[r]	344
Boeing									
707	7	73	68	11	38	28	32	54	77
720	—	—	24	61	30	6	6	9	6
727	—	—	—	—	—	6	95	112	135
Convair									
440	21	14	5	—	—	—	—	—	—
880	—	—	15	49	9	14	—	—	—
990	—	—	—	—	22	15	—	—	—
Douglas									
DC-6	65	1	—	—	—	—	—	—	—
DC-7	57	—	—	—	—	—	—	—	—
DC-8	—	21	91	42	22	19	20	31	16
DC-9	—	—	—	—	—	—	—	5	69
Fairchild									
F-27	25	41	14	8	7	6	5	12	3
FH-227	—	—	—	—	—	—	—	—	27
Lockheed									
1049	21	5	—	—	—	—	—	—	—
1649	8	—	—	—	—	—	—	—	—
Electra	12	107	24	21	—	—	—	—	—
130	—	—	4	6	6	6	—	10	11
Other	—	—	—	—	—	—	5	—	—

[r] Revised. Excludes Grumman Gulfstream and Lockheed JetStar which are now listed with general aviation aircraft in tables on pages 37 and 38.

[a] Commercial transport totals differ from FAA totals for "transports" because they exclude some executive and other transports for other than commercial use.

Source: Aerospace Industries Association, company reports.

PRODUCTION OF GENERAL AVIATION AIRCRAFT, BY FIFTEEN MANUFACTURERS, 1966

Manufacturer and Model	Complete Aircraft, Number	Manufacturers' Net Billing Price (Thousands of Dollars)
TOTAL	15,747	$444,219[a]
Aero Commander	229	$ 51,537
100	13	
200	43	
500B	12	
500U	12	
560F	1	
680FP	1	
Grand Commander (680FL)	15	
680T	31	
Pressurized Grand Commander (680FLP)	10	
Jet Commander (1121)	50	
S2C Snow Commander	2	
S2D Snow Commander	39	
Alon		
A2	138	1,056
Beech	1,535	97,284
King Air 90	114	
H Super 18	2	
Queen Air 88	29	
Queen Air 80	61	
Queen Air 65	41	
Baron (C55)	241	
Baron (B55)	48	
Travelair (95)	33	
Bonanza (35)	137	
Bonanza (V35)	156	
Bonanza (V35TC)	33	
Bonanza (35TC)	13	
Debonair (C33A)	127	
Debonair (C33)	63	
Debonair (33)	10	
Musketeer (24)	157	
Musketeer (23)	94	
Musketeer (19)	176	
Bellanca	65	1,333
Model 260B	44	
Model 260C	10	
Viking 300	11	

(*Continued on next page*)

PRODUCTION OF GENERAL AVIATION AIRCRAFT, BY FIFTEEN MANUFACTURERS, 1966—*Continued*

Manufacturer and Model	Complete Aircraft, Number	Manufacturers' Net Billing Price (Thousands of Dollars)
Cessna	7,888	128,150
150	3,087	
F150	100	
F172	108	
172/Skyhawk	1,597	
180	167	
182/Skylane	973	
182A	20	
185/Skywagon	193	
Super Skylane	161	
Super Skywagon	252	
210 Centurion	120	
T210 Centurion	137	
Super Skymaster	238	
310	239	
310K	42	
Skyknight	127	
401	16	
402	3	
411	115	
Agwagon	193	
Champion		
Citabria	331	2,269
Grumman	70	N.A.
GR 159 Gulfstream	13	
GR 164 Ag Cat	57	
Imco	89	1,292
CallAir A-9	66	
CallAir B-1	23	
Lake		
LA-4	24	637
Lear Jet	51	28,555
Model 23	19	
Model 24	32	

(*Continued on next page*)

PRODUCTION OF GENERAL AVIATION AIRCRAFT, BY FIFTEEN MANUFACTURERS, 1966—*Continued*

Manufacturer and Model	Complete Aircraft, Number	Manufacturers' Net Billing Price (Thousands of Dollars)
Lockheed		
JetStar	24	36,000
Maule		
MA-4	51	600
Mooney	779	15,406
M-20C	187	
M-20D	1	
M-20E	347	
M-20F	237	
MU—2	4	
MU-2B	3	
North American		
NA 265 Sabreliner	36	N.A.
Piper	4,437	80,100
PA-18-150 Super Cub	138	
PA-23-250 Aztec	442	
PA-23-235 Apache	6	
PA-24-260 Comanche	274	
PA-24-400 Comanche	7	
PA-25-235 Pawnee	432	
PA-28-140 Cherokee	1,144	
PA-28-150 Cherokee	36	
PA-28-160 Cherokee	22	
PA-28-180 Cherokee	766	
PA-28-235 Cherokee	95	
PA-30-160 Comanche	437	
PA-32-260 Cherokee	576	
PA-32-300 Cherokee	62	

[a] Total dollar figures exclude Grumman and North American.

NOTE: The totals here may differ from FAA figures because they are based on selected reports only. Excludes aircraft shipped to the military, helicopters and gliders.

Source: Aerospace Industries Association, company reports.

PRODUCTION OF GENERAL AVIATION AIRCRAFT BY 15 MANUFACTURERS, 1947 TO DATE

Year	TOTAL	Aero Commander	Beech	Cessna	Grumman	Lear	Lockheed	North American	Piper	Other
NUMBER OF AIRCRAFT SHIPPED										
1947....	15,594	—	1,288	2,390	—	—	—	—	3,464	8,452
1948....	7,037	—	746	1,631	—	—	—	—	1,479	3,181
1950....	3,386	—	489	1,134	—	—	—	—	1,108	655
1952....	3,058	39	414	1,373	—	—	—	—	1,161	71
1954....	3,071	67	579	1,200	—	—	—	—	1,191	34
1956....	6,738	154	724	3,235	—	—	—	—	2,329	296
1958....	6,414	97	694	2,926	N.A.	—	—	—	2,162	535
1960....	7,588	155	962	3,720	N.A.	—	—	—	2,313	438
1961....	6,811	139	818	2,746	19	—	14	N.A.	2,646	429
1962....	6,723	121	830	3,124	17	—	9	N.A.	2,139	483
1963....	7,603	114	1,061	3,456	24	—	10	N.A.	2,321	617
1964....	9,371	109	1,103	4,188	26	3	6	N.A.	3,196	740
1965....	11,967	110	1,192	5,629	17	80	18	N.A.	3,776	1,145
1966....	15,747	229	1,535	7,888	70[a]	51	24	36	4,437	1,477
MANUFACTURERS' NET BILLING PRICE (Thousands of Dollars)										
1947....	$57,929	—	13,405	5,976	—	—	—	—	7,697	30,851
1948....	32,469	—	10,126	6,768	—	—	—	—	3,083	12,492
1950....	19,157	—	6,516	5,506	—	—	—	—	3,092	4,043
1952....	26,159	2,011	9,848	9,220	—	—	—	—	4,891	189
1954....	43,461	4,517	20,056	10,666	—	—	—	—	8,070	152
1956....	103,791	11,183	28,770	38,570	—	—	—	—	23,474	1,794
1958....	101,939	6,902	27,072	36,897	N.A.	—	—	—	26,548	4,520
1960....	151,220	11,917	43,061	56,664	N.A.	—	—	—	35,102	4,476
1961....	124,323	11,047	37,072	42,266	N.A.	—	N.A.	N.A.	28,889	5,049
1962....	136,837	10,846	37,359	50,181	N.A.	—	N.A.	N.A.	32,142	6,309
1963....	153,415	11,840	38,594	55,662	N.A.	—	N.A.	N.A.	38,540	8,779
1964....	198,876	11,973	54,923	66,818	N.A.	N.A.	N.A.	N.A.	54,479	10,783
1965....	318,732	27,727	72,211	97,239	N.A.	45,130	N.A.	N.A.	62,130	14,296
1966[b] ...	444,219	51,537	97,284	128,150	N.A.	28,555	36,000	N.A.	80,100	22,593

N.A.—Not available.

NOTE: The totals shown here may vary from Bureau of the Census figures because they are based on reports by selected manufacturers only. These manufacturers produce about 97% of all U.S. general aviation aircraft. Bureau of the Census totals for all civil aircraft including commercial transport aircraft are shown on page 31.

[a] Includes Ag Cats, which were not included in earlier years.

[b] Total dollar figures exclude Grumman and North American.

Source: Aerospace Industries Association, company reports.

PRODUCTION OF MILITARY HELICOPTERS
Calendar Years 1941 to Date

Year Ending December 31	TOTAL[a]	Air Force	Navy	Army
1941	7	7	—	—
1942	—	—	—	—
1943	22	19	3	—
1944	144	120	24	—
1945	275	241	34	—
1946	44	40	4	—
1947	57	36	21	—
1948	153	94	59	—
1949	73	24	43	6
1950	60	6	39	15
1951	360	14	143	192
1952	983	49	353	559
1953	943	165	245	463
1954	431	172	46	155
1955	444	82	128	200
1956	647	62	152	430
1957	689	16	193	450
1958	668	2	204	435
1959	451	28	101	322
1960	494	57	147	284
1961	366	42	187	137
1962	624	33	208	313
1963	762	45	165	462
1964	1,099	34	145	828

[a] The total includes helicopters bought by the Department of Defense under the Military Assistance Program and for other federal agencies.

Source: Department of Defense. Data released with a two-year lag for security reasons. For more recent data see pages 17 and 34.

PRODUCTION OF COMMERCIAL HELICOPTERS
(Number of Helicopters)
Calendar Years 1958 to Date

Company and Helicopter	1958	1959	1960	1961	1962	1963	1964	1965	1966
TOTAL	240	253	266	378	407	504	579	598	586
Bell									
U.S. production									
47 series	95	89	87	93	92	101	118	134	183
204 series	—	—	—	—	1	13	8	16	20
Foreign licensees									
47 series	59	107	57	70	63	81	103	123	147
204 series	—	—	—	—	18	32	48	48	46
102 series	—	—	1	2	—	—	—	—	—
Boeing-Vertol									
U.S. production									
H-21	17	8	—	—	—	—	—	—	—
BV-44/43	34	17	12	—	1	—	—	—	—
BV-107	—	—	—	—	4	5	16	13	13
Foreign licensees									
BV-107	—	—	—	—	—	7	3	1	1
Brantley									
B2 series	—	—	33	77	62	36	48	25	14
305	—	—	—	—	—	—	—	14	23
Enstrom									
F-28	—	—	—	—	—	—	—	—	4
Fairchild Hiller									
12 series	12	25	72	99	54	34	34	73	29
HeliPorter	—	—	—	—	—	—	—	—	3
FH-1100	—	—	—	—	—	—	—	—	8
Hughes									
200's	—	—	—	17	86	163	46	23	—
300's	—	—	—	—	—	—	121	81	62
Kaman									
HH-43B	—	—	—	6	11	11	11	10	1
HH-43F	—	—	—	—	—	—	—	—	5
Sikorsky									
U.S. and foreign production									
S-55	17	4	1	3	—	—	—	—	—
S-58	4	—	2	—	—	1	—	—	—
S-61	—	—	—	1	8	13	18	31	18
S-62	2	3	2	10	6	6	5	1	9
S-64	—	—	—	—	1	1	—	—	—

Source: Aerospace Industries Association, company reports.

PRODUCTION OF HELICOPTERS
TOTAL, COMMERCIAL AND MILITARY
Calendar Years 1954 to Date

Year Ending December 31	TOTAL[r]	Commercial[r]	Military
1954	562	131	431
1955	590	146	444
1956	915	268	647
1957	1,003	314	689
1958	908	240	668
1959	704	253	451
1960	760[r]	266[r]	494
1961	744[r]	378[r]	366
1962	1,031[r]	407[r]	624
1963	1,266[r]	504[r]	762
1964	1,678[r]	579[r]	1,099
1965	N.A.	598[r]	N.A.
1966	N.A.	586	N.A.

N.A.—Not available. See pages 17 and 34 for military production and inventory.
[r] Revised.
Source: Aerospace Industries Association, company reports.
Department of Defense

AIRCRAFT ENGINE PRODUCTION, CALENDAR YEARS 1917 TO DATE
(Number of Engines)

Year Ending December 31	TOTAL	Military		Civil	
1917–1919	N.A.	44,453		N.A.	
1928	3,252	2,620		632	
1929	7,378	1,861		5,517	
1930	3,766	1,841		1,925	
1935	2,965	991		1,974	
1940	30,167[E]	22,667		7,500[E]	
1941	64,681[E]	58,181		6,500[E]	
1942	138,089	138,089		—	
1943	227,116	227,116		—	
		Recipr.	Jet	Recipr.	Jet
1944	256,911	256,789	122	—	—
1945	111,650[E]	108,442	1,208	2,000[E]	—
1946	43,407	1,680	905	40,822	—
1947	20,912	2,683	1,878	16,351	—
1948	14,027	2,495	2,493	9,039	—
1949	11,972	2,981	5,009	3,982	—
1950	13,675	3,122	6,239	4,314	—
1951	20,867	6,471	9,816	4,580	—
1952	31,041	8,731	16,928	5,382	—
1953	40,263	13,365	20,251	6,647	—
1954	26,959	7,868	13,572	5,519	—
1955	21,108	3,875	9,594	7,639	—
1956	21,348	2,663	7,186	11,499	—
1957	21,946	2,429	8,658	10,859	38
1958	18,354	1,452	6,669	10,233	515
1959	17,162	661	3,965	11,152	1,384
1960	16,199	756	2,917	10,891	1,625
1961	15,835	417	4,755	9,669	994
1962	15,920	241	5,200	9,921	558
1963	17,185	155	5,235	11,322	473
1964	19,585	175	5,205	13,346	859
1965	23,647[E]	250[E]	5,200[E]	17,018	1,179[r]
1966	29,012	350[E]	5,400[E]	21,324	1,938

NOTE: Jet includes turboprop and turbofan.
N.A.—Not available.
[E] Estimate.
[r] Revised.
Sources:
Aerospace Industries Association, "Aerospace Facts and Figures" (Annually).
Bureau of the Census, "Current Industrial Reports, Series M37G" (Monthly).
Department of Defense.

CIVIL AIRCRAFT ENGINE PRODUCTION
Calendar Years 1959 to Date
(Number of Engines)

Manufacturer and Engine Designation	1959	1960	1961	1962	1963	1964	1965	1966
TOTAL	12,250	12,159	10,660r	10,478r	11,795	14,205	18,187r	23,262
Reciprocating	10,875	10,524	9,669	9,921	11,322	13,346	17,018	21,324
Jet	1,384	1,635	991r	557r	473	859	1,169r	1,938
Continental	5,913	5,873	5,105	5,242	5,409	6,216	9,045	11,132
A-65	16	56	46	51	45	30	41	17
O-200/C-90	1,348	840	828	826	773	918	2,059	3,298
O-300	953	1,252	987	1,104	1,210	1,368	1,678	1,655
IO-346	—	—	—	—	—	92	291	64
IO-360	—	—	—	—	—	141	680	739
O-470	2,816	3,207	850	1,006	902	1,072	1,115	1,422
IO-470	—	—	1,888	1,974	1,595	1,281	1,295	1,038
TSIO-470	—	—	322	140	133	212	12	11
GIO-470	—	—	—	—	—	52	12	27
GTSIO-520	—	—	—	—	271	42	321	281
TSIO-520	—	—	—	—	—	—	383	702
IO-520	—	—	—	—	394	983	1,023	1,868
Other	780	518	184	141	86	15	135	—
General Electric	90	278	324	83	14	25	32	489
CT-58	—	—	—	—	—	25	31	12
CJ-805	—	66	185	25	1	—	1	—
CF-700	—	—	—	—	—	—	—	122
CJ-610	—	—	—	—	—	—	—	355
Other	90	212	139	58	13	—	—	—
Lycoming	4,700	4,611	4,472	4,621	5,817	7,127	7,973	10,192
O-720	—	—	—	—	—	152	43	71
O-541	—	—	—	—	—	—	—	4
O-540	906	1,247	728	1,194	2,070	2,749	2,969	3,429
O-480	308	271	122	142	169	121	204	221
O-435	—	—	12	7	206	230	405	506
O-360	1,044	701	218	1,080	1,508	1,729	2,330	2,629
O-320	2,021	1,452	1,128	1,248	1,578	2,068	1,942	3,098
O-290	113	80	17	17	13	11	11	9
O-235	8	111	1,241	289	264	67	62	222
Other	300	749	1,006	644	9	—	7	3
Pratt & Whitney	694	787	645	474	459	834	1,137	1,449
JT3D	—	63	357	406	251	337	491	598
JT12	—	23	97	44	38	87	151	167
JT8D	—	—	—	3	165	410	495	684
Other	694	701	191	21	5	—	—	—

NOTE: Included in the totals are: 1959, 604 by Allison and 258 by Curtiss-Wright; 1960, 576 by Allison and 84 by Curtiss-Wright; 1961, 22 by Allison and 92 by Curtiss-Wright; 1962, 58 by Curtiss-Wright; 1963, 96 by Curtiss-Wright; and 1964, 3 by Curtiss-Wright.

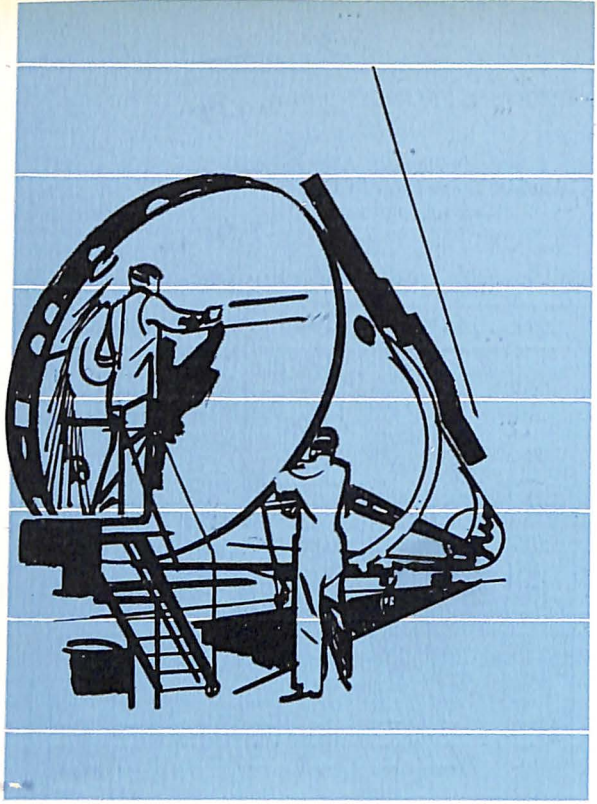
r Revised.

Source: Aerospace Industries Association, company reports.

MILITARY AIRCRAFT ENGINE ACCEPTANCES
Calendar Years 1955 to Date
(Number of Engines)

ENGINE DESIGNATION	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
TOTAL	13,469	9,849	11,087	8,121	4,626	3,674	5,172	5,441	5,390	5,380
Jet	9,333	6,532	8,104	6,135	3,421	2,025	2,821	3,162	2,871	2,638
J-33	514	95	106	20	—	—	—	—	—	—
J-34	—	40	76	99	139	80	—	—	—	—
J-44	—	—	181	320	55	—	—	—	—	—
J-48	131	318	214	60	24	—	—	—	—	—
J-52	—	—	—	5	36	220	305	471	318	310
J-57	1,918	3,876	5,391	4,000	1,957	565	532	562	476	133
J-60	—	—	—	—	1	29	184	219	207	44
J-69	32	235	542	652	538	487	284	435	321	335
J-75	—	27	70	209	293	256	229	219	174	42
J-79	2	102	302	460	309	174	598	752	894	1,279
J-85	—	—	2	32	69	214	688	486	471	495
J-93	—	—	—	—	—	—	1	—	—	—
J-65	3,252	1,135	798	137	—	—	—	—	—	—
J-71	388	507	422	135	—	—	—	—	—	—
J-83	—	—	—	6	—	—	—	—	—	—
J-35	507	—	—	—	—	—	—	—	—	—
J-40	61	—	—	—	—	—	—	—	—	—
J-46	265	—	—	—	—	—	—	—	—	—
J-47	1,871	191	—	—	—	—	—	—	—	—
J-73	392	6	—	—	—	—	—	—	—	—
JT-3D	—	—	—	—	—	—	—	18	10	—
Turbo-Fan	—	—	—	—	—	168	683	298	76	195
TF-33	—	—	—	—	—	168	683	298	76	182
TF-30	—	—	—	—	—	—	—	—	—	13
Turbo-Prop	261	654	554	534	544	724	1,251	1,740	2,288	2,372
T-33	—	—	—	—	2	—	—	—	—	—
T-34	87	73	52	103	63	49	—	—	—	—
T-50	—	—	—	—	—	—	43	68	78	131
T-53	—	—	—	40	165	339	358	452	759	981
T-56	165	580	481	371	260	234	522	763	1,019	719
T-58	—	1	21	20	54	96	298	384	348	342
T-40	2	—	—	—	—	—	—	—	—	—
T-49	7	—	—	—	—	—	—	—	—	—
T-YT-55	—	—	—	—	—	—	30	73	68	138
T-64	—	—	—	—	—	—	—	1	16	61
Reciprocating	3,875	2,663	2,429	1,452	661	756	417	241	155	175
O-435	4	96	217	298	327	189	—	—	—	—
O-480	—	30	230	285	66	57	11	—	—	—
O-470	435	377	143	173	—	—	—	—	—	—
O-335	95	137	13	—	—	—	—	—	—	—
O-526	—	—	4	—	—	—	—	—	—	—
O-525	—	—	9	—	—	—	—	—	—	—
R-1340	—	—	7	22	—	—	—	—	—	—
R-1820	1,035	1,160	1,191	506	155	418	282	241	155	175
R-3350	1,022	547	198	87	113	93	124	—	—	—
R-1300	118	77	201	11	—	—	—	—	—	—
R-2800	529	239	216	70	—	—	—	—	—	—
R-4360	637	—	—	—	—	—	—	—	—	—

Source: Department of Defense. Data released with a two-year lag for security reasons.



MISSILE PROGRAMS

Major manufacturers of missile systems, which include manufacturers of engines, propulsion units and parts, reported a continuing decline in missile sales during 1966—$2.8 billion in 1966 as compared to $3 billion in 1965. Largely attributable to the completion of missile programs initiated in previous years, this trend is expected to reverse itself as new programs currently in the design and development phase reach production status.

Operational status was attained for the first wing of 150 Minuteman II strategic intercontinental missiles. In addition, 50 of such missiles, possessing improved guidance and targeting capabilities, have been deployed as replacements for the previously sited eight-hundred "I" series. Eventual plans call for the replacement of Minuteman "Is" with either "IIs" or the still more advanced capability "III" series currently being developed.

Complementing this force of land-based ICBMs are 39 of the planned 41-boat Polaris fleet. The last two boats programmed for the fleet are scheduled for deployment during Fiscal Year 1968. Following completion of a retrofit program to phase out A-1 missiles, the Polaris fleet

will consist of 13 boats equipped with A-2 missiles and 28 boats deployed with the more advanced and longer ranged A-3s. Development of the Poseidon is continuing and current plans contemplate deployment of this advanced under-sea launched missile on a schedule tied to the regular Polaris boat overhaul schedule.

In defense and tactical missile areas—surface-to-surface, surface-to-air, air-to-air, and air-to-ground—considerable development and procurement activity occurred during 1966. Highlights in these programs included:

- A continuing and extensive development program for an effective anti-ballistic missile defense system with funds additionally earmarked in the proposed FY 1968 budget to permit the initial production of an operational system should there be a decision to proceed with deployment of such a capability.
- The conversion to a self-propelled mode of several Hawk surface-to-air defense missile battalions.
- Continued development of a SAM-D, designed to provide all weather defense against medium and high altitude aircraft, as an eventual replacement for the Hawk.
- Initiation of a procurement program for the Standard ship launched air defense missile as a replacement for the Tartar and Terrier missiles.

SALES AND BACKLOG REPORTED BY MAJOR MANUFACTURERS OF MISSILE SYSTEMS AND PARTS
Calendar Years 1961 to Date
(Millions of Dollars)

Year Ending December 31	Missile Systems and Parts	
	Net Sales During Year	Backlog December 31
1961	$3,628	$2,873
1962	3,699	2,139
1963	3,313	2,114
1964	2,580	1,921
1965	2,449	2,203
1966	2,317	2,264

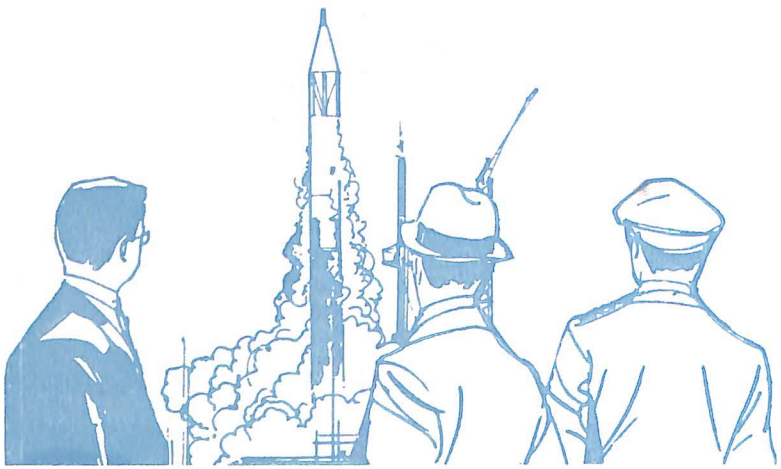
NOTE: Based on data from 60 companies engaged in the manufacture of aerospace products. Data exclude sales of military engines and propulsion units.
Source: Bureau of the Census "Current Industrial Reports, M37D," (Quarterly).

- A program to replace Mace B surface-to-surface tactical missiles with Pershing.
- A development/procurement program for advanced, television guided air-to-surface tactical missiles: the AGM-62A, Walleye, and the AGM-65A, Maverick.
- Approval of a development/production program for a short range air-to-surface interdiction missile to be launched from strategic bombers, the AGM-69A—SRAM.

SALES AND BACKLOG REPORTED BY MAJOR MANUFACTURERS OF MILITARY ENGINES AND PROPULSION UNITS FOR MISSILES AND SPACE VEHICLES
Calendar Years 1961 to Date
(Millions of Dollars)

Year Ending December 31	Net Sales During Year	Backlog as of Dec. 31
1961	$ 784	$367
1962	1,060	494
1963	1,153	699
1964	851	557
1965	560	514
1966	513	531

NOTE: Based on data from 60 companies engaged in the manufacture of aerospace products. Nonmilitary engines and propulsion units are reported with the sales and backlog of nonmilitary space vehicle systems. The figures are inflated by the inclusion of subcontracts.
Source: Bureau of the Census, "Current Industrial Reports, Series M37D" (Quarterly).



DEPARTMENT OF DEFENSE
EXPENDITURES FOR GUIDED MISSILE PROCUREMENT, BY AGENCY
Fiscal Years 1951 to Date
(Millions of Dollars)

Year Ending June 30	TOTAL DEFENSE DEPARTMENT	Air Force	Navy	Army
1951	$ 21	$ 16	$ 5	—
1952	169	66	56	$ 46
1953	245	N.A.	N.A.	N.A.
1954	417	N.A.	N.A.	N.A.
1955	604	N.A.	N.A.	N.A.
1956	1,005	N.A.	N.A.	N.A.
1957	1,855	N.A.	N.A.	N.A.
1958	2,434	N.A.	N.A.	N.A.
1959	3,337	N.A.	N.A.	N.A.
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	2,101	981	496
1965	2,096	1,320	521	254
1966	2,069	1,313	512	244
1967[E]	1,990	1,210	535	245
1968[E]	2,213	1,325	454	434

NOTE: For data on research and development expenditures for missiles see pages 50 and 70.
N.A.—Not available.
[E] Estimate.
Source: Department of Defense, Report "FAD 557," January 24, 1967.

DEPARTMENT OF DEFENSE
EXPENDITURES FOR GUIDED MISSILES
Fiscal Year 1960 to Date
(Millions of Dollars)

Year Ending June 30	TOTAL DEFENSE DEPARTMENT	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[E]	4,179	1,990	2,189
1968[E]	4,601	2,213	2,388

NOTE: Does not include military asistance.
[E] Estimate.
Source: Department of Defense, Reports "FAD 557, 558," January 24, 19[illegible].

MAJOR MISSILES IN DEVELOPMENT OR PRODUCTION

Project	Service	Systems Contractor	Propulsion		Guidance Mfr.	Status
			Mfr.	Type		
SURFACE-TO-AIR						
ASMS	Navy	Raytheon	—	—	—	Early development
Chapparal	Army	Philco, Motorola	—	—	—	Advanced development
Hawk	Army	Raytheon	Aerojet	Solid	Raytheon	Operational
HIBEX	Army	Boeing		Solid		Early development
Nike-Hercules	Army	Western Electric	Hercules Powder & Thiokol	Solid	Western Electric	Operational
Nike-X	Army	Western Electric	Thiokol & Lockheed	Solid	Bell Telephone Labs.	Development
Redeye	Army	General Dynamics	Atlantic Research	Solid	Philco	Development
Sprint	Army	Martin				Development
Talos	Navy	Bendix	Bendix & McDonnell	Ramjet	Sperry	Operational
Tartar	Navy	General Dynamics	Aerojet	Solid	Raytheon	Operational
Terrier	Navy	General Dynamics	Allegany Ballistic Lab.	Solid	General Dynamics S. D. Hicks & Cameron Iron Works	Operational
Standard	Navy	General Dynamics	—	—	—	Advanced development
Sam-D	Army	—	—	Solid	—	Early development
AIR-TO-AIR						
Falcon	USAF	Hughes	Thiokol	Solid	Hughes	Operational
Genie MB-1	USAF	Douglas	Aerojet	Solid	Unguided	Operational
Phoenix	USAF-Navy	General Dynamics	Grumman & Hughes	Solid	General Precision	Development
Sidewinder 1-C	USAF-Navy	Philco & Motorola	Navy Propellant Plant	Solid	Philco & General Electric	Operational
Sparrow III	Navy	Raytheon	Aerojet	Solid	Raytheon	Operational
AIM-47A	USAF	Hughes	—	Solid	—	Early development

(Continued on next page)

MAJOR MISSILES IN DEVELOPMENT OR PRODUCTION—*Continued*

Project	Service	Systems Contractor	Propulsion		Guidance Mfr.	Status
			Mfr.	Type		
SURFACE-TO-SURFACE						
ASBD	Navy	—	—	—	—	Study
Davy Crockett	Army	Army Weapons Cmd.	—	Solid	—	Operational
Honest John	Army	Douglas & Emerson Electric	Hercules Powder	Solid	Unguided	Operational (Phasing Out)
Lance	Army	Chrysler & Ling-Temco-Vought	North American	Solid	Systron-Donner	Advanced development
Little John	Army	Emerson	Hercules	Solid	Unguided	Operational
Mace B	USAF	Martin	Thiokol & General Motors	Solid & Turbojet	Goodyear & General Motors	Operational
MAW	Army	McDonnell, Sperry Rand	Thiokol	Solid	Sperry Rand	Early development
Minuteman II & III	USAF	Boeing	Aerojet Thiokol	Solid	No. American	Operational
Pershing	Army	Martin	Thiokol	Solid	Bendix	Operational
Polaris	Navy	Lockheed	Aerojet	Solid	General Electric, Hughes, MIT	Operational
Poseidon	Navy	—	—	—	—	Early development
Sergeant	Army	Sperry	Thiokol	Solid	Sperry	Operational
Shillelagh	Army	Ford/Aeronutronics	Amco Chemical & Picatinny Arsenal	Solid	Clary, Whittaker	Operational
Titan II	USAF	Martin	Aerojet	Liquid	General Motors	Operational
TOW	Army	Hughes	—	Solid	—	Development

(*Continued on next page*)

MAJOR MISSILES IN DEVELOPMENT OR PRODUCTION—*Continued*

Project	Service	Systems Contractor	Propulsion		Guidance Mfr.	Status
			Mfr.	Type		
AIR-TO-SURFACE						
ATGAR	USAF	North American	—	—	—	Early development
Bullpup	Navy-USAF	Martin	Thiokol	Solid	Maxson Electronics	Operational
Shrike	Navy	Naval Ordnance Test Station	—	Solid	Texas Instruments	Operational
Zuni	Navy	Naval Ordnance Test	—	Solid	Unguided	Operational
SRAM	USAF	—	—	—	—	Early development
Walleye	Navy-USAF	Martin		Glide Bomb		Advanced development
Maverick	USAF					Early development
SURFACE-TO-UNDERWATER						
Alpha	Navy	In-House	—	Solid	—	Operational
Asroc	Navy	Honeywell	Honeywell	Solid	General Precision	Operational
UNDERWATER-TO-UNDERWATER						
Subroc	Navy	Goodyear	Thiokol	Solid	General Precision	Operational

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

INTERCONTINENTAL BALLISTICS MISSILES PRODUCED FOR THE AIR FORCE
Calendar Year 1961 to Date

Year Ending December 31	Weapons Systems in Acquisition December 31	Intercontinental Ballistic Missiles Delivered
1961	4	111
1962	4	186
1963	2	486
1964	1	405
1965	1	172
1966	1	221

Source: Air Force Systems Command, 1966 "Annual Report."

SPACE PROGRAMS

Efforts to achieve a manned lunar landing by 1970 continued to dominate the Fiscal Year 1967 program of the National Aeronautics and Space Administration. New obligational authority for the fiscal year amounted to about $5 billion. However, through use of carry-over funds from previous appropriations, NASA expenditures during FY 1967 are expected to amount to $5.6 billion. This is $330 million less than the previous year's high of more than $5.9 billion and is a result of the completion of the Gemini program.

The major portion of FY 1967 expenditures is devoted to the manned space flight program, $3.7 billion, with the balance being applied to such things as the advancement and application of space science and technology in unmanned space exploration ($1.2 billion), aircraft technology ($95 million) and NASA support activities ($460 million).

New obligational authority of slightly in excess of $5 billion has been requested for NASA for FY 1968. This money, although primarily intended to support the Apollo lunar landing program, marks the beginning of extending United States space capabilities beyond that of a manned lunar landing. Included are long-range preparations for the

further exploration of the moon, the use of manned space vehicles to conduct a variety of scientific and engineering experiments in space, unmanned exploration of Mars and Venus and improvements in space communications and weather prediction technology.

In addition to NASA space program expenditures, DoD and other federal agency procurements in space related activities are expected to amount to $1.9 billion in FY 1967 and $2 billion in FY 1968. The preponderant share of these and NASA funds is applied to the purchase of services, research and development programs and products of the aerospace industry.

United States space achievements reached a peak during 1966. Included were:

- Five successful Gemini flights which increased this country's space flight time experience by 309 man hours and conclusively demonstrated a capability for extra-vehicular activity, rendezvous and docking and orbital plane change. These five two-man flights brought this phase of America's manned space flight program to a close.
- Three satisfactory engineering evaluation test flights were also completed in the qualification of the uprated Saturn I with 205,000 pounds of thrust for three-man earth orbital flights of the command and service capsules.
- Satisfactory atmospheric testing of the ascent and descent engines which was conducted on the two-man, two-stage Lunar Module.

Near and deep space environmental analyses continued with the launching of two more Explorer satellites. Experiments included further examination of potential hazards to manned space flight and involved the measurement of magnetic fields, low energy particles in the solar wind and solar cosmic rays.

The first Surveyor spacecraft was launched on May 30 and made a soft landing on the lunar surface about 63 hours later. Exceeding all planned mission objectives, the spacecraft performed almost flawlessly both during a 234,200-mile flight to the moon and as it carried out complex operations on its surface. During the first lunar day Surveyor I sent back 10,338 high-quality, detailed photographs. After hibernating through the two-week lunar night, it was again turned on during the second lunar day and took 899 additional photographs.

The first in a series of five Lunar Orbiter spacecraft was launched in August. Lunar Orbiter photographed nine selected potential sites for manned landings on the moon. The spacecraft also provided the first pictures of the earth taken from the immediate vicinity of the moon. A second Lunar Orbiter spacecraft launched in November photographed 13 other selected potential Apollo landing sites.

The nation's operational meteorological satellite system was inaugurated with the launchings of Essa I and II. Based on the Tiros weather satellite design, these satellites are now providing, on a daily basis, global daytime cloud cover data to national users as well as local cloud pictures to Automatic Picture Transmission (APT) users throughout the world.

The large solid motor program progressed with the successful testing of a second 260-inch diameter solid rocket motor. This motor, identical to the first, developed a maximum thrust of over 3.5 million pounds and burned for about 2 minutes; test results were exceptionally close to the pre-firing predictions. Based on the success of the two test firings a follow-on contract has been negotiated for the firing in mid-1967 of a third motor with a thrust level of over 5 million pounds.

A single Titan IIIC successfully placed seven communications satellite repeaters and one experimental satellite into equatorial, near-synchronous orbit. A subsequent Titan IIIC was used to launch 11 DoD experiments and a modified Gemini spacecraft. The experiments and spacecraft provided test data in support of the Defense Department's Manned Orbiting Laboratory (MOL) for which the procurement of developmental hardware has been initiated.

In-space nuclear power generation, the first power conversion system, began operating, and components and subassemblies of the SNAP-27 generator were being delivered. Also, two major tests, associated with the Nerva reactor and engine system efforts, were conducted.

EXPENDITURES OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION BY PROGRAM TYPE
Fiscal Year 1964 to Date
(Millions of Dollars)

Program and Type of Activity	Actual			Estimate	
	1964	1965	1966	1967	1968
Total, National Aeronautics and Space Administration	4,171.0	5,092.9	5,933.0	5,600.0	5,300.0
Conduct of research: Total	1,003.2	1,059.1	1,315.9	1,400.0	1,526.0
Basic scientific research in space:					
Spacecraft, instrumentation, conduct of experiments, and supporting costs	408.4	295.8	414.6	505.0	695.0
Procurement of launch vehicles for basic research purposes	207.0	39.5	49.1	70.0	80.0
Other basic research in space science and technology	74.3	105.2	104.4	110.0	100.0
Subtotal, basic research	689.7	440.5	568.1	685.0	875.0
Other research	313.5	565.7	661.8	675.0	601.0
Procurement of launch vehicles for other research purposes	—	52.9	86.0	40.0	50.0
Conduct of development: Total	2,730.0	3,495.9	4,034.5	3,910.0	3,600.0
Manned space flight and supporting development	2,474.9	3,210.8	3,849.4	3,740.0	3,460.0
Development of launch vehicles for research purposes	—	94.3	85.8	60.0	30.0
Other development	255.1	190.8	99.3	110.0	110.0
Research and development facilities: Total	437.8	537.9	582.6	290.0	174.0
Facility grants to colleges and universities	—	7.0	10.1	10.0	14.0
Manned space flight and supporting facilities	346.0	444.0	484.5	200.0	110.0
Other research and development facilities	91.8	86.9	88.0	80.0	50.0

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

SPACECRAFT LAUNCHINGS AS OF APRIL 3, 1967

Country	TOTAL	Payloads in Earth Orbit	Payloads Decayed	Space Probes
TOTAL	681	269	388	24
United States	460	215	233	12
U.S.S.R.	211	45	154	12
U.S./Canada	2	2	—	—
U.S./U.K.	2	2	—	—
France	5	5	—	—
Italy	1	—	1	—

Source: National Aeronautics and Space Administration.

UNITED STATES SPACE LAUNCHINGS
1957 to Date

Year	Earth Satellite Attempts		Escape Payload Attempts	
	Success	Failure	Success	Failure
1957	–	1	–	–
1958	5	8	–	4
1959	9	9	1	2
1960	16	12	1	2
1961	35	12	–	2
1962	54	12	4	1
1963	60	11	–	-
1964	69	8	4	–
1965	94	8	3	-
1966	95	12	5	1[a]
TOTAL	437	93	18	12

NOTE: Information contained in this table is drawn from unclassified sources. Numbers are given in terms of separate payloads placed in earth orbit, sent to the moon, or placed in solar orbit.

[a] Failed to go to escape as intended, but did attain earth orbit.

Source: National Aeronautics and Space Council. "Report to the Congress from the President of the United States, United States Aeronautics and Space Activities, 1966."

CHRONOLOGY OF MANNED SPACE FLIGHTS

Launch Date	Project	Pilot	Nation	Duration
Suborbital				
May 5, 1961	Mercury-Redstone 3	Alan Shepard	USA	302 miles
July 21, 1961	Mercury-Redstone 4	Virgil Grissom	USA	303 miles
Orbital				
April 12, 1961	Vostok 1	Yuri Gagarin	USSR	1 Orbit
Aug 6, 1961	Vostok 2	Gherman Titov	USSR	17 Orbits
Feb 20, 1962	Mercury-Atlas 6	John Glenn	USA	3 Orbits
May 24, 1962	Mercury-Atlas 7	Scott Carpenter	USA	3 Orbits
Aug 11, 1962	Vostok 3	Andreyan Nikolayev	USSR	64 Orbits
Aug 12, 1962	Vostok 4	Pavel Popovich	USSR	48 Orbits
Oct 3, 1962	Mercury-Atlas 8	Walter Schirra	USA	6 Orbits
May 15, 1963	Mercury-Atlas 9	Gordon Cooper	USA	22 Orbits
June 14, 1963	Vostok V	Valery Byovsky	USSR	81 Orbits
June 16, 1963	Vostok VI	Miss Valentina Tereshkova	USSR	48 Orbits
Oct 12, 1964	Voskhod I	Vladimir M. Komarov Konstantin Feoktistiv Boris B. Yegorov	USSR	16 Orbits
Mar 18, 1965	Voskhod II	Pavel Belyayev Alexei Leonov	USSR	[a]
Mar 23, 1965	GT-3	Virgil I. Grissom John W. Young	USA	3 Orbits
June 3, 1965	GT-4	James A. McDivitt Edward H. White II	USA	63 Orbits
Aug 21, 1965	GT-5	L. Gordon Cooper Charles Conrad	USA	120 Orbits
Dec 4, 1965	GT-7	Frank Borman James A. Lovell, Jr.	USA	206 Orbits
Dec 15, 1965	GT-6[b]	Walter M. Schirra, Jr. Thomas P. Stafford	USA	17 Orbits
Mar 16, 1966	GT-8	Neil A. Armstrong David R. Scott	USA	7 Orbits
June 8, 1966	GT-9	Thomas P. Stafford Eugene A. Cernan	USA	44 Orbits
July 18, 1966	GT-10	John W. Young Michael Collins	USA	43 Orbits
Sept 12, 1966	GT-11	Charles Conrad, Jr. Richard F. Gordon, Jr.	USA	44 Orbits
Nov 11, 1966	GT-12	James A. Lovell, Jr. Edwin E. Aldrin, Jr.	USA	59 Orbits

[a] Actual number in doubt.
[b] Mission originally scheduled October 25, 1965, postponed when Agena target vehicle failed to achieve orbit.
Source: National Aeronautics and Space Administration.

CHRONOLOGY OF MAJOR UNITED STATES SPACE LAUNCHINGS

Date	Apollo Launch	Purpose
1966		
Jan 20	Apollo Launch Escape	Intermediate Altitude Abort Test
Feb 3	ESSA I	Operational Weather Satellite
Feb 26	Saturn 1B	Launch Vehicle Spacecraft Test
Feb 28	ESSA II	Operational Weather Satellite
Mar 16	GT V	Gemini Rendezvous/Docking Vehicle
Mar 16	GT 8	Two-man Rendezvous/Docking GT V
Mar 30	OVI 4	Biological Test Observations
Apr 7	Surveyor	Atlas-Centaur Development
May 15	Nimbus II	Meteorological Observations
May 25	Explorer XXXII	Upper Atmospheric Observations
May 30	Surveyor I	Lunar Soft-landing
Jun 3	Gemini IX	Manned Space Rendezvous/Docking
Jun 7	OGO III	Geophysical Observations
Jun 9	Secor VI	Geodetic Measurements
Jun 16	GGTS-1	Gravity Gradient Stabilization Tests
Jun 16	Titan III C	Interim Defense Communications Satellite System
Jul 1	Explorer XXXIII	Earth Magnetohydrodynamic Wake Observations
Jul 5	Apollo	Saturn IV B Evaluation
Jul 18	Gemini X	Manned Space Rendezvous/Docking
Aug 10	Lunar Orbiter I	Lunar Photo Mission
Aug 17	Pioneer VII	Deep Space Scientific Observations
Aug 22	Apollo	Saturn I B System Test
Sep 12	Gemini XI	Manned Space Rendezvous/Docking
Sep 20	Surveyor II	Lunar-Transfer Trajectory Test
Oct 2	ESSA III	Satellite Weather Observation
Oct 26	Surveyor	Atlas-Centaur Development
Oct 27	Intelstat II A	Transfer Orbit
Nov 3	Titan III C	Test Data
Nov 6	Lunar Orbiter II	Lunar Photo Mission
Nov 11	Gemini XII	Manned Space Rendezvous/Docking
Dec 6	ATS-1	Space Technology Application
Dec 14	Biosatellite I	Biological Observations
Dec 21	Prime XV-5D	Lifting Body Spacecraft Development

NOTE: For data for earlier years, see earlier editions of "Aerospace Facts and Figures." This chronology of major U.S. space programs includes the successful, partially successful, and unsuccessful launchings of all vehicles larger than sounding rockets.
Source: National Aeronautics and Space Administration.

EXPENDITURES FOR SPACE ACTIVITIES
Fiscal Years, 1955 to Date
(Millions of Dollars)

Year Ending June 30	TOTAL	National Aeronautics and Space Administration[a]	Department of Defense[b]	Other
1955	$ 75	$ 74	$ 1	—
1956	100	71	17	$ 12
1957	150	76	48	26
1958	249	89	136	24
1959	521	146	341	34
1960	960	401	518	41
1961	1,518	744	710	64
1962	2,418	1,257	1,029	132
1963	4,114	2,552	1,368	194
1964	5,970	4,171	1,564	235
1965	6,886	5,035	1,592	259
1966	7,719	5,858	1,638	223
1967[E]	7,403	5,505	1,680	218
1968[E]	7,230	5,190	1,840	200

NOTE: Most of the activities of the National Aeronautics and Space Administration are classified as Research and Development. See chapter on Research and Development for additional tables.
[E] Estimate.
[a] Excludes amount for aircraft technology beginning with 1965.
[b] This includes the astronautics budget activity and other activities which contribute to the space effort.
Source: "The Budget of the United States Government" (Annually).

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
EXPENDITURES BY BUDGET FUNCTION
Fiscal Years, 1959 to Date
(Millions of Dollars)

Year Ending June 30	TOTAL EXPENDITURES	Research and Development	Construction of Facilities	Administrative Operations
1959	$ 145	$ 34	$ 25	$ 87
1960	401	256	54	91
1961	744	487	98	159
1962	1,257	936	114	207
1963	2,552	1,912	225	417
1964	4,171	3,317	438	416
1965	5,093	3,984	531	578
1966	5,933	4,741	573	619
1967[E]	5,600	4,681	280	639
1968[E]	5,300	4,470	160	670

[E] Estimate.
Source: "The Budget of the United States Government" (Annually).

SALES AND BACKLOG REPORTED BY MAJOR MANUFACTURERS OF
SPACE VEHICLE SYSTEMS
Calendar Years 1961 to Date
(Millions of Dollars)

Year Ending December 31	Net Sales During Year			Backlog, December 31		
	TOTAL	Military[a]	Non-military	TOTAL	Military[a]	Non-military
1961	$ 763	$ 551	$ 212	$ 596	$368	$ 228
1962	1,319	712	607	881	577	304
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	2,723	746	1,977	1,51	447	1,069

NOTE: Based on data from 60 companies engaged in the manufacture of aerospace products.
[a] Data for military space vehicle systems exclude engines and propulsion units, those for nonmilitary space vehicle systems include engines and propulsion units. For sales and backlog of military engines and propulsion units, see chapter on missiles, page 47.
Source: Bureau of the Census, "Current Industrial Reports, Series M37D" (Quarterly).

U.S. Man Hours Space Flight Time Log

Mission	Launch Date	Man Hours In Mission		Total Cumulative Time	
		Hrs.	Min.	Hrs.	Min.
MR-3 (Shepard)	May 5, 1961	—	15	—	15
MR-4 (Grissom)	Jul 21, 1961	—	15	—	30
MA-6 (Glenn)	Feb 20, 1962	4	55	5	25
MA-7 (Carpenter)	May 24, 1862	4	56	10	21
MA-8 (Schirra)	Oct 3, 1962	9	13	19	34
MA-9 (Cooper)	May 15, 1963	34	20	53	54
Gemini 3 (Grissom, Young)	Mar 23, 1965	9	46	63	40
Gemini 4 (McDivitt, White)	Jun 3, 1965	195	53	259	33
Gemini 5 (Cooper, Conrad)	Aug 21, 1965	381	51	641	24
Gemini 6 (Schirra, Stafford)	Dec 15, 1965	51	43	693	07
Gemini 7 (Borman, Lovell)	Dec 4, 1965	661	10	1,354	17
Gemini 8 (Armstrong, Scott)	Mar 16, 1966	21	12	1,375	29
Gemini 9 (Stafford, Cernan)	Jun 3, 1966	72	21	1,447	50
Gemini 10 (Young, Collins)	Jul 18, 1966	70	46	1,518	36
Gemini 11 (Conrad, Gordon)	Sep 12, 1966	71	17	1,589	53
Gemini 12 (Lovell, Aldrin)	Nov 11, 1966	94	34	1,684	27

Source: National Aeronautics and Space Administration.

United States Space Launch Vehicles

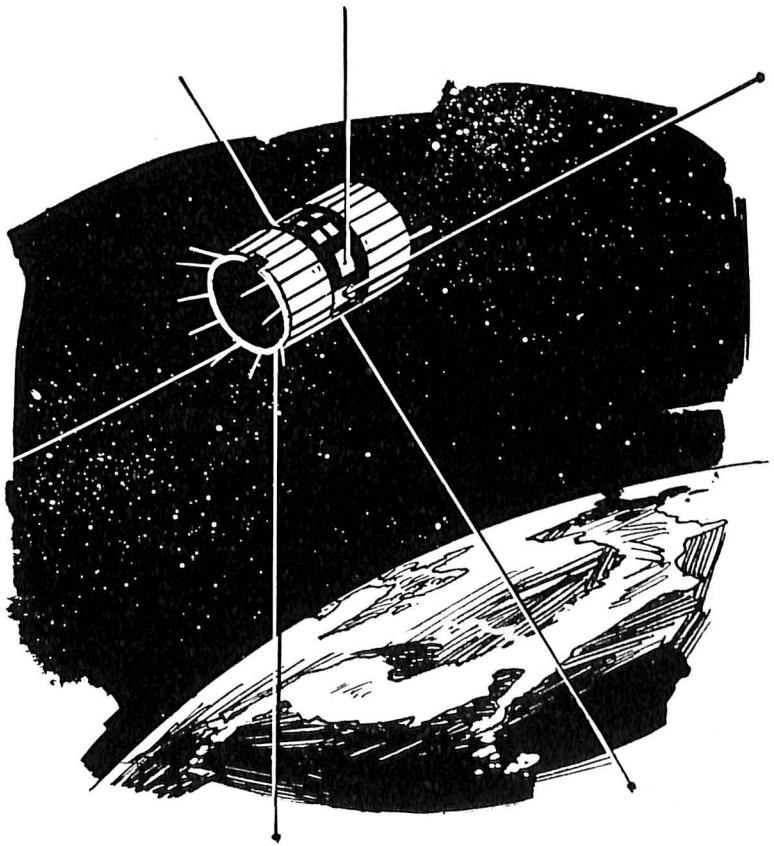
Vehicle	Stages	Thrust (in thousands of pounds)	Payload (pounds)	
			300 NM Orbit	Escape
Scout	1. Algol (IIB)* 2. Castor II* 3. Antares II* 4. Altair III*	88 60.5 22 5.9	320	50
Thor Delta	1. Thor (DSV-3E-1) 2. Delta (DSV-3) 3. Altair III*	169 7.1 5.8	950	150
Thrust augmented Thor Delta	1. Thor (DSV-3E-1) plus three TX33-52* 2. Delta (DSV-3) 3. Altair III*	169 plus 54 each 7.1 5.8	1,275 —	275
Thor Agena	1. Thor (DM-21) 2. Agena	170 16	1,600	—
Thrust augmented Thor Agena	1. Thor (DM-21) plus 3 TX 33-52* 2. Agena	170 54 each 16	2,200	—
Atlas Agena	1. Atlas booster and sustainer 2. Agena	388 16	6,300	1,150
Titan II (GLV)	1. Two LR-87 2. LR-91	430 100	(8,000 @ 105 NM)	—
Titan IIIA	1. Two LR-87 2. LR-91 3. Transtage	430 100 16	5,000	—
Titan IIIB Agena	1. Two LR-87 2. LR-91 3. Agena	430 100 16	7,700	1,700
Titan IIIC	1. Two 5-segment 120" diameter* 2. Two LR-87 3. LR-91 4. Transtage	2,400 430 100 16	23,000	5,000

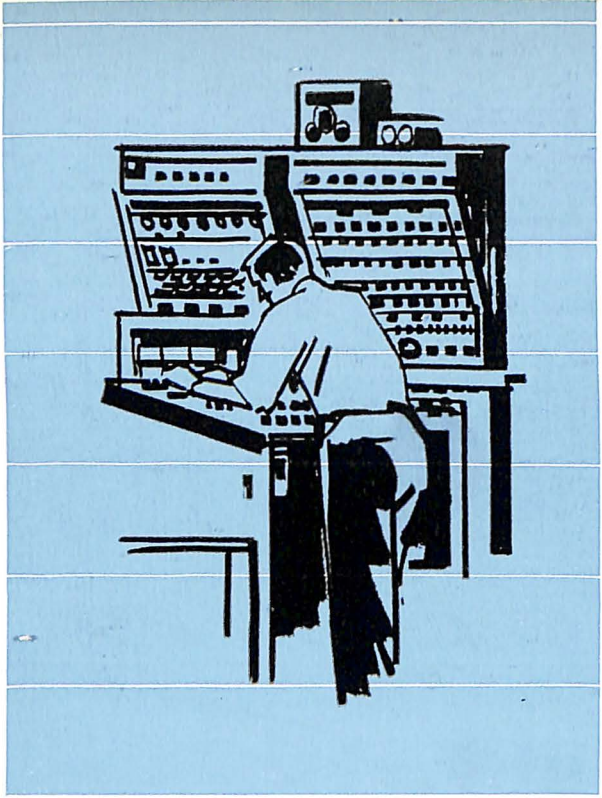
(*Continued on next page*)

UNITED STATES SPACE LAUNCH VEHICLES—*Continued*

Atlas Centaur	1. Atlas booster and sustainer 2. Centaur (Two RL-10)	388 30	8,500	2,300
Saturn I	1. S-I (8 H-1) 2. SIV (6 RL-10)	1,500 90	15,000	—
Uprated Saturn I	1. S-IB (8 H-1) 2. S-IVB (1 J-2)	1,600 205	23,500 (40,500 @ 105 NM)	
Saturn V	1. S-IC (5 F-1) 2. S-II (5 J-2) 3. SIVB (1 J-2)	7,500 1,025 205	220,000 (285,000 @ 105 NM)	95,000

* Solid propellant, all other are liquid.
Source: National Aeronautics and Space Administration.





RESEARCH AND DEVELOPMENT

Recognizing that the continued advancement of science and technology for both defense needs and domestic progress is an important responsibility of the federal government, expenditures for government sponsored research and development continue at a significant rate.

During Fiscal Year 1966 this effort amounted to over $16 billion, or about 15 percent of total federal expenditures, with an additional $1 billion being used for the improvement of existing or the construction of new research and development facilities. Federal expenditures for research and development activities including facilities in FY 1967 and FY 1968 are, according to the Bureau of the Budget, expected to exceed $16.5 billion and $17.1 billion respectively.

These increases reflect to a large extent the broadening support being funneled by the government into such research areas as marine science and technology, urban development programs, atmospheric and environmental sciences and control projects and the improvement of systems for the management and application of scientific and technical information.

By far the greatest portion of federal research and development funds are aerospace industry oriented. In addition to National Aeronautics

and Space Administration space activities which are preponderantly so oriented, a summary of which is presented in the previous chapter, nearly 60 percent of Department of Defense expenditures for RDT&E during FY 1966 were devoted to advancing the technology in aircraft, missiles, military astronautics and related equipment. A small increase is estimated in these areas in FY 1967.

Supplementing federal research and development funds are increasing expenditures by aerospace companies toward the furtherance of both basic research and applied research and development. For 1965—the latest date available—company-funded activities in these areas exceeded $620 million, up more than 39 percent from the previous year.

NASA PROGRAMS. Supplementing the extensive NASA space activities, NASA increased its efforts in aircraft technology research and development. Expenditures for FY 1967 are estimated at $97 million, up

FEDERAL EXPENDITURES FOR RESEARCH AND DEVELOPMENT
Fiscal Years, 1954 to Date
(Millions of Dollars)

Year Ending June 30	TOTAL	Department of Defense	National Aeronautics and Space Administration	Atomic Energy Commission	Other
1954	$ 3,148	$2,487	$ 90	$ 383	$ 188
1955	3,308	2,630	74	385	219
1956	3,476	2,639	71	474	262
1957	4,462	3,371	76	657	358
1958	4,990	3,664	89	804	433
1959	5,803	4,183	145	877	598
1960	7,738	5,654	401	986	697
1961	9,278	6,618	744	1,111	805
1962	10,373	6,812	1,251	1,284	1,026
1963	11,988	6,849	2,540	1,335	1,264
1964	14,674	7,516	4,171	1,503	1,484
1965	13,753	6,623	4,555	1,241	1,334
1966	14,971	6,675	5,350	1,213	1,733
1967[E]	15,763	7,104	5,310	1,275	2,074
1968[E]	16,292	7,596	5,126	1,370	2,200

NOTE: Includes military personnel, procurement, civil functions, and some other items not included in other tables in this chapter. Excludes R&D facilities.
[E] Estimate.
Source: "The Budget of the United States Government" (Annually).

$28 million from the previous fiscal year. During 1966 continuing research effort was devoted to aircraft dynamics, light-weight structural concepts, supersonic aircraft propulsion systems and aircraft ground operating problems. Twenty additional flights were conducted in the three X-15 research aircraft for additional data gathering with respect to manned maneuverable flight at hypersonic speeds.

MILITARY PROGRAMS. Major military aerospace industry R&D during 1966 (exclusive of missile and space programs discussed in other chapters) included basic and applied research in subjects of potential military significance: exploratory, advanced and engineering development of new systems, and development of systems approved for introduction into the operational forces. Highlights included:

Initiation of prototype production of the C-5 military cargo aircraft.

Successful progress in the flight testing of prototype models of the F-111 variable geometry aircraft.

Approval of a development program for strategic bomber and reconnaissance version of the F-111.

Continuation of studies designed to lead possibly to an advanced Air Force and Navy tactical fighter.

Approval for production of an Air Force-Marine counter insurgency aircraft (COIN).

Start of an Army helicopter developmental program for an advanced aerial fire support system.

Continued tri-service efforts in V/STOL aircraft developmental programs.

DEPARTMENT OF DEFENSE
EXPENDITURES FOR RESEARCH, DEVELOPMENT, TEST AND EVALUATION
Fiscal Years 1951 to Date
(Millions of Dollars)

Year Ending June 30	Department of Defense	Air Force	Navy	Army	Other
1951	$ 758	N.A.	N.A.	N.A.	N.A.
1952	1,165	N.A.	N.A.	N.A.	N.A.
1953	2,148	N.A.	N.A.	N.A.	N.A.
1954	2,187	N.A.	N.A.	N.A.	N.A.
1955	2,261	N.A.	N.A.	N.A.	N.A.
1956	2,101	N.A.	N.A.	N.A.	N.A.
1957	2,406	N.A.	N.A.	N.A.	N.A.
1958	2,504	N.A.	N.A.	N.A.	N.A.
1959	2,866	N.A.	N.A.	N.A.	N.A.
1960	4,710	N.A.	N.A.	N.A.	N.A.
1961	6,131	$3,300	$1,435	$1,207	$189
1962	6,319	3,493	1,364	1,280	181
1963	6,376	3,301	1,429	1,355	291
1964	7,022	3,722	1,578	1,338	384
1965	6,236	3,146	1,294	1,344	452
1966	6,259	2,948	1,407	1,412	492
1967[E]	6,700	3,060	1,660	1,500	480
1968[E]	7,200	3,280	1,840	1,590	490

NOTE: For RDT&E for aircraft, missiles and astronautics *only*, see page 70.
N.A.—Not available.
[E] Estimate.
Source: Department of Defense, Report "FAD 558," January 24, 1967.

ATOMIC ENERGY COMMISSION. During 1966 the joint NASA/AEC nuclear-rocket program progressed, on the basis of successful ground tests, from a graphite reactor engine system technology program into a combined technology and engine system development program while the space electric power program moved from the developmental to the application phase.

OTHER PROGRAMS. In addition to these federal research and development programs, many other agencies sponsor science and technology advancement programs. In FY 1966, expenditures for such programs amounted to $1.9 billion and according to the Bureau of the Budget are expected to exceed $2.3 billion in FY 1967. The nature and implications of these programs in terms of the aerospace industry are discussed on pages 7 and 8 with statistical tables on pages 24 and 71.

DEPARTMENT OF DEFENSE
EXPENDITURES FOR RESEARCH, DEVELOPMENT, TEST AND EVALUATION, BY FUNCTIONS
Fiscal Years, 1960 to Date
(Millions of Dollars)

Year Ending June 30	TOTAL, ALL RDT&E FUNCTIONS	AEROSPACE				Other
		TOTAL	Aircraft	Missiles	Astronautics	
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[E]	6,700	4,225	1,099	2,189	937	2,475
1968[E]	7,200	4,590	1,156	2,388	1,046	2,610

[E] Estimate.
Source: Department of Defense, Report "FAD 558," January 24, 1967.

INDUSTRIAL RESEARCH AND DEVELOPMENT, ALL INDUSTRIES AND THE AEROSPACE INDUSTRY
CALENDAR YEARS 1956 TO DATE
(Millions of Dollars)

Year Ending December 31	TOTAL, RESEARCH AND DEVELOPMENT	AEROSPACE[a]		
		Total	Federal Government Funds	Company Funds
1956	$6,605	$2,138	N.A.	N.A.
1957	7,731	2,574	$2,275	$299
1958	8,389	2,609	2,276	333
1959	9,618	3,090[r]	2,754[r]	336[r]
1960	10,509	3,514[r]	3,150[r]	364[r]
1961	10,908	3,829[r]	3,438[r]	392[r]
1962	11,464	4,042[r]	3,588[r]	454[r]
1963	12,630[r]	4,712[r]	4,261	451[r]
1964	13,512[r]	5,055[r]	4,610[r]	445[r]
1965	14,197	5,120	4,500	620

N.A.—Not available.
[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.
Sources: National Science Foundation, Aerospace Industries Association.

INDUSTRIAL RESEARCH AND DEVELOPMENT IN AEROSPACE, BY TYPE OF RESEARCH AND FUND SOURCE[a]
Calendar Years 1957 to Date
(Millions of Dollars)

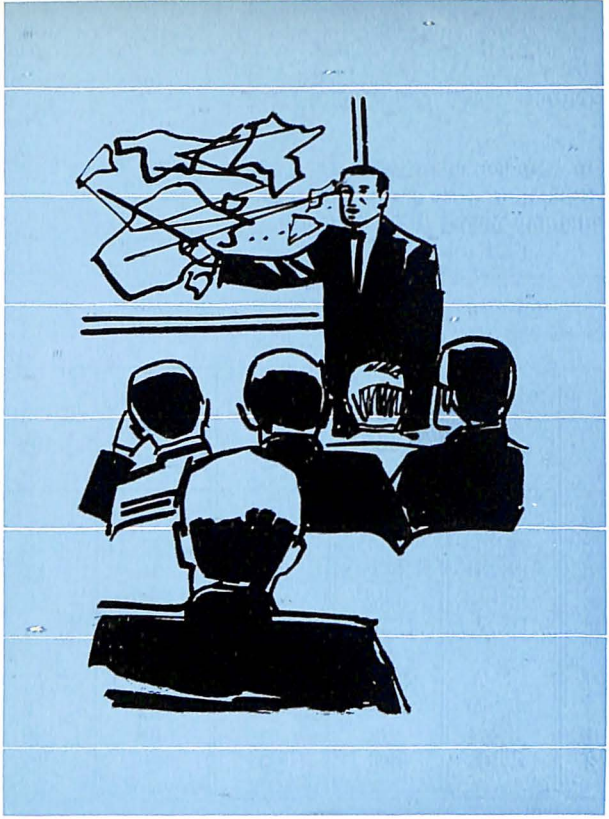
Year Ending December 31	TOTAL AEROSPACE	Applied Research and Development Funds			Basic Research Funds		
		Total	Federal Government	Company	Total	Federal Government	Company
1957	$2,574	$2,549	N.A.	N.A.	$25	N.A.	N.A.
1958	2,609	2,583	$2,266	$317	26	$10	$16
1959	3,110	3,078	2,751	327	32	18	14
1960	3,558	3,496	3,148	348	62	32	30
1961	3,904	3,864	N.A.	N.A.	40	N.A.	N.A.
1962	4,147	4,091	N.A.	N.A.	55	N.A.	N.A.
1963	4 846	4,787	4,341	446	60	32	28
1964	5,097	5,038	4,578	460	59	30	29
1965	5,120	5,052	4,461	591	68	39	29

N.A.—Not available.
[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.
Source: National Science Foundation, Aerospace Industries Association.

RESEARCH AND DEVELOPMENT EXPENDITURES
(Other than Department of Defense, National Aeronautics and Space Administration and Atomic Energy Commission)
FISCAL YEARS 1966 to 1968
(Millions of Dollars)

AGENCY	Actual	Estimate
	Years ending June 30	
	1966	1967	1968
TOTAL	$1,886.6	$2,266.2	$2,474.4
Agriculture, Department of	249.0	281.2	310.8
Commerce, Department of	76.4	63.1	79.1
Health, Education and Welfare, Department of	877.1	1,095.8	1,183.5
Interior, Department of	144.7	164.4	224.6
Labor, Department of	23.1	26.5	29.9
Transportation, Department of	183.3	273.3	219.0
National Science Foundation	234.5	253.5	303.7
Veterans Administration	42.2	47.1	49.5
Other	56.3	61.3	74.3

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



EXPORTS

A record postwar year in aerospace export sales was achieved in 1966. Exports reached $1.5 billion, a 4.2 percent increase over 1965, reflecting substantial and continuing gains in the commercial jet transport, general aviation and internal combustion engine categories.

Commercial transport exports reached their highest level since 1960, up 19.2 percent in value over 1965 (from $353 million to $421 million). The largest gain was in the value of passenger transport shipments which rose from $261.4 million to $338.6 million.

General aviation airplane exports also showed a large increase, from $71 million in 1965 to nearly $91 million in 1966, a 28 percent gain. This increase is attributed primarily to the developing need for air transportation in other countries and the ability of American manufacturers to meet it.

Helicopters and other rotary wing exports for 1966 were valued at $29.0 million, a decrease of $10.5 million from the previous year. Although overall helicopter production in the United States reached an all time high, the number of such aircraft available for export was restricted

EXPORTS

U. S. Aerospace Exports, 1965, 1966
Units and Value

	Units		Value (Millions of Dollars)	
	1966	1965	1966	1965
TOTAL VALUE, All Aerospace Exports	—	—	$1,536.3	$1,474.2
Aircraft, Total	4,077	3,697	1,080.6	1,056.8
Transports	133	116	464.4	416.3
Military	51	40	43.6	63.5
Passenger, new	2	3	1.8	0.3
Cargo, new	49	37	41.8	63.2
Nonmilitary	82	76	420.8	352.8
Under 33,000 lbs. new	6	16	0.2	4.9
Passenger	2	15	0.1	4.8
Cargo	4	1	0.1	0.1
33,000 lbs. and over, new	76	60	420.6	347.9
Passenger	61	47	338.6	261.4
Cargo	5	2	13.6	14.6
Passenger/cargo	10	11	68.4	71.9
General Aviation	3,046	2,562	90.7	71.0
Military, new	61	105	1.6	2.1
Nonmilitary	2,985	2,457	89.1	68.9
Single engine, new	2,387	2,031	35.2	30.7
Multi-engine, under 3,000 lbs. new	261	184	13.4	8.4
Multi-engine, 3,000 lbs. and over, new	337	242	40.5	29.8
Rotary Wing	224	234	29.0	39.5
Military, new	63	57	17.5	23.3
Nonmilitary	161	177	11.5	16.2
Under 2,000 lbs. new	119	110	5.1	4.7
2,000 lbs. and over	42	67	6.4	11.5
Fighters, including bombers, military, new	137	163	107.6	156.6
Trainers, military, new	95	124	31.8	57.1
Other aircraft, including used	442	498	50.6	40.3
Military	31	79	4.0	0.9
Nonmilitary	411	419	46.6	39.4
Parts and accessories for aircraft, NEC	—	—	306.5	276.0
Engines, Total	5,030	4,238	292.2	256.1
Jet and gas turbines, new and used	802	757	69.1	60.9
Military	238	385	19.8	22.1
Nonmilitary	564	372	49.3	38.8
Missile turbines	340	203	4.1	5.1
Internal combustion	3,888	3,278	35.0	20.3
Military, new and used	446	320	7.3	2.9
Nonmilitary	3,442	2,958	27.7	17.4
Under 500 h.p., new	1,714	1,491	6.7	4.8
500 h.p. and over, new	354	175	9.1	2.2
Used	1,374	1,292	11.0	10.4
Spare parts	—	—	184.0	169.8
Jet and gas turbine	—	—	67.5	52.9
Missile turbine	—	—	0.7	0.7
Internal combustion	—	—	115.8	116.2
Other Parts and Equipment, NEC	—	—	163.5	161.3

Source: Bureau of the Census, Report FT410 (Monthly).

largely as a result of growing domestic applications and increasing demands for Vietnam.

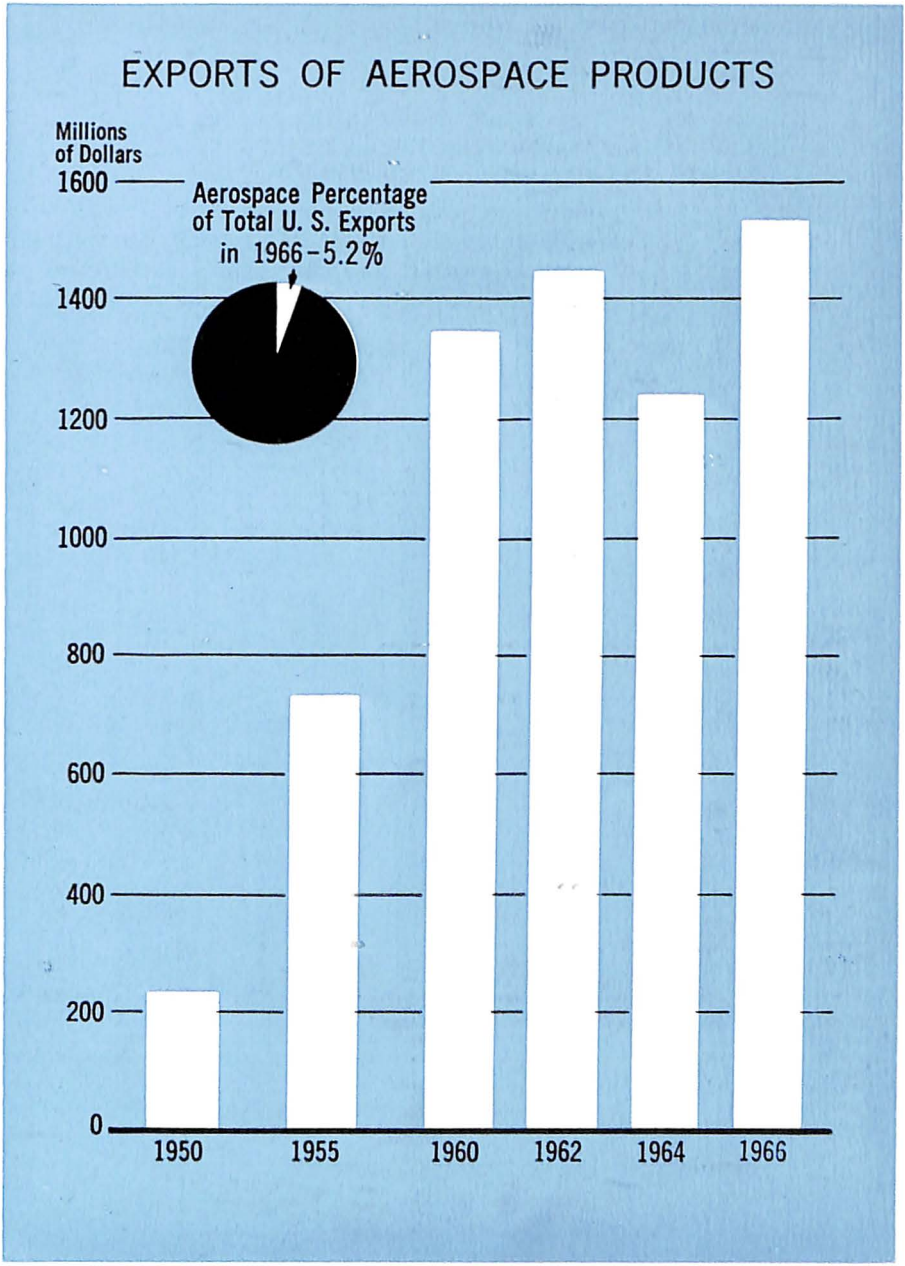
Exports of military aircraft and engines for 1966 were $237.3 million, a decrease of more than $96 million since 1965. As in the case of rotary wing exports, the decrease was largely attributable to domestic and Vietnam requirements.

Sales abroad during 1966 of piston and gas turbine engines, both military and non-military and including parts, were $292.2 million, an increase of more than 14 percent over 1965.

U. S. AEROSPACE EXPORTS
Calendar Years 1948 to Date
(Millions of Dollars)

Year Ending Dec 31	TOTAL AEROSPACE PRODUCTS	Nonmilitary				
		Transports	Utility	Engines	Rotary Wing	Other
1948	$ 153.6	$ 37.4	$ 4.2	$0.3	$ 1.9	$ 109.8
1949	283.0	22.2	2.8	0.1	1.2	256.6
1950	242.4	40.4	2.2	0.3	0.9	198.6
1951	301.4	13.2	3.7	0.5	0.9	283.1
1952	603.2	18.2	5.6	0.9	1.4	577.1
1953	880.6	79.2	5.4	0.7	4.9	790.4
1954	618.9	93.0	4.5	1.5	4.0	502.9
1955	727.5	81.2	7.4	2.0	4.2	632.7
1956	1,059.3	132.9	11.0	3.5	3.7	908.2
1957	1,028.0	179.3	13.1	8.7	11.9	815.0
1958	972.3	147.2	12.1	4.3	9.6	799.1
1959	769.5	107.6	14.5	2.4	8.2	636.8
1960	1,329.5	480.1	23.6	3.7	7.7	814.4
1961	1,210.0	267.6	27.5	4.4	6.8	903.7
1962	1,435.5	254.9	23.1	4.5	8.8	1,144.2
1963	1,240.1	191.0	26.9	3.6	9.8	1,008.8
1964	1,212.4	211.0	33.3	5.3	14.6	948.2
		Military and Nonmilitary				
1965	1,472.2	416.3	71.0	256.1[a]	39.5	691.3[b]
1966	1,536.3	464.4	90.7	292.2[a]	29.0	660.0[b]

[a] Includes military data which were formerly included in "Other."
[b] Includes new military aircraft, other aircraft and parts, accessories and equipment.
NOTE: Export figures since 1965 have been collected on a basis different from that used in previous years and the new data are generally not comparable with previous figures. This issue includes a summary of 1965 and 1966 data on page 73. New series will be included in future issues.
Source: Bureau of the Census, "U.S. Exports of Domestic and Foreign Merchandise, Report FT410" (Monthly).



For statistical data on which this chart is based, see U.S. Exports, Page 20, and U.S. Aerospace Exports, Page 74.

EXPORTS OF NEW NONMILITARY PASSENGER TRANSPORT AIRCRAFT
Calendar Years 1948 to 1964
(See Note)

Year Ending Dec 31	TOTAL		3,000–14,999 lbs airframe weight		15,000–29,999 lbs airframe weight		30,000 lbs & over airframe weight	
	Number	Value (Millions)	Number	Value (Millions)	Number	Value (Millions)	Number	Value (Millions)
1948	91	$37.4	34	$2.4	14	$4.2	43	$30.8
1949	51	22.2	16	1.3	25	7.6	10	13.4
1950	48	40.4	4	.4	15	6.6	29	33.4
1951	26	13.2	13	1.1	1	[a]	12	12.1
1952	25	18.2	9	.6	1	.6	15	17.0
1953	87	79.2	17	1.3	13	7.5	57	70.4
1954	110	93.0	29	2.0	7	4.0	74	87.0
1955	95	81.2	39	2.5	5	2.4	51	76.3
1956	151	132.9	64	4.7	2	.8	85	127.4
1957	203	179.3	94	7.7	9	6.9	100	164.7
1958	128	147.2	36	3.5	9	5.6	83	138.1
1959	65	107.6	23	2.3	3	1.7	39	103.6
1960	159	480.1	57	6.7	10	9.1	92	464.3
1961	120	267.6	64	7.7	4	3.5	52	256.4
1962	172	254.9	120	11.1	2	2.7	50	241.1
1963	181	191.0	147	14.6	4	3.6	30	172.8
1964	225	211.1	188	22.1	5	7.0	32	182.0

NOTE: Export figures since 1965 have been collected on a basis different from that used in previous years and the new data are generally not comparable with previous figures. This issue includes a summary of 1965 and 1966 data on page 73. New series will be included in future issues.

[a] Less than $500,000.

Source: Bureau of the Census, "U. S. Exports of Domestic & Foreign Merchandise, Report FT 410" (Monthly).

Exports of General Aviation Aircraft Under 3000 Pounds Airframe Weight Calendar Years 1948 to 1964 (See Note 2)

Year Ending Dec. 31	Total		3-Places or less		4-Places and over	
	Number	Value (Millions)	Number	Value (Millions)	Number	Value (Millions)
1948.....	935	$4.2	552	$1.5	383	$2.7
1949.....	510	2.8	235	.7	275	2.1
1950.....	408	2.2	173	.5	235	1.7
1951.....	540	3.7	237	1.0	303	2.7
1952.....	815	5.6	551	3.1	264	2.5
1953.....	776	5.4	370	1.5	406	3.9
1954.....	529	4.5	223	1.1	306	3.4
1955.....	748	7.4	296	1.9	453	5.5
1956.....	966	11.0	340	2.5	626	8.5
1957.....	1,086	13.1	368	2.5	718	10.6
1958.....	986	12.1	268	2.2	628	9.9
1959.....	1,033	14.5	384	3.6	639	10.9
1960.....	1,528	23.6	374	3.0	1,154	20.6
1961.....	1,646	27.5	582	4.3	1,064	23.2
1962.....	1,458	23.1	431	3.8	1,027	19.3
1963.....	1,583	26.9	484	5.7	1,099	21.2
1964.....	1,834	33.3	640	7.4	1,194	25.9

Note 1: This table excludes light transports such as the Aero Commander, Beech 18, etc., which are included in other tables in this chapter.

Note 2: Export figures since 1965 have been collected on a basis different from that used in previous years and the new data are generally not comparable with previous figures. This issue includes a summary of 1965 and 1966 data on page 73. New series will be included in future issues.

Source: Bureau of the Census, "U. S. Exports of Domestic & Foreign Merchandise, Report FT 410" (Monthly).

EXPORTS OF LIGHT TRANSPORTS AND GENERAL AVIATION AIRCRAFT UNDER 20,000 POUNDS AIRFRAME WEIGHT, BY SELECTED U. S. MANUFACTURERS
Calendar Years, 1960 to Date

Year Ending December 31	Number	Value (Thousands of Dollars)
1960	1,481	$27,312.6
1961	1,583	29,789.8
1962	1,458	30,938.7
1963	1,579	35,060.6
1964	1,775	44,118.4
1965	2,242	59,596.1
1966	2,903	75,373.3

NOTE: Data based on exports for Aero Commander, Beech, Cessna, Lear Jet, and Piper of new civil aircraft under 20,000 pounds, empty airframe weight.
NOTE: This table shows the exports of selected AIA member companies which sell both utility aircraft (under 3,000 lbs.) and light transports (3,000 lbs. to 20,000 lbs.) While they export fewer aircraft than the entire general aviation industry shown on page 73, the inclusion of the light transports accounts for the higher value of the exports.
r Revised.
Source: Aerospace Industries Association, company reports.

EXPORTS OF LIGHT TRANSPORTS AND GENERAL AVIATION AIRCRAFT, BY SELECTED U. S. MANUFACTURERS, BY DESTINATION, CALENDAR YEAR 1966

Total and Destination	Number	Value (Thousands of Dollars)
TOTAL	2,903	$75,373.3
Europe	865	28,229.7
Africa	294	5,425.2
Asia	85	3,009.5
Oceania	3[illegible]	6,368.9
Canada	408	8,803.3
Latin America	892	23,493.2
Not distributed by area	3	43.5

NOTE: Data based on exports of new civil aircraft under 20,000 pounds, empty airframe weight..
Source: Aerospace Industries Association, company reports.

MUTUAL SECURITY PROGRAM, SHIPMENT OF MILITARY AIRCRAFT
FISCAL YEARS 1950 TO DATE

Year Ending June 30	Total	Air Force	Navy
1950	251	818	283
1951	850		
1952	1,317	1,124	193
1953	2,689	2,274	415
1954	1,170	923	247
1955	1,292	1,138	154
1956	2,659	2,580	79
1957	2,182	2,085	97
1958	1,714	1,565	149
1959	620	528	92
1960	355	317	38
1961	483	427	56
1962	358	341	17
1963	456	439	17
1964	499	409	90
1965	568	488	80
1966	387	379	8
TOTAL[a]	17,850	15,835	2,015

[a] October 6, 1949 to June 30, 1966.
Source: Department of Defense.

U. S. AEROSPACE IMPORTS
Calendar Years 1955 to Date
(Thousands of Dollars)

Year Ending Dec 31	TOTAL	Aircraft[a]	Aircraft Engines	Aircraft Parts, N.E.C.
1955	$32,096	$14,415	$1,265	$16,416
1956	86,790	55,594	2,300	28,896
1957	52,671	15,476	1,639	35,556
1958	78,560	32,715	5,991	39,854
1959	68,066	16,273	7,510	44,283
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

[a] Aircraft includes new and used airplanes, seaplanes, and amphibians.
Source: Bureau of the Census, "U. S. Imports of Merchandise for Consumption, Report FT 110, 125" (Monthly).

U. S. EXPORTS OF NEW SMALL AIRCRAFT ENGINES[a] FOR CIVILIAN AIRCRAFT
Calendar Years 1948 to 1964
(See Note)

Year Ending December 31	Number	Value (Thousands of dollars)
1948[b]	660	$326
1949[b]	107	112
1950	247	285
1951	304	509
1952	551	941
1953	347	708
1954	728	1,516
1955	897	2,016
1956	1,371	3,529
1957	1,516	3,860
1958	1,552	4,312
1959	948	2,448
1960	1,464	3,716
1961	1,575	4,399
1962	1,819	4,510
1963	1,292	3,635
1964	1,677	5,257

NOTE: Export figures since 1965 have been collected on a basis different from that used in previous years and the new data are generally not comparable with previous figures. This issue includes a summary of 1965 and 1966 data on page 76. New series will be included in future issues.

[a] Under 400 hp.

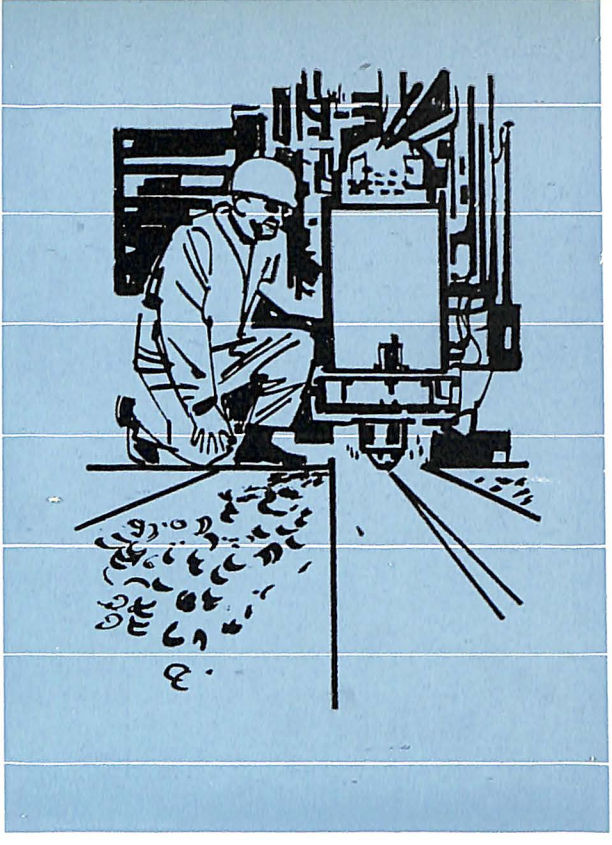
[b] Under 250 hp.

Source: Bureau of the Census, "U. S. Exports of Domestic & Foreign Merchandise, Report FT 410" (Monthly).

EXPORTS OF ROTARY WING AIRCRAFT, USED, AND OTHER AIRCRAFT
Calendar Years 1948 to Date

Year Ending Dec 31	Rotary Wing Aircraft (nonmilitary)		Used Aircraft (nonmilitary)		Other (nonmilitary)	
	Number	Value (Millions)	Number	Value (Millions)	Number	Value (Millions)
1948.....	47	$1.9	202	$ .7	.....	.....
1949.....	31	1.2	252	.6	.....	.....
1950.....	38	.9	262	.9	.....	.....
1951.....	28	.9	300	.9	.....	.....
1952.....	37	1.4	303	1.5	.....	.....
1953.....	98	4.9	4.6	1.5	.....	.....
1954.....	74	4.0	340	1.2	.....	.....
1955.....	66	4.2	800	37.1	4	0.01
1956.....	55	3.7	534	22.7	1	0.002
1957.....	104	11.9	627	43.2	4	0.005
1958.....	67	9.6	595	35.8	4	4.3
1959.....	63	8.2	461	20.5	6	2.9
1960.....	82	7.7	564	25.7	3	0.02
1961.....	119	6.8	495	33.9	81	4.0
1962.....	110	8.8	382	36.6	9	0.1
1963.....	123	9.8	356	16.4	8	0.05
1964.....	123	14.6	389	28.2	6	0.17
1965.....	177	16.2	407	39.0	12	0.4
1966.....	161	11.5	364	30.7	14	0.2

Source: Bureau of the Census, "U. S. Exports of Domestic & Foreign Merchandise, Report FT 410" (Monthly).



MANPOWER

In 1966 aerospace industry employment averaged 1,298,000, an increase of 165,000 over 1965. This gain of 14.6 percent marks the highest annual increase in aerospace employment in recent years. Between 1965 and 1966 aircraft employment increased from 458,000 to 560,000; missile, space and other employment from 675,000 to 738,000.

Production workers in the aerospace industry averaged 686,000 monthly in 1966. This was an increase of 102,000 over the 1965 monthly average, a gain of 17.5 percent.

During 1966, salaries and wages in the industry at all levels of employment showed a marked rise. For example, the average weekly earnings in aircraft and parts plants rose from $ 31.88 in 1965 to $143.89 in 1966, the highest annual increase since 1951.

According to the table on page 91, the greatest concentration of aerospace employment continued to be in California. In October 1966 that state had 358,000 aerospace employees, or more than 27 percent of all U. S. aerospace employment.

The number of aircraft and missiles scientists and engineers engaged in research and development increased from 97,400 in 1965 to 100,700 in 1966. They continue to represent nearly one-third of all U. S. scientists and engineers engaged in industrial research and development.

A continued rise in aerospace employment is anticipated for 1967.

ESTIMATED AEROSPACE EMPLOYMENT, TOTAL AND PRODUCTION WORKERS
Calendar Years 1959 to Date

Monthly Average for the Year	TOTAL AEROSPACE	AIRCRAFT[a]		MISSILES AND SPACE[b]		OTHER[d]
		TOTAL (Including Propulsion)	Propulsion	TOTAL Missiles and Space	Communications Equipment[c]	
TOTAL EMPLOYMENT (Thousands)						
1959	1,128	707	128	342	106	79
1960	1,074	638	124	356	118	80
1961	1,096	557	121	421	165	118
1962	1,177	458	116	562	174	157
1963	1,174	446	116	578	185	150
1964	1,117	434	109	535	166	148
1965	1,133	458	105	505	188	170
1966	1,298	560	118	566	206	172
PRODUCTION WORKERS (Thousands)						
1959	673	443	73	183	49	47
1960	607	370	68	191	53	46
1961	597	317	67	215	80	65
1962	619	269	66	273	85	77
1963	580	244	62	260	83	76
1964	552	243	58	236	72	73
1965	584	262	57	236	78	86
1966	686	364	74	283	97	93

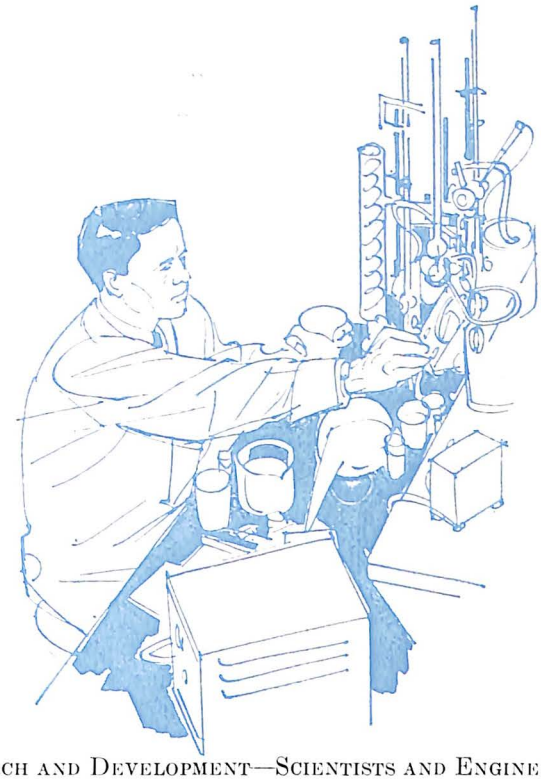
[a] "Aircraft" includes employees in the aircraft industry (SIC 372) engaged in aircraft, aircraft engine, propellers, or parts production.
[b] "Missiles and Space" includes employees in the aircraft, complete missile and space, and electronic industries engaged in missile and space work.
[c] "Communications equipment" includes employees in the electrical machinery industry (SIC 36) engaged in missile and space work.
[d] "Other" includes employees in industry classifications (SIC 28, 35, 38, 73, 89 and others) engaged in missile and space work.
Sources:
Bureau of Labor Statistics "Employment and Earnings."
Bureau of Employment Security, "Missiles, Spacecraft and Aircraft"
AIA estimates.

MANPOWER

Labor Turnover Rates in the Aerospace Industry
Calendar Years 1958 to Date
(Rates per 100 Employees per Year)

Year Ending Dec. 31	Complete Missiles and Spacecraft		Aircraft							
			Total		Airframes		Engines and Parts		Other Parts and Equipment	
	Accessions	Separations	Accessions	Separations	Accessions	Separations	Accessions	Separations	Accessions	Separations
1958	58.1	26.0	28.3	33.3	26.9	29.8	27.8	35.0	33.8	42.0
1959	48.9	29.2	27.4	37.9	22.4	36.5	29.1	35.0	39.4	45.0
1960	32.3	30.9	28.6	39.2	23.4	33.8	35.1	39.5	34.3	53.9
1961	37.0	27.2	32.6	30.9	31.3	29.3	28.9	24.8	43.2	44.9
1962	37.2	31.6	35.2	31.3	32.9	29.0	30.5	23.9	49.3	47.9
1963	29.9	31.5	28.9	29.4	28.6	27.9	24.3	25.0	39.5	42.9
1964	23.5	39.1	24.7	31.0	23.0	28.9	20.2	28.0	38.6	42.9
1965	32.6	28.7	38.7	26.9	38.5	22.8	32.2	28.4	51.9	20.5
1966	44.1	30.8	48.6	31.5	47.3	28.1	43.2	31.0	61.0	46.9

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



RESEARCH AND DEVELOPMENT—SCIENTISTS AND ENGINEERS—
TOTAL AND AEROSPACE
1957 to Date

As of January	TOTAL Scientists and Engineers	Aircraft and Missiles Scientists and Engineers	Aerospace as a Per Cent of Total
1957	229,400	58,700	25.6
1958	243,800	58,600	24.0
1959	268,400	65,900	24.6
1960	292,000	72,400 r	24.8 r
1961	312,100	78,500 r	25.2 r
1962	312,000	79,400 r	25.4 r
1963	327,300	90,700 r	27.7 r
1964	340,200	99,400 r	29.2 r
1965	343,600	97,400 r	28.3 r
1966	358,900	100,700	28.1

NOTE: Scientists and engineers working less than full time have been included in terms of their full-time-equivalent number.
r Revised.
Source: National Science Foundation.

EMPLOYMENT IN THE AIRCRAFT AND PARTS INDUSTRY
Calendar Years 1914 to Date
(Thousands of Employees)

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Other Aircraft Parts and Equipment
1914	0.2	N.A.	N.A.	N.A.
1919	4.2	N.A.	N.A.	N.A.
1923	3.5	N.A.	N.A.	N.A.
1929	18.6	N.A.	N.A.	N.A.
1935	14.9	N.A.	N.A.	N.A.
1939	63.2	45.1	11.3	6.8[E]
1940	148.6	101.8	31.4	15.4[E]
1941	347.1	234.6	75.3	37.2[E]
1942	831.7	549.6	192.0	90.1[E]
1943	1,345.6	882.1	314.9	148.6[E]
1944	1,296.6	815.5	339.7	141.4[E]
1945	788.1	489.9	210.9	87.3[E]
1946	237.3	159.0	49.9	28.4[E]
1951	467.8	313.3	95.0	59.5[E]
1953	795.5	472.4	191.2	131.9[E]
1955	761.3	466.6	168.0	126.7[E]
1957	895.8	519.0	213.2	163.6[E]
1959	747.6	419.5	182.8	145.3
1960	645.7	350.8	173.6	121.3
1961	619.2	324.3	186.6	108.4
1962	634.6	331.4	199.4	103.9
1963	635.2	332.0	200.7	102.5
1964	605.5	317.8	189.0	98.7
1965	617.8	330.6	187.5	99.7
1966	755.6	420.9	211.1	123.6
1967				
Mar.	814.9	456.9	223.3	134.7

[E] Estimate.

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. An estimated 195,000 employees in the aircraft and parts industry worked on missiles and spacecraft in 1966.

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

PRODUCTION WORKERS IN THE AIRCRAFT AND PARTS INDUSTRY
Calendar Years 1914 to Date
(Thousands of Production Workers)

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Other Aircraft Parts and Equipment
1914	0.2	N.A.	N.A.	N.A.
1919	3.5	N.A.	N.A.	N.A.
1923	2.9	N.A.	N.A.	N.A.
1929	14.7	N.A.	N.A.	N.A.
1935	11.4	N.A.	N.A.	N.A.
1939	49.6	38.4	9.5	5.3[E]
1940	118.0	79.2	26.5	12.3[E]
1941	278.3	183.8	65.0	29.5[E]
1942	674.8	433.9	168.3	72.6[E]
1943	1,090.5	692.1	278.8	119.6[E]
1944	1,016.0	616.3	290.3	109.4[E]
1945	591.0	360.5	164.9	65.6[E]
1946	167.5	113.1	34.0	20.4[E]
1951	348.4	234.8	66.5	47.1[E]
1953	586.2	346.8	136.1	103.3[E]
1955	525.5	322.5	108.5	94.5[E]
1957	591.4	342.4	132.1	116.9[E]
1959	458.0	257.4	104.1	96.5
1960	376.8	203.8	96.6	76.4
1961	351.5	178.8	103.9	68.8
1962	350.6	175.9	108.7	65.9
1963	348.4	174.8	107.2	66.4
1964	338.4	175.0	99.1	64.3
1965	352.9	183.3	102.4	67.2
1966	448.0	241.9	121.1	85.0
1967				
Mar.	492.7	266.4	132.4	93.9

[E] Estimate.

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 table in this chapter. An estimated 127,000 production workers in the aircraft and parts industry worked on missiles and spacecraft in 1966.

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

AVERAGE HOURLY EARNINGS IN AIRCRAFT AND PARTS PLANTS
1939 to Date
(Includes Overtime Premiums)

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Other Aircraft Parts and Equipment
1939	N.A.	N.A.	$0.812	N.A.
1940	N.A.	N.A.	0.816	N.A.
1941	N.A.	N.A.	1.008	N.A.
1942	N.A.	N.A.	1.189	N.A.
1943	N.A.	N.A.	1.236	N.A.
1944	N.A.	N.A.	1.287	N.A.
1945	N.A.	N.A.	1.286	N.A.
1946	N.A.	N.A.	1.316	N.A.
1947	$1.372	$1.360	1.384	N.A.
1948	1.487	1.465	1.519	N.A.
1949	1.560	1.548	1.571	N.A.
1950	1.637	1.622	1.662	N.A.
1951	1.78	1.75	1.85	N.A.
1952	1.89	1.87	1.94	N.A.
1953	1.99	1.98	1.99	N.A.
1954	2.07	2.08	2.05	N.A.
1955	2.16	2.17	2.13	N.A.
1956	2.27	2.27	2.24	N.A.
1957	2.35	2.35	2.35	N.A.
1958	2.50	2.51	2.51	$2.44
1959	2.62	2.64	2.64	2.55
1960	2.70	2.71	2.73	2.64
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	2.90
1964	3.05	3.05	3.09	2.99
1965	3.14	3.15	3.17	3.06
1966	3.30	3.34	3.32	3.19
1967				
Mar.	3.39	3.45	3.35	3.28

NOTE: The production workers surveyed include substantial missile and spacecraft employment.
See NOTE page 87.
N.A.—Not available.
Source: Bureau of Labor Statistics, "Employment and Earnings," (Monthly).

AVERAGE WEEKLY EARNINGS IN AIRCRAFT AND PARTS PLANTS
1939 to Date
(Includes Overtime Premiums)

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Other Aircraft Parts and Equipment
1939	N.A.	N.A.	$ 36.05	N.A.
1940	N.A.	N.A.	37.62	N.A.
1941	N.A.	N.A.	47.78	N.A.
1942	N.A.	N.A.	58.38	N.A.
1943	N.A.	N.A.	59.33	N.A.
1944	N.A.	N.A.	60.75	N.A.
1945	N.A.	N.A.	57.48	N.A.
1946	N.A.	N.A.	54.22	N.A.
1947	$ 54.74	$ 54.13	54.67	N.A.
1948	60.97	60.36	61.52	N.A.
1949	63.34	62.85	63.31	N.A.
1950	68.10	67.15	69.31	N.A.
1951	77.96	75.95	83.07	N.A.
1952	81.27	79.85	84.20	N.A.
1953	83.38	81.99	84.77	N.A.
1954	84.66	85.28	82.62	N.A.
1955	89.21	89.84	86.48	N.A.
1956	95.57	95.11	94.30	N.A.
1957	96.35	95.88	95.65	N.A.
1958	101.25	101.66	99.65	$100.53
1959	106.63	105.86	108.50	106.34
1960	110.43	110.03	112.20	109.30
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	122.67
1964	125.36	123.53	127.31	126.78
1965	131.88	131.26	133.46	131.27
1966	143.89	143.95	144.09	141.96
1967				
Mar.	144.75	146.63	141.31	144.65

NOTE: The production workers surveyed include substantial missile and spacecraft employment.
See NOTE page 87.
N.A.—Not available.
Source: Bureau of Labor Statistics, "Employment and Earnings," (Monthly).

AVERAGE EMPLOYMENT IN THE AIRCRAFT AND PARTS INDUSTRY
BY GEOGRAPHICAL DIVISION AND SELECTED STATES—1960 TO DATE[a]

Geographical Divisions and Selected States	1960	1961	1962	1963	1964	1965
TOTAL	668,914	625,095[b]	633,024[b]	633,875[b]	607,095[b]	626,352[b]
New England	71,313	75,346	76,762	77,531	75,071	80,220
Massachusetts	8,546	9,493	9,023	9,407	9,046	9,035
Connecticut	61,291	64,012	65,693	66,338	65,117	69,437
Me., N.H., Vt., R.I.	1,476	1,841	3,046	1,786	908	1,748
Middle Atlantic	71,554	71,321	74,476	82,771	74,116	74,723
New York	45,159	44,168	44,034	50,644	46,116	46,172
New Jersey	15,458	14,946	16,017	14,848	10,557	11,240
Pennsylvania	10,937	12,207	14,425	17,279	17,433	17,311
East North Central	77,846	69,932	70,107	69,023	62,695	64,142
Ohio	49,997	41,722	39,893	39,724	34,803	34,202
Indiana	18,124	17,821	18,592	19,677	18,894	19,590
Illinois	4,304	4,896	6,100	4,110	3,916	5,358
Mich., Wisc.	5,421	5,493	5,522	5,512	5,082	4,992
West North Central	62,197	57,311	60,047	63,029	70,423	69,474
Missouri	27,420	24,026	27,153	33,449	36,874	37,325
Kansas	33,193	31,177	31,805	28,840	32,542	31,095
Minn., Iowa, N.D., S.D., Neb.	1,584	2,108	1,089	740	1,007	1,054
South Atlantic	40,616	31,072	34,551	36,265	37,262	42,735
Maryland	16,228	3,668	3,640	3,094	2,577	3,193
Del., D.C., Va., W.Va., N.C., S.C.	497	4,539	1,210	1,842	1,621	2,497
Georgia	23,891	11,288	14,396	17,064	18,482	20,624
Florida[c]	—	13,593	15,305	14,265	14,582	16,421
East South Central	5,303	5,031	7,498	8,561	6,338	8,832
Alabama	5,303	4,102	7,435	7,435	5,382	7,650
Ky., Tenn., Miss.		929	1,094	1,126	956	1,182
West South Central	44,724	43,468	41,237	40,310	44,244	45,492
Texas	44,724	39,051	36,158	34,265	37,385	37,690
Ark., La., Okla.		4,417	5,079	6,045	6,859	7,802
Mountain	27,211	17,664	21,956	20,926	17,198	15,447
Arizona	14,164	5,167	5,451	5,252	4,833	5,627
Utah[c]	—	8,663	11,695	12,047	8,786	6,245
Mont., Idaho, Wyo., Colo., N.Mex., Nev.	13,047	3,834	4,810	3,627	3,579	3,575
Pacific	268,150	253,916	246,349	235,159	218,959	225,202
California	209,830	191,050	172,413	170,634	165,213	167,075
Washington[d]	—	62,252	73,326	64,204	52,591	56,940
Ore., Alaska, Hawaii	58,320[b]	614	610	621	1,155	1,187

NOTE: Corresponding data for the years since 1947 may be found in "Aerospace Facts and Figures," earlier editions.

[a] The difference between these totals and employment totals appearing elsewhere are due to technical differences in methodologies of B.E.S., B.L.S., and Census, and do not seriously affect the usability of the data. The definition used is the narrow "aircraft industry" definition (SIC 372) which is narrower than the definition of "aerospace" used in some other tables.

[b] Includes Puerto Rico.

[c] Until 1961, Utah was included with Montana, Idaho, Wyoming, Colorado, New Mexico, and Nevada.

[d] Until 1961, Washington was included with Oregon, Alaska, and Hawaii.

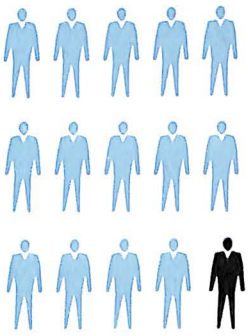
[e] Until 1961 was included with Georgia.

Source: Department of Labor, Bureau of Employment Security.

THE TEN LARGEST AEROSPACE LABOR MARKET AREAS
As of October 1966

	Aerospace Employment (Thousands)	Per Cent of Total U.S. Employment in Aerospace
TOTAL, U.S. aerospace employment[a]	1,322.1	100.0
TOTAL, 10 labor market areas[b]	611.2	46.2
Los Angeles, Long Beach, Cal.	240.2	18.2
Anaheim, Santa Ana, Garden Grove, Cal.	52.5	4.0
New York, New York	51.3	3.9
Hartford, Connecticut	46.5	3.5
Philadelphia, Pennsylvania	45.8	3.5
St. Louis, Missouri	41.5	3.1
San Jose, Cal.	35.1	2.7
Wichita, Kansas	34.4	2.6
Boston, Massachusetts	33.4	2.5
San Diego, Cal.	30.5	2.3

[a] U.S. aerospace employment as computed by the Bureau of Employment differs from the total computed by AIA because of different methodology.
[b] To avoid disclosure, two large labor market areas are excluded. They are Seattle, Washington, and Atlanta, Georgia with 94,462 employees.
Source: U.S. Department of Labor, Bureau of Employment Security.



One out of every
15 employees
in manufacturing
is employed by
the aerospace industry.

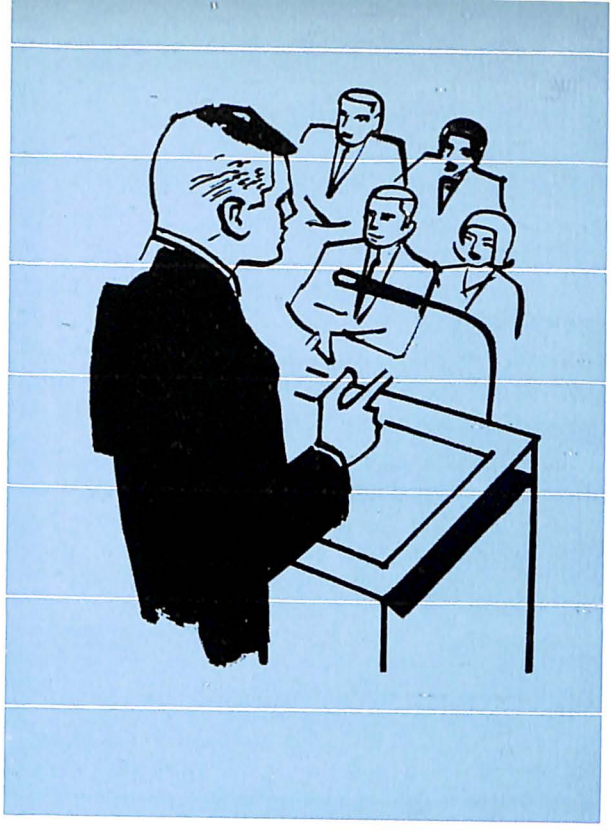
WORK STOPPAGES IN THE AIRCRAFT AND PARTS INDUSTRY
Calendar Years 1927 to Date

Year Ending December 31	Number of Strikes	Number of Workers Involved	Man-Days Idle in Year
1927–1933	4	1,153	18,965
1934	4	3,207	111,048
1935	1	1,700	6,800
1936	—	—	—
1937	6	9,390	90,964
1938	N.A.	N.A.	N.A.
1939	2	1,263	85,419
1940	3	6,270	36,402
1941	29	28,422	112,549
1942	15	6,584	12,416
1943	60	52,481	130,112
1944	103	189,801	386,371
1945	85	150,200	581,000
1946	15	21,300	557,000
1947	10	3,520	67,900
1948	8	21,400	1,100,000
1949	10	10,300	451,000
1950	18	23,900	145,000
1951	29	48,800	765,000
1952	44	81,000	927,000
1953	31	57,800	1,350,000
1954	11	6,350	171,000
1955	38	48,500	403,000
1956	21	23,100	1,040,000
1957	18	23,200	88,200
1958	20	36,700	308,000
1959	26	21,700	312,000
1960	28	82,400	1,190,000
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

N.A.—Not available.

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.

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



FINANCE

The level of profits in the aerospace industry stabilized in 1966 at about 3 percent after taxes as a ratio to sales. This profit rate compares with 5.6 percent for all manufacturing as a proportion of sales after taxes.

Total assets of the 50 aerospace companies represented on the Securities and Exchange Commission quarterly survey increased from $8,709 million to $11,068 million, a 27 percent gain between 1965 and 1966. Total current assets of these firms, including U.S. government securities, receivables, cash and inventories, increased from $6,637 million in 1965 to $8,236 million in 1966, a 24 percent rise.

These increasing demands on the productive capability of the industry have also resulted in increases in short and long-term loan financing. As a result, liabilities of these aerospace firms rose from $5,256 million to $7,094 million between 1965 and 1966. However, stockholders equity—the difference between total assets and total liabilities—rose in the period from $3,454 million to $3,975 million.

In 1966, the federal government continued to be the major customer of aerospace products and services, with around 81 percent of aerospace

sales made to the Department of Defense, National Aeronautics and Space Administration, the Atomic Energy Commission, the Federal Aviation Agency and other government agencies.

A high percentage of net profits after taxes continued to be retained and reinvested by aerospace companies in 1966. Between 1965 and 1966 the amount of net profit retained increased from $339 million to $380 million, a gain of over 12 percent. Of the $572 million of net profits after taxes for these aerospace firms in 1966, over 66 percent was retained.

The growing demand for products and services of the aerospace industry in past years has led to a growing demand for investment in plant and equipment. Between 1965 and 1966 the value of average net plant and equipment increased from $1,670 million to $2,148 million, a 29 percent rise.

COMPOSITION OF CURRENT ASSETS, 1956 TO DATE, 50 AEROSPACE COMPANIES
(in Per Cent of Total)

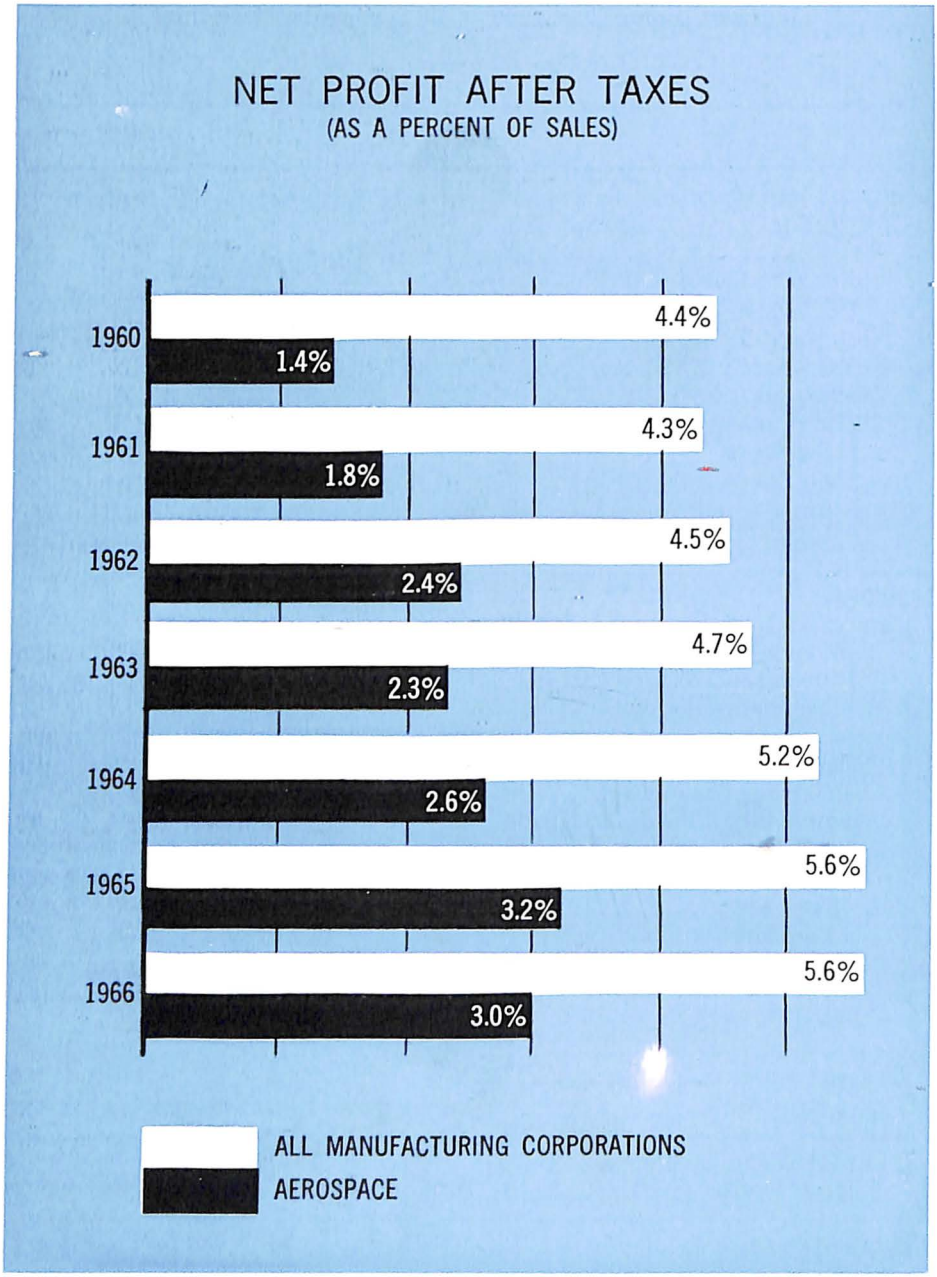
Year	Total Current Assets	Cash and Securities	Inventories	Receivables	Miscellaneous
1956	100.0	9.7	64.1	25.3	0.9
1957	100.0	8.7	62.8	27.2	1.3
1958	100.0	9.7	60.2	28.8	1.3
1959	100.0	8.0	60.8	29.3	1.9
1960	100.0	8.2	60.2	30.2	1.4
1961	100.0	8.0	58.2	32.0	1.8
1962	100.0	7.2	58.4	32.3	1.2
1963	100.0	7.4	61.2	28.7	2.7
1964	100.0	7.8	62.0	27.1	3.1
1965	100.0	7.1	61.0	26.9	5.0
1966	100.0	5.0	66.2	25.1	3.7

NOTE: Includes companies classified in industry group 372 which filed reports with the Securities and Exchange Commission.
Source: Securities & Exchange Commission—Federal Trade Commission, "Quarterly Financial Report for Manufacturing Corporations."

BALANCE SHEET COMPARISONS, 50 AEROSPACE COMPANIES
1961 to Date
(Millions of Dollars)

	1961	1962	1963	1964	1965	1966
Assets:						
Current Assets						
Cash	$ 417	$ 395	$ 435	$ 415	$ 395	$ 369
U. S. Government Securities	58	46	39	74	75	46
Total Cash and U. S. Govt. Securities	$ 475	$ 441	$ 474	$ 489	$ 470	$ 415
Receivables (total)	1,906	1,981	1,847	1,695	1,788	2,066
Inventories (gross)	3,470	3,580	3,936	3,876	4,048	5,453
Other current assets	112	133	174	193	331	302
Total Current Assets	$5,963	$6,135	$6,431	$6,253	$6,637	$ 8,236
Total Net Plant	1,420	1,509	1,575	1,591	1,670	2,148
Other Non-Current Assets	305	257	278	341	402	684
Total Assets	$7,688	$7,901	$8,284	$8,185	$8,709	$11,068
Liabilities:						
Current Liabilities						
Short term loans	700	698	461	388	339	670
Advances by U. S. Govt.	1,308	1,338	1,674	1,725	1,868	2,446
Trade accounts and notes payable	1,005	1,037	1,072	928	835	1,098
Federal income taxes accrued	186	265	255	239	252	256
Installments due on long term debt	24	32	28	38	45	61
Other current liabilities	822	769	756	770	1,043	1,369
Total current liabilities	$4,045	$4,139	$4,246	$4,088	$4,382	$ 5,900
Long Term Debt	806	783	835	816	807	1,094
Other Non-Current Liabilities	28	37	42	47	67	100
Total Liabilities	$4,879	$4,959	$5,123	$4,951	$5,256	$ 7,094
Stockholders' Equity:						
Capital Stock	1,291	1,318	1,354	1,339	1,312	1,488
Earned Surplus and Reserves	1,517	1,625	1,808	1,895	2,142	2,486
Total Net Worth	$2,808	$2,943	$3,162	$3,234	$3,454	$ 3,974
Total Liabilities and Stockholder's Equity	$7,688	$7,091	$8,284	$8,185	$8,709	$11,068
Net Working Capital	$1,918	$1,996	$2,185	$2,166	$2,256	$ 2,336

NOTE: Includes companies classified in industry group 372 which filed reports with the Securities and Exchange Commission.
Source: Securities & Exchange Commission—Federal Trade Commission, "Quarterly Financial Report for Manufacturing Corporations."



For statistical data on which this chart is based, see Net Profit, Page 23.

FINANCIAL RATIOS, 50 AEROSPACE COMPANIES
1956 to Date

Year	Net Federal Taxes as a Per Cent of Total Income	Net Profit as a Per Cent of Sales After Taxes
1956	52.3	3.1
1957	52.3	2.9
1958	51.7	2.4
1959	52.3	1.6
1960	44.4	1.4
1961	50.7	1.8
1962	47.2	2.4
1963	47.5	2.3
1964	46.9	2.6
1965	46.7	3.2
1966	45.2	3.0

NOTE: Does not include data for companies which produce aerospace products but are classified in industries other than industry group 372.
Source: Securities & Exchange Commission—Federal Trade Commission, "Quarterly Financial Report for Manufacturing Corporations."

INCOME ACCOUNTS, 50 AEROSPACE COMPANIES
1960 to Date
(Millions of Dollars)

	1960	1961	1962	1963	1964	1965	1966
Net Sales	$12,974	$13,954	$15,206	$15,313	$15,403	$16,073	$19,224
Net Profit from Operations	386	570	739	695	756	997	1,076
Total Income before Federal Income Taxes	333	521	682	665	748	984	1,046
Provision for Federal Income Taxes	148	264	322	316	351	460	473
Net Profit after Taxes	185	257	360	350	395	524	572
Net Profit Retained in Business	80	147	231	214	241	339	380

NOTE: Does not include data for companies which produce aerospace products but are classified in industries other than industry group 372.
Source: Securities & Exchange Commission—Federal Trade Commission, "Quarterly Financial Report for Manufacturing Corporations."

MAJOR DEFENSE CONTRACTORS
(Listed by rank according to net value of military prime contracts awarded, July 1, 1950-June 30, 1966)
(Millions of Dollars)

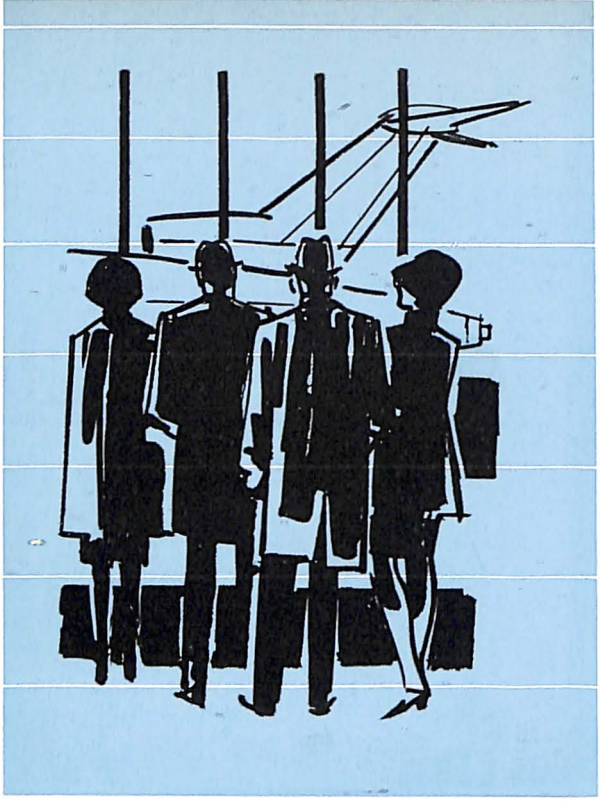
Company	July 1, 1950 to June 30, 1966	July 1, 1965 to June 30, 1966	July 1, 1964 to June 30, 1965	July 1, 1963 to June 30, 1964	July 1, 1962 to June 30, 1963	World War II[a] (Percent)
U. S. TOTAL, ALL CONTRACTS	$384,622.1	$33,532.6	$24,177.8	$25,163.7	$25,834.0	100.0%
Boeing	17,877.5	914.5	583.3	1,365.2	1,356.3	1.5
General Dynamics	16,804.7	1,136.0	1,178.6	986.7	1,033.2	N.A.
Lockheed	15,625.7	1,531.0	1,715.0	1,455.4	1,517.0	1.9
General Electric	14,098.4	1,187.0	824.3	892.6	1,021.2	1.9
North American	12,832.1	520.4	745.8	1,019.5	1,062.4	1.6
United Aircraft	11,787.9	1,138.7	632.1	625.4	529.9	2.2
General Motors	10,127.6	508.0	254.4	255.8	444.0	7.9
American Telephone and Telegraph	8,192.0	672.1	587.6	635.6	578.6	1.5
Douglas	7,823.4	278.9	170.1	203.2	361.1	2.5
Martin Marietta	6,603.8	337.8	315.6	476.4	766.8	1.3
McDonnell	6,407.8	722.2	855.8	1,157.4	497.0	N.A.
Fairchild Hiller[b]	5,389.1	80.1	70.1	89.2	196.8	0.7
Sperry Rand	5,215.7	426.8	318.4	373.9	445.5	0.9
Hughes	4,212.5	336.6	278.3	288.7	312.9	N.A.
Grumman	4,192.6	322.9	353.4	395.6	390.5	0.8
Bendix	4,029.5	281.8	234.9	257.4	290.3	1.1
Westinghouse Electric	3,919.7	348.7	260.9	236.9	322.6	0.8
Radio Corp. of America	3,751.3	242.4	213.9	233.6	328.6	0.3
Raytheon	3,645.9	368.5	293.4	253.0	294.9	N.A.
Curtiss-Wright	3,461.0	91.1	49.3	51.2	98.4	4.1
International Business Machines	3,296.4	181.6	186.2	332.4	203.3	N.A.
General Tire & Rubber	3,197.6	327.3	302.0	364.4	424.6	N.A.
Avco	3,193.9	506.0	234.2	278.7	253.1	0.6
Northrop	3,088.0	276.0	255.9	164.9	222.9	0.1
Textron	2,179.2	554.8	195.7	216.3	151.2	0.7
International Telephone & Telegraph	1,914.8	219.8	206.7	256.1	265.5	N.A.
Philco	1,794.7	247.9	312.0	211.2	227.7	N.A.
Thiokol	1,453.3	110.7	136.2	253.6	238.6	N.A.
Honeywell	1,404.8	250.6	82.5	107.5	170.0	N.A.
Ling-Temco-Vought	1,387.0	310.8	264.7	97.5	205.9	N.A.

N.A.—Not available.
[a] Estimated at $193.3 billion.
[b] Includes Republic Aviation.
Sources:
1950 to Date: Department of Defense, "100 Companies and their Subsidiary Corporations Listed According to Net Value of Military Prime Contract Awards" (Annually).
World War II: War Production Board.

MAJOR NATIONAL AERONAUTICS AND SPACE ADMINISTRATION CONTRACTORS
(Listed by rank according to net value of NASA prime contracts awarded, July 1, 1960-June 30, 1966)
(Millions of Dollars)

Company	July 1, 1960 to June 30, 1966	July 1, 1965 to June 30, 1966	July 1, 1964 to June 30, 1965	July 1, 1963 to June 30, 1964	July 1, 1962 to June 30, 1963	July 1, 1961 to June 30, 1962
U. S. TOTAL, ALL CONTRACTS	$15,488.7	$4,087.7	$4,141.4	$3,521.1	$2,261.6	$1,053.6
North American	3,945.4	1,128.9	1,099.4	917.2	525.8	199.1
Douglas	1,021.3	259.7	251.7	250.3	160.5	68.4
Boeing	933.4	313.7	306.0	197.1	101.0	15.6
Grumman	888.8	381.2	267.2	156.4	48.2	24.6
McDonnell	790.0	52.3	166.7	267.6	193.1	68.5
General Electric	646.0	235.7	181.5	143.6	53.0	23.0
General Dynamics	484.5	92.1	111.1	148.2	103.1	27.9
Chrysler	388.5	83.5	86.0	99.4	75.4	31.3
International Business Machines	370.8	108.2	128.3	85.6	36.1	12.6
Radio Corp. of America	278.7	51.3	106.6	49.8	42.2	20.2
Bendix	244.4	78.0	66.1	41.9	32.5	19.4
General Motors	247.9	123.3	72.5	41.9	10.2	[a]
United Aircraft	203.7	40.7	43.3	36.7	48.9	34.1
Brown Engineering	159.4	24.3	30.9	41.6	24.1	11.9
Lockheed	151.3	44.5	35.8	39.0	23.7	5.0
TRW	134.9	49.9	50.5	39.0	2.6	3.8
Ling-Temco-Vought	127.9	28.8	15.1	21.5	26.7	27.0
Philco	121.3	25.4	30.0	35.7	14.9	4.4
Hayes International	112.0	28.1	28.5	18.7	15.4	11.0
Hughes	91.3	22.4	26.5	14.9	18.3	9.2
Sperry Rand	86.1	29.5	39.4	11.8	3.2	2.2
Fairchild Hiller[b]	79.3	15.3	22.2	19.7	15.5	[a]
Honeywell	67.0	22.2	27.1	7.1	3.2	4.7
Union Carbide	64.2	19.7	20.0	20.1	[a]	4.4
Collins Radio	53.4	17.0	31.5	4.9	[a]	[a]
Western Electric	39.5	4.2	[a]	[a]	[a]	8.7
Catalytic Construction	36.7	5.5	25.3	5.9	[a]	[a]
Bellcom	35.6	9.7	9.8	8.7	6.4	[a]
Martin Marietta	31.6	5.7	8.4	8.5	7.2	1.8
Raytheon	28.8	3.2	2.2	34.2	[a]	[a]
Kollsman Instrument	21.6	1.7	[a]	13.6	5.1	1.2

[a] Not in list of major contractors for indicated year.
[b] Includes Republic Aviation.
Source: National Aeronautics and Space Adminstration, "NASA Annual Procurement Report."



AIR TRANSPORTATION

Nearly 110 million passengers logged 80 billion passenger miles on U. S. scheduled airlines in 1966, another record year. It was the first time that the number of passengers totalled more than 100 million in any one year and represented a 15 percent increase above 1965.

Air freight was up 34.4 percent over the previous year to more than three billion ton miles. U. S. mail was up 56.9 percent to 775 million ton miles.

At year's end U. S. airlines had a total of 2,272 aircraft flying world-wide routes, up from 2,125 in 1966. Of this number, the largest proportion, 1,378, were turbine-powered. The 873 piston-powered aircraft declined from 1,067 registered in 1966, an indication of the continuing growth of jets in world airline operations.

Original value of flight equipment during the year totalled more than $4.5 billion. Last year equipment totalled less than $4 billion.

Domestic and foreign carriers had 1,499 jet aircraft valued at nearly $7 billion on order from U. S. manufacturers by the end of 1966, 748 of which were slated for delivery in 1967.

Of the continuing, healthy growth of the airline industry, Air Transport

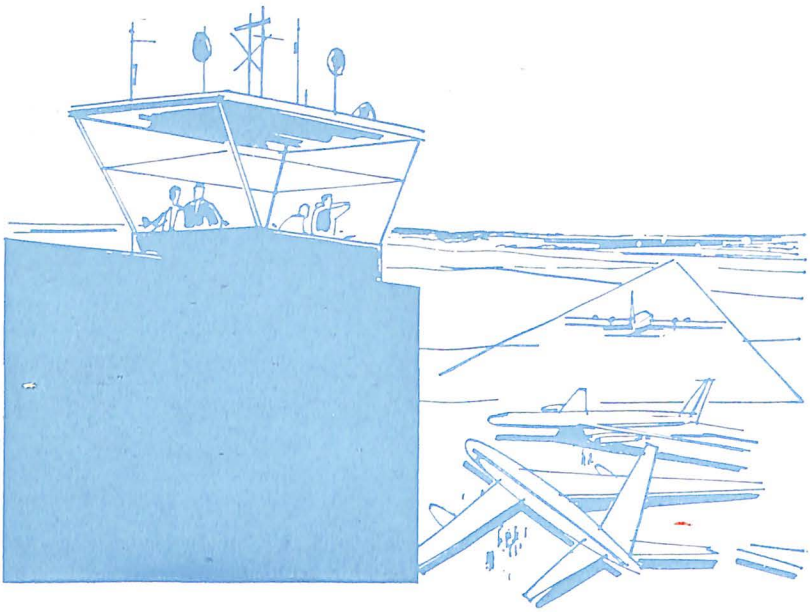
Association President Stuart G. Tipton said: "Today, the airlines are embarked on a long-term investment program. . . . This year, capital outlays for flight equipment and related facilities will reach an all-time high of more than $2 billion. In the five year period 1966-1970 the planned outlays of the industry," he predicts, "are expected to reach over $8 billion and for the ten-year period 1966-1975 will be more than $18 billion."

Considering the cargo aspect of the industry, Tipton points out that air freight "is becoming more important in the airlines' transportation revenue mix. Last year air cargo accounted for 12.2 percent of this revenue, compared with 10.9 percent in 1956. Projections through 1980 see this trend continuing and signal a new era in air cargo for which the airlines are now preparing."

INVENTORY OF CIVIL AIRCRAFT
Including Air Carrier Aircraft
1928 to Date

Year As of January 1	TOTAL	Eligible	Ineligible
1928	2,740	N.A.	N.A.
1932	10,680	N.A.	N.A.
1935	8,322	N.A.	N.A.
1941	26,013	N.A.	N.A.
1951	92,809	60,921	31,888
1952	88,545	54,039	34,506
1955	92,067	58,994	33,073
1956	85,320	60,432	24,888
1957	87,531	64,688	22,843
1958	93,189	67,153	26,036
1959	98,893	69,718	29,175
1960	105,309	70,747	34,562
1961	111,580	78,760	32,820
1962	117,904	82,853	35,051
1963	124,273	86,287	37,986
1964	129,975	87,267	42,708
1965	137,189	90,935	46,254
1966	142,083	97,743	44,340

N.A.—Not available.
Source: Federal Aviation Agency, "FAA Statistical Handbook of Aviation" (Annually).



INVENTORY OF ELIGIBLE CIVIL AIRCRAFT, BY YEAR OF MANUFACTURE
As of January 1, 1966

Year of Manufacture	Number	Per Cent of Total
TOTAL	97,741	100.0
1965	9.971	10.2
1964	7,250	7.4
1963	5,732	5.9
1962	4,932	5.0
1961	4,719	4.8
1960	5,236	5.4
1959	5,735	5.9
1958	4,569	4.7
1957	3,726	3.8
1956	4,369	4.5
1955 and prior years	41,502	42.4

NOTE: An eligible aircraft is an aircraft with a current airworthiness certificate which, through a periodic or progressive inspection, has been renewed within the past 12 months.
Source: Federal Aviation Agency, "FAA Statistical Handbook of Aviation" (Annually).

U. S. Manufactured Aircraft in Operation on World Airlines
Calendar Years 1961 to Date

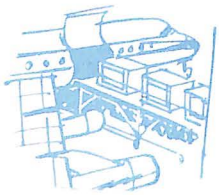
	1961	1962	1963	1964	1965
Total Manufactured in U. S.	2,542	2,345	2,266	2,317	2,548
4 Engine	1,505	1,474	1,434	1,417	1,493
Turbojets	423	517	580	627	738
Boeing 707	150	209	206	233	291
Boeing 720	40	51	55	109	119
Boeing 720B	44	25	52		
Douglas DC-8	149	167	183	199	236
Convair 880	40	44	53	53	40
Convair 990	—	21	31	33	52
Turboprops	137	137	137	137	136
Lockheed Electra	137	137	137	137	136
Piston Engine	945	820	717	655	619
Lockheed Constellation	261	206	179	176	136
Douglas DC-7	254	232	178	133	85
Douglas DC-6	316	277	257	250	265
Douglas DC-4	114	105	103	96	132
Boeing Stratocruiser	—	—	—	—	1
3 Engine	—	—	4	97	193
Boeing 727 (turbojet)	—	—	4	97	193
2 Engine	971	833	783	754	803
Turbojets	—	—	—	—	4
Douglas DC-9	—	—	—	—	4
Turboprops	8	7	7	7	7
Fairchild F-27	8	7	7	7	7
Piston Engine	963	826	776	747	792
Convair 240, 340, 440	288	250	228	201	190
Martin 202, 404	40	4	4	—	4
Curtiss Commando C-46	36	36	37	38	57
Douglas	568	516	479	471	481
Other	31	20	28	37	60
1 Engine	34	12	18	19	21
Helicopters	32	26	27	30	38
All Manufacturers Grand Total	3,319	3,162	3,086	3,137	3,461
Per Cent of Grand Total Manufactured in U. S.	76.6	74.2	73.4	73.9	73.6

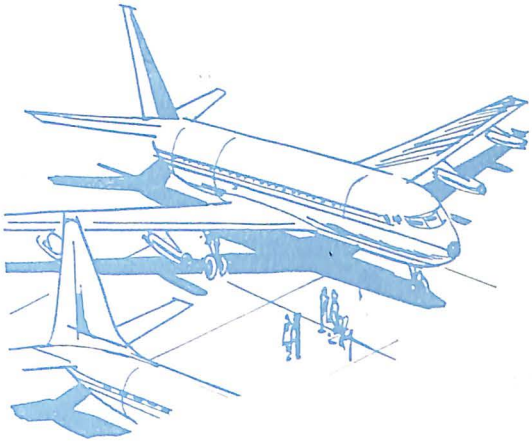
Source: International Air Transport Association, "World Air Transport Statistics" (Annually). Based on reports by IATA members.

WORLD CIVIL AIRLINES
Selected Calendar Years, 1919 to Date
(Revenue Traffic, Scheduled Services, International and Domestic)
(Data in Millions)

Year Ending December 31	Miles Flown	Passengers Carried	Passenger-Miles	Cargo Ton-Miles	Mail Ton-Miles
1919	1	N.A.	N.A.	N.A.	N.A.
1929	55	N.A.	105	N.A.	N.A.
1934	100	N.A.	405	N.A.	N.A.
1939	185	N.A.	1,260	N.A.	N.A.
1944	260	N.A.	3,410	N.A.	N.A.
1949	840	27	15,000	390	130
1951	1,005	42	22,000	630	190
1953	1,205	52	28,500	720	185
1955	1,425	68	38,000	900	255
1956	1,580	77	44,000	1,030	275
1957	1,765	86	50,500	1,125	295
1958	1,820	88	53,000	1,150	320
1959	1,920	98	61,000	1,330	355
1960	1,925	106	67,500	1,485	415
1961	1,940	111	72,500	1,700	490
1962	2,015	121	80,500	1,995	545
1963	2,125	135	91,500	2,230	590
1964	2,290	154	106,000	2,670	625
1965	2,550	177	123,000	3,400	755
1966	2,780	201	142,000	4,010	1,040

N.A.—Not available.
NOTE: Excludes China (mainland) and the USSR.
Source: International Civil Aviation Organization, "Development of Civil Air Transport, Total Scheduled Services-Revenue Traffic" (Annually).





UNITED STATES CIVIL AIRLINES
Selected Calendar Years, 1949 to Date

Year Ending Dec 31	Revenue Miles Flown (Millions)	Passengers Carried (Millions)	Revenue Passenger-Miles (Millions)	Cargo Ton-Miles[a] (Millions)	Mail Ton-Miles[b] (Millions)
1949	463	17	8,827	196	66
1951	527	25	13,204	324	92
1953	657	32	18,245	359	106
1955	780	42	24,351	503	150
1956	869	46	27,625	634	160
1957	976	49	31,261	721	169
1958	973	49	31,499	726	185
1959	1,030	56	36,372	853	209
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	50,362	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	3,050	775

NOTE: Figures represent total scheduled services 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.
Source: Civil Aeronautics Board.

COMPOSITION OF U. S. AIR LINE FLEET, BY TYPE OF AIRCRAFT, NUMBER OF ENGINES, AND MODEL: JANUARY 1, 1967, 1966, AND 1965
(Number of Aircraft)

Type of Aircraft, Number of Engines, and Model	January 1		
	1967	1966	1965
TOTAL, AIRCRAFT	2,272	2,125	2,081
Total fixed-wing	2,251	2,104	2,061
Turbine-powered-total	1,378	1,037	840
Four engine-total	796	726	669
Turbojet-total	586	511	546
B-707	245	191	160
B-729	129	121	112
CV-990	17	18	19
CV-880	46	47	48
DC-8	149	134	117
Turboprop-total	210	215	213
L-188, 188A	125	126	126
L-382	5	—	—
V-745	44	48	48
V-810/812	8	11	11
Argosy 650	6	6	7
CL-44	22	24	21
Three engine-total	287	173	88
B-727	287	173	88
Twin engine-total	287	130	79
Turbojet-total	133	41	20
Caravelle	20	20	20
BAC-111	54	17	—
Dassault/Sud SE-20	3	—	—
DC-9	56	4	—
Turboprop-total	154	89	59
CV-340T	42	18	4
CV-240T	28	2	—
F-27	64	63	54
FH-227	16	—	—
G-159	1	1	1
Nihon YS-11	3	—	—
NO-262	—	5	—
Single engine-total	8	8	4
Turboprop-total	8	8	4
PC-6A	4	4	4
PC-6B	4	4	—

(*Continued on next page*)

COMPOSITION OF U. S. AIR LINE FLEET, BY TYPE OF AIRCRAFT, NUMBER OF ENGINES AND MODEL: JANUARY 1, 1967, 1966, 1965—*Continued*
(Number of Aircraft)

Type of Aircraft, Number of Engines, and Model	January 1		
	1967	1966	1965
Piston-powered-total	873	1,067	1,221
Four engine-total	388	447	563
B-377	1	1	1
DC-4	10	9	22
DC-6	164	210	234
DC-7	91	92	132
L-049/149	6	8	7
L-749	37	38	43
L-1049	70	82	101
L-1649	9	7	23
Twin engine-total	461	590	620
AC-680E	1	1	1
CV-28-5ACF	4	4	3
CV-240	32	56	51
CV 340/440	112	146	154
BE-D18, E18, G18	1	2	—
C-46, 20T	69	82	88
DC-2	—	1	1
DC-3, 3A	137	176	204
F-C82	4	2	1
G-21, 21A	19	22	20
G-44A	3	6	5
G-SA16	2	2	2
G-73	1	2	2
L-12	—	1	—
M-202A	1	15	17
M-404	75	72	71
Single engine-total	24	30	38
Rotary Wing-total	21	21	20
Turbine-powered-total	16	15	13
S-61	8	7	6
S-62	1	1	3
V-107 II	7	7	4
Piston-powered-total	5	6	7
S-51	—	—	1
S-55	2	2	2
S-58C	3	4	4

Source: Department of Transportation, Federal Aviation Administration, "U. S. Civil Carrier Fleet" (Annually).

U. S. DOMESTIC AND INTERNATIONAL AIRLINE PASSENGER SERVICE
Selected Calendar Years, 1926 to Date

Year Ending Dec 31	Domestic		International	
	Passengers Carried (Thousands)	Revenue Passenger-Miles Flown (Millions)	Passengers Carried (Thousands)	Revenue Passenger-Miles Flown (Millions)
1926	6	1.3	N.A.	N.A.
1930	385	85.1	33	7.8
1935	679	281.2	111	46.7
1940	2,803	1,052.2	163	99.8
1945	6,541	3,360.3	511	450.1
1950	17,468	8,029.1	1,752	2,214.0
1951	22,711	10,589.7	2,140	2,613.8
1952	25,176	12,559.3	2,391	3,065.0
1953	28,901	14,793.9	2,745	3,450.8
1954	32,529	16,802.4	2,919	3,810.4
1955	38,221	19,852.1	3,488	3,398.9
1956	41,937	22,398.6	4,068	5,226.2
1957	45,162	25,378.8	4,259	5,882.0
1958	44,741	25,375.5	4,428	6,123.9
1959	51,000	29,307.6	4,999	7,064.2
1960	52,377	30,556.6	5,499	8,306.2
1961	52,712	31,062.3	5,699	8,768.5
1962	55,950	33,623.0	6,598	10,138.0
1963	63,925	38,456.6	7,513	11,905.4
1964	72,988	44,141.3	8,775	14,352.4
1965	84,460	51,887.4	10,195	16,789.0
1966	97,746	60,590.8	11,646	19,298.4

NOTE: Figures represent total scheduled services excluding nonrevenue operations of certificated route air carriers. Passenger originations only.
N.A.—Not available.
Source: Civil Aeronautics Board.

U. S. DOMESTIC AIRLINES
TOTAL ASSETS AND NET INVESTMENT IN FLIGHT EQUIPMENT
(Dollar Figures in Millions)
1958 to Date

As of June 30	Total Assets[a]	Flight Equipment (Net-after depreciation)	Per Cent of Total Assets in Flight Equipment
1958	$1,182	$ 852	72.1%
1959	1,494	1,048	70.1
1960	1,760	1,374	78.1
1961	2,099	1,734	82.6
1962	2,273	1,874	82.4
1963	2,211	1,818	82.2
1964	2,415	2,029	84.0
1965	2,816	2,391	84.9
1966	3,747	2,981	79.6

[a] Comprises net investment in buildings and ground equipment, flight equipment, working capital, etc.
NOTE: Excludes helicopter airlines.
Sources:
Civil Aeronautics Board 1964, "Annual Report."
Civil Aeronautics Board, Research and Statistics Section.

U. S. DOMESTIC AIRLINES, VALUE OF FLIGHT EQUIPMENT[a]
1958 to Date
(Millions of Dollars)

As of June 30	Total Gross Value of Flight Equipment	Less: Depreciation	Plus: Construction Work in Process	Equals: Net Value of Flight Equipment
1958	$1,498.5	$ 709.8	$ 63.4	$ 852.1
1959	1,752.8	816.8	112.3	1,048.3
1960	2,174.3	889.6	89.5	1,374.2
1961	2,719.2	1,062.0	76.7	1,733.9
1962	3,006.0	1,183.3	51.7	1,874.4
1963	3,132.4	1,341.4	27.1	1,818.1
1964	3,382.7	1,401.6	48.4	2,029.5
1965	3,843.5	1,504.7	51.7	2,390.5
1966	4,519.7	1,645.5	106.9	2,981.1

[a] Excludes helicopters.
Source: Civil Aeronautics Board.

TOTAL ORDERS FOR JET AIRCRAFT FROM U. S. MANUFACTURERS FOR DOMESTIC AND FOREIGN DELIVERY
As of December 31, 1966
Airline- and Executive-Type, Fixed Wing

	TOTAL For Delivery in 1967 or Later	For Delivery During		
		1967	1968	1969 or Later
TOTAL				
Number of aircraft	1,499	748	574	177
Value-million dollars	$6,914	$2,796	$2,080	$2,038
TRANSPORTS				
Number of aircraft	1,077	532	383	162
Value-million dollars	$6,604[a]	$2,646	$1,951	$2,007
EXECUTIVE TYPE				
Number of aircraft	422[b]	216	191	15
Value-million dollars	$ 310	$ 150	$ 129	$ 31
NUMBER OF TRANSPORT AIRCRAFT				
Boeing				
B-707	154	107	41	6
B-720	5	5	—	—
B-727	223	133	76	14
B-737	124	10	97	17
B-747	88	—	—	88
Douglas				
DC-8	144	71	64	9
DC-9	309	176	105	28
Fairchild Hiller				
F-27	1	1	—	—
FH-227	29	29	—	—

FOREIGN ORDERS FOR JET TRANSPORT AIRCRAFT
as of December 31, 1966

	TOTAL	For Delivery During		
		1967	1968	1969 or Later
TOTAL				
Number of transport aircraft	309	150	110	49
Value-million dollars	$1,859	$787	$557	$515
NUMBER OF TRANSPORT AIRCRAFT				
Boeing				
B-707	35	21	14	—
B-727	31	26	5	—
B-737	35	6	22	7
B-747	20	—	—	20
Douglas				
DC-8	56	32	21	3
DC-9	132	65	48	19

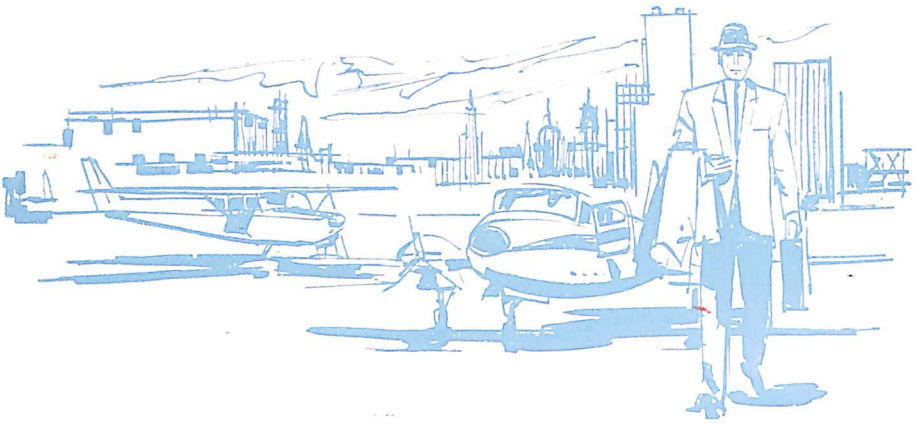
[a] Dollar values exclude the cost of spare parts.
[b] Backlogs of executive jet aircraft are not totally comparable to those reported for transports, as executive orders are essentially purchased largely off-the-shelf with intermediate purchasing lead times.
Source: Aerospace Industries Association, reports from member companies.

PUBLIC AIRPORTS BY LENGTH OF RUNWAY AND REGION, January 1, 1967

Region	TOTAL	Airports by Length of Runway (in feet)		
		Under 5,000	5,000–9,999	10,000 & over
TOTAL	9,673	8,423	1,000	250
New England	427	349	54	24
Middle Atlantic	906	820	60	26
East North Central	1,307	1,206	82	19
West North Central	1,548	1,435	89	24
South Atlantic	954	804	136	14
East South Central	431	385	45	1
West South Central	1,389	1,250	120	19
Mountain	1,055	838	208	9
Pacific	1,631	1,319	200	112
Other	25	17	6	2

Department of Transportation, Federal Aviation Administration

General Aviation



Production and utilization of general aviation aircraft achieved dramatic new records during 1966.

By September the industry had delivered more new airplanes than were delivered in the full 12 months of 1965, which had been a record year. Total production reached 15,700 (page 36). While all categories of models showed substantial gains, the largest numerical increase came in the smaller single-engine models. This growth in numbers of aircraft in which most flight training is accomplished reflected both the industry's efforts at broadening the base of general aviation and the public's widening moves to use their own airplanes.

Supercharged engines appeared in greater numbers on single-engine as well as twin-engine airplanes. These pushed more airplanes into the environment of higher altitude operations. Jetprop and pure jet-powered general aviation airplanes increased substantially in number. By mid-year there were about two-thirds as many jet-powered airplanes in the general aviation fleet as in the scheduled airline fleet. Total general aviation airplanes outnumbered the airlines by more than fifty to one.

Air taxi and commuter airline operations continued to lead as the fastest growing segments of general aviation. More than 5,000 airplanes were operated by 3,200 air taxi companies. Of these, more than 100 were operating over scheduled routes. In 1964 there were only 12 scheduled commuter airline operators.

General aviation handled under IFR (Instrument Flight Rules) increased 44 percent over 1965. More than one-half as many landing approaches were performed under IFR by general aviation as by the scheduled airlines.

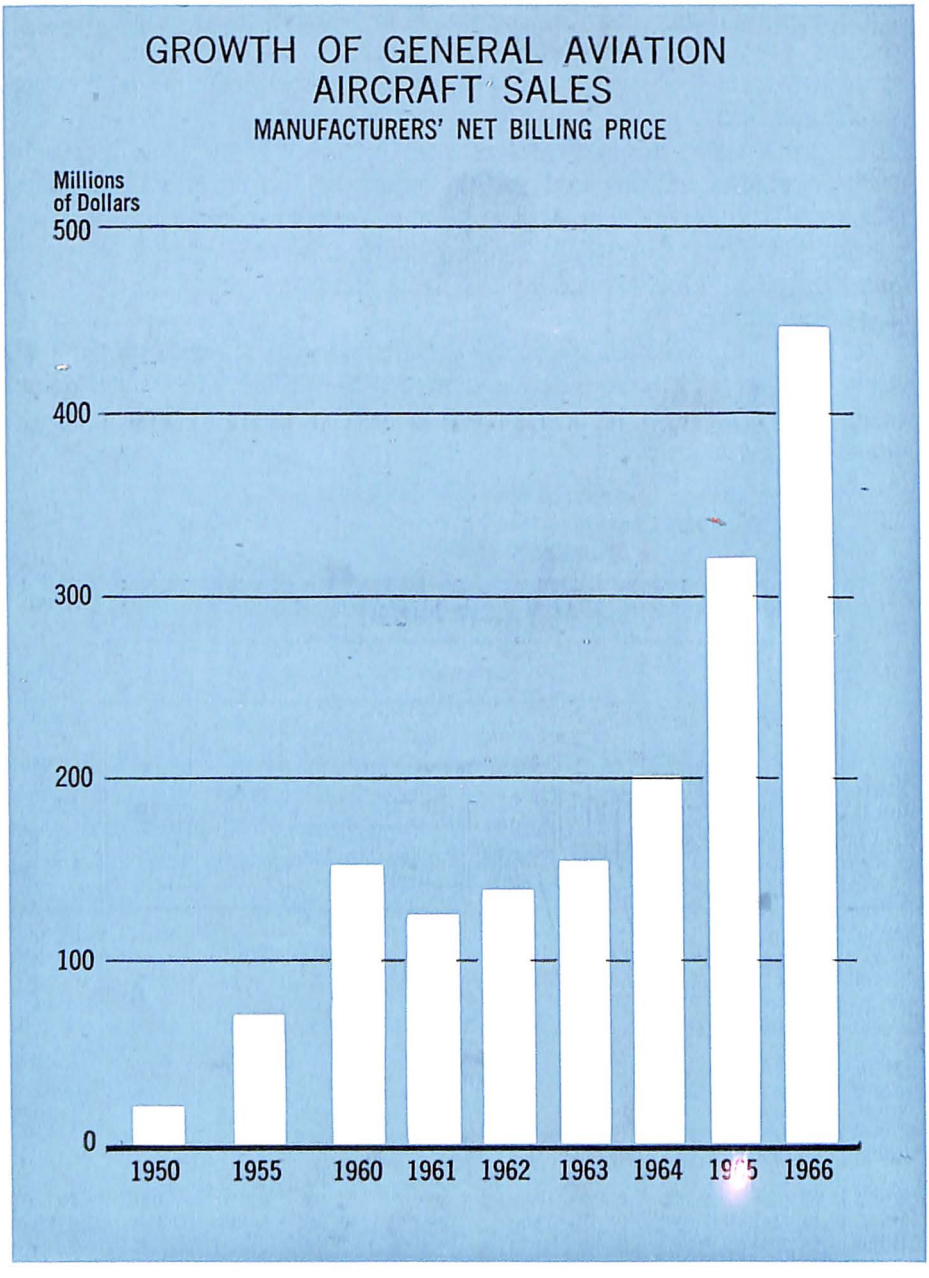
Flight training showed similar growth, boosted by both a public interest in general aviation and industry promotion. In the first six months of the year issuances of new student pilot certificates increased 54 percent over the same period of 1965. By year's end an estimated 130,000 new pilots had been licensed, raising the total pilot population to over the half-million mark.

Air cargo operations in general aviation airplanes began to burst at the seams during 1966. Airplanes designed with special, wide cargo doors and quickly removable seats appeared in greater numbers and varieties from the manufacturers.

ELIGIBLE CIVIL AIRCRAFT BY TYPE AND CIVIL AIRPORTS
Calendar Years 1954 to Date

Year Jan. 1	Active Civil Aircraft								Airports on Record with FAA
	TOTAL	Total Air Carrier[a]	General Aviation Aircraft						
			TOTAL	Fixed-Wing Aircraft			Rotorcraft[b]	Other[c]	
				Multi-engine	Single-Engine				
					4-place & over	3-place & less			
1954	55,505	1,615	53,890	N.A.	N.A.	N.A.	N.A.	N.A.	6,760
1955	58,994	1,606	57,388	2,600	17,078	37,278	235	197	6,977
1956	60,432	1,642	58,790	3,342	19,240	35,654	283	271	6,839
1957	64,638	1,802	62,886	4,183	22,805	35,291	350	257	7,028
1958	67,153	1,864	65,289	5,036	23,751	35,809	433	260	6,412
1959	69,718	1,879	67,839	5,416	26,170	35,440	521	292	6,018
1960[d]	70,747	2,020	68,727	6,034	27,301	34,543	525	324	6,426
1961	78,760	2,211	76,549	7,243	34,829	33,472	634	371	6,881
1962	82,853	2,221	80,632	8,401	38,206	32,800	798	427	7,715
1963	86,287	2,166	84,121	9,186	41,120	32,341	967	507	8,084
1964	87,267	2,179	85,088	9,695	42,657	30,977	1,171	588	8,814
1965	90,935	2,193	88,742	10,644	45,777	30,367	1,306	648	9,490
1966	97,743	2,295	95,448	11,874	N.A.	N.A.	1,492	N.A.	9,566

N.A.—Not available.
[a] Registered, not necessarily in operation. Includes helicopters.
[b] Includes autogiros; excludes air carrier helicopters.
[c] Includes gliders, dirigibles, and balloons.
[d] Excludes approximately 4,000 unclassified active aircraft.
Source: Federal Aviation Agency. "U. S. Active Civil Aircraft by State and County."

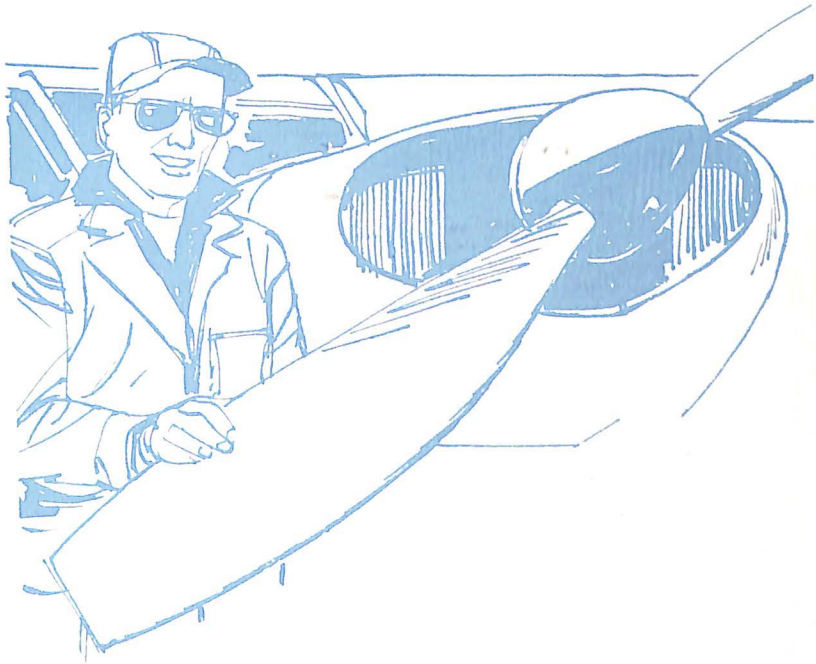


For statistical data on which this chart is based, see Production of General Aviation Aircraft, Page 39.

ACTIVE AIRMAN CERTIFICATES HELD
1955 to Date

Year as of Jan. 1	Pilots						Non-pilots	Other
	TOTAL	Students	Private	Commercial	Airline	Other		
1955	349,729	71,969	184,595	80,346	12,129	690	140,199	64,263
1956	298,076	80,494	132,525	72,957	11,774	326	148,335	71,307
1957	259,567	96,124	96,864	54,545	11,173	861	155,121	62,927
1958	309,212	98,498	124,799	70,813	13,964	1,138	149,274	74,682
1959	354,365	103,456	140,573	93,126	15,840	1,370	157,424	88,079
1960	359,875	107,815	139,804	93,815	16,950	1,491	167,074	91,259
1961	348,062	99,182	138,869	89,904	18,279	1,828	169,598	94,723
1962	352,860[E]	93,973	144,312[E]	92,976[E]	19,155[E]	2,444[E]	175,287[E]	98,257[E]
1963	365,971	95,870	149,755	96,047	20,032	4,267	181,982	101,793
1964	378,700	105,298	152,209	96,341	20,269	4,583	186,304	83,800
1965	431,041	120,743	175,574	108,428	21,572	4,724	195,396	116,600
1966	479,770	139,172	196,393	116,665	22,440	5,100	204,463	128,541
1967	548,757	165,177	222,427	131,539	23,917	5,697	217,132	146,068

[E] Estimate.
Source: Federal Aviation Agency, Office of Management Services.

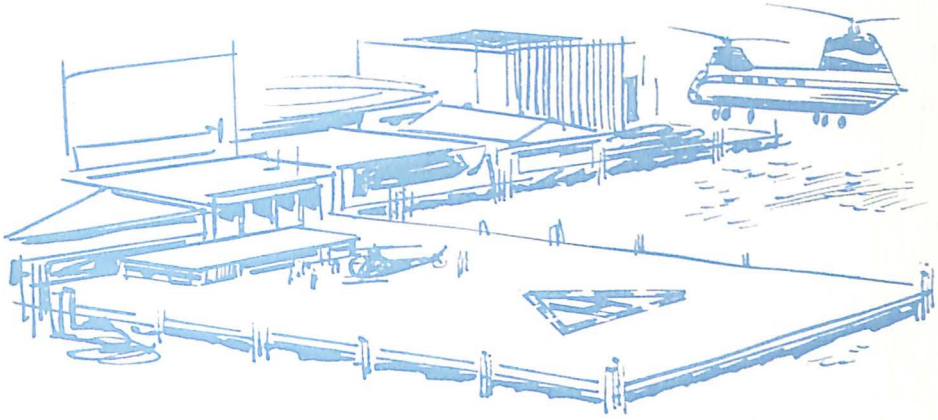


GENERAL AVIATION, HOURS, AND MILES FLOWN, BY TYPE OF FLYING
Calendar Years 1931 to Date

Year Ending December 31	Total	Business		Commercial		Instructional		Personal		Other	
		Units	Percent	Units	Percent	Units	Percent	Units	Percent	Units	Percent
ESTIMATED HOURS FLOWN, Thousands											
1931	1,083	152	14	281	26	307	28	343	32	—	—
1936	1,059	122	12	245	23	380	36	312	29	—	—
1941	4,460	250	6	511	11	2,816	63	883	20	—	—
1946	9,788	1,068	11	943	10	5,996	61	1,686	17	95	1
1951	8,451	2,950	35	1,584	19	1,902	23	1,880	22	135	1
1953	8,527	3,626	42	1,649	19	1,248	15	1,846	22	158	2
1955	9,500	4,300	45	1,950	21	1,275	13	1,975	21	—	—
1957	10,938	4,864	45	2,013	18	1,864	17	2,109	19	88	1
1959	12,903	5,699	44	2,365	18	2,043	16	2,796	22	—	—
1960	13,121	5,699	44	2,365	18	1,828	14	3,172	24	57	[a]
1961	13,602	5,699	42	2,634	19	1,796	13	3,398	25	75	1
1962	14,500	5,431	38	3,051	21	2,385	16	3,489	24	144	1
1963	15,106	5,740	38	3,172	21	2,417	16	3,626	24	151	1
1964	15,738	5,823	37	3,305	21	2,675	17	3,777	24	156	1
1965	16,733	5,857	35	3,348	20	3,346	20	4,016	24	166	1
ESTIMATED MILES FLOWN, Millions											
1931	94	13	14	26	28	25	27	29	31	—	—
1936	93	12	13	25	26	30	33	27	28	—	—
1941	346	27	8	51	15	197	57	71	20	—	—
1946	875	122	14	108	12	479	55	157	18	10	1
1951	975	380	39	190	20	190	19	200	21	15	1
1953	1,045	499	48	210	20	121	11	196	19	19	2
1955	1,216	628	52	246	20	121	10	222	18	—	—
1957	1,426	721	51	249	17	202	14	241	17	13	1
1959	1,716	858	50	292	17	223	13	243	20	—	—
1960	1,769	881	50	299	17	194	11	387	22	8	[a]
1961	1,858	888	48	333	18	203	11	425	23	9	[a]
1962	1,965	935	48	367	18	256	13	388	20	20	1
1963	2,049	983	48	369	18	266	13	410	20	20	1
1964	2,181	1,047	48	393	18	284	13	436	20	22	1
1965	2,562	1,204	47	461	18	359	14	512	20	26	1

[a] Less than .05 per cent.
Source: Federal Aviation Agency, "FAA Statistical Handbook of Aviation" (Annually).

Vertical Lift Aircraft



Production of vertical lift aircraft during 1966 approximated 2,500 aircraft, nearly double the 1965 total for both domestic and export markets. (See pages 34 and 41.)

Civil helicopters continued to provide a variety of service such as air taxis, agricultural tools, construction cranes, forest fire fighters, traffic patrols, ambulances and executive transports.

Employment by manufacturers of these aircraft exceeded 44,000, a 46 percent increase over the 1965 total.

The 1966 *Directory of Helicopter Operators* listed 933 operators flying 2,318 helicopters, an increase of nine percent in the number of operators and 12 percent in the number of helicopters as compared to 1965. The largest increase, 18 percent, was in the number of companies and executives that own and operate helicopters.

The *Directory* also lists 1,118 helicopter landing facilities in the U. S., Canada and Puerto Rico, more than half of which are privately owned.

An illustrated directory of hospital heliports published by AIA's Vertical Lift Aircraft Council showed that the number of hospital landing facilities had more than doubled since 1965. To develop additional facilities, four states, Montana, Wyoming, Michigan and New Jersey, have established hospital heliport programs to aid in construction of proper landing sites.

HELICOPTER SCHEDULED AIRLINES
Available Service and Utilization
Calendar Years 1952 to Date
(In Thousands)

Year Ending Dec 31	Passengers Carried	Revenue Ton-Miles Flown	Revenue Passenger-Miles Flown	Revenue Plane-Miles Flown
1952	—	75	—	632
1953	1	127	26	1,007
1954	8	151	183	1,074
1955	29	193	628	1,152
1956	64	281	1,585	1,318
1957	153	449	3,275	1,604
1958	230	594	4,885	1,675
1959	366	856	7,477	1,899
1960	430	1,054	9,475	2,219
1961	490	963	8,604	2,157
1962	359	897	8,192	1,518
1963	458	1,317	12,510	1,462
1964	608	1,668	16,003	1,976
1965	718	1,948	18,811	1,984
1966	1,067	2,562	25,420	2,241

Source: Civil Aeronautics Board.

HELICOPTER PILOTS
As of 1 January 1965

Type	TOTAL	Helicopter Only	Helicopter and Airplane	Other
TOTAL	9,542	1,055	8,305	182
Private	527	143	367	17
Commercial	8,743	767	7,811	165
Airline Transport Rating ...	272	145	127	—

Source: Federal Aviation Agency, Statistical Department.

HELICOPTER SCHEDULED AIRLINES
Revenue Ton-Mile Traffic Carried
Calendar Years 1952 to Date
(In Thousands)

Year Ending Dec 31	TOTAL TON-MILES	Passenger	U. S. Mail	Express	Freight	Excess Baggage
1952	75	—	75	—	—	—
1953	127	2	125	—	2	—
1954	151	18	116	13	4	—
1955	193	59	97	32	5	—
1956	281	146	91	36	7	1
1957	449	314	91	34	7	3
1958	594	468	84	33	6	3
1959	856	717	87	41	7	4
1960	1,054	911	91	40	7	5
1961	963	818	94	40	7	5
1962	897	778	65	44	6	3
1963	1,317	1,189	74	44	6	5
1964	1,668	1,520	92	45	6	6
1965	1,948	1,787	84	60	10	6
1966	2,562	2,415	60	70	10	7

Source: Civil Aeronautics Board.

HELIPORTS AND HELISTOPS
in the UNITED STATES, CANADA, and PUERTO RICO
1960—1965

REGION	1960	1963	1964	1965
TOTAL	357	797	1,000	1,118[a]
New England	17	67	94	88
Middle Atlantic	42	90	148	179
East North Central	126	169	151	122
West North Central	8	26	36	47
South Atlantic	21	54	83	97
East South Central	8	13	20	25
West South Central	36	73	87	116
Mountain	15	60	77	78
Pacific	73	203	262	320
Other	11	42	42	46

[a] Of this number, 1,019 are ground level and 99 are elevated.
Source: Aerospace Industries Association.

HOSPITAL HELIPORTS
IN THE UNITED STATES, BY REGION
1965—1966

	1965	1966
TOTAL	34	67
New England	1	2
Middle Atlantic	4	8
East North Central	1	12
West North Central	—	1
South Atlantic	10	13
East South Central	—	1
West South Central	9	13
Mountain	1	3
Pacific	8	14

NOTE: In 1966, Montana inaugurated a state-wide Hospital Heliport Program whereby heliports will be constructed at any hospital when adequate ground or roof area is provided. Three other states now propose similar programs.
Source: Aerospace Industries Association.

CIVIL HELICOPTER OPERATORS AND HELICOPTERS OPERATED
1960 to Date

Year as of February 1	TOTAL Number	Users		
		Commercial	Companies and Executives	Government Agencies[a]
CIVIL HELICOPTER OPERATORS				
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
HELICOPTERS OPERATED				
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

NOTE: Includes United States and Canada.
[a] Federal, state and local governments.
Source: Aerospace Industries Association, company reports.

Public Relations Officials of Manufacturing Member Companies of the Aerospace Industries Association

Abex Corporation
J. Paul Carroll
Director of Public Relations
and Internal Communications
530 Fifth Avenue
New York, New York 10036

Aero Commander Aircraft Divisions
Rockwell-Standard Corporation
Alvin F. Balaban
Director, Public Relations
Rockwell-Standard Building
Pittsburgh, Pennsylvania 15222

E J Cain
Assistant to Director,
Public Relations
Rockwell-Standard Building
Pittsburgh, Pennsylvania 15222

Aerodex, Inc.
R. S. Skidmore
Director, Public Relations
Box 123
International Airport
Miami, Florida 33148

Aerojet-General Corporation
J. J. Lipper
Director of Public
Communications
9100 East Flair Drive
El Monte, California 91734

T. H. Sprague
Corporate Manager, Public
Relations
9100 East Flair Drive
El Monte, California 91734

John Z Ickes, Manager
Public Relations
P. O. Box 15847
Sacramento, California 95813

G. S. Rector, Manager
Public Relations
Suite 2060, 1440 Broadway
New York, New York 10018

James H. Mackin, Manager
Public Relations
11711 Woodruff Avenue
Downey, California 90241

David F. Riordan, Manager
Public Relations
Von Karman Center
P. O. Box 296
Azusa, California 91703

J. R. Levine, Manager
Public Relations
1120 Connecticut Avenue, N. W.
Washington, D. C. 20036

O. G. Whitehurst, Manager
Public Relations
Cape Kennedy
P. O. Box 4425
Patrick Air Force Base, Florida

W. E. Northwood
Manager, Public Relations
Space General Corporation
(A subsidiary of Aerojet-General)
9200 East Flair Drive
El Monte, California 91734

Aeronca, Inc.
Paul F. Moore
Director of Industrial and
Public Relations
1712 Germantown Road
Middletown, Ohio

Aeronutronic Division of Philco-Ford
Corp., a subsidiary of Ford Motor
Company
Donald E. Flamm
Southern California
Public Relations Manager
Philco-Ford Corporation
Ford Road
Newport Beach, California 92663

Allison Division, General Motors Corp.
Roger C. Fleming
Director of Public Relations
Indianapolis, Indiana 46206

James V. Lecocq
Assistant Director of Public
Relations
Indianapolis, Indiana 46206

Milan C. Olbina
Manager, News Relations
Indianapolis, Indiana 46206

Aluminum Company of America
John L. Fleming
Vice President-Public Relations and Advertising
1501 Alcoa Bldg.
Pittsburgh, Pennsylvania 15219

William H. Shepard
Manager, Public Relations
1501 Alcoa Building
Pittsburgh, Pennsylvania 15219

John St. Peter
1200 Ring Building
Washington, D. C. 20036

Gordon C. Meek
Manager, News Bureau
1501 Alcoa Building
Pittsburgh, Pennsylvania 15219

James S. Ellenburg, Jr.
200 Park Avenue
New York, New York 10017

William K. Kinner
Coordinator, Product News
1501 Alcoa Building
Pittsburgh, Pennsylvania 15219

Avco Corporation
Paul A. Deegan
Vice President-Administration
Avco Lycoming Division
Stratford, Connecticut

Fred T. Richards
Assistant to the Chairman
750 Third Avenue
New York, New York 10017

Carl Lewis, Vice President
Public Relations Counsel
Hill & Knowlton, Inc.
150 East 42nd Street
New York, New York

Electronics & Ordnance & Nashville Divs.
Richard E. Stockwell
Box 116
Cincinnati, Ohio

Avco Space Missiles and Electronics Group
R. A. Dulong
Manager, Public Relations and Presentations
Wilmington, Massachusetts

H. Preston Pitts, Jr.
Manager-Public and Government Relations
Avco Defense & Industrial Products Group
1701 K Street, N. W.
Washington, D. C. 20006

Avco-Everett Research Laboratory
V. J. Coates
Everett, Massachusetts

Avco Lycoming Division
Joseph E. Tyson, Manager, Sales Promotion
Williamsport, Pennsylvania

Beech Aircraft Corporation
Bob Glaves
Manager, Press Relations
Wichita, Kansas 67201

Bell Aerosystems Co., a division of Bell Aerospace Corporation, a Textron Company
G. Jackson Butterbaugh
Director, Public Relations
P. O. Box 1
Buffalo, New York 14240

Charles F. Kreiner
Public Relations Administrative Services Manager
P. O. Box 1
Buffalo, New York 14240

Albert W. Spindler
News Bureau Manager
P. O. Box 1
Buffalo, New York 14240

Scott Hammon
Public Relations Assistant
P. O. Box 1
Buffalo, New York 14240

John J. Geary
Public Relations Assistant
P. O. Box 1
Buffalo, New York 14240

Ralph Wallenhorst
Public Relations Assistant
P. O. Box 1
Buffalo, New York 14240

Donald Norton
Public Relations Assistant
P. O. Box 1
Buffalo, New York 14240

Bell Helicopter Company
a division of Textron Inc.
James C. Fuller
Assistant Vice President
Public Relations
P. O. Box 482
Fort Worth, Texas 76101

Larry M. Hayes
Asst. Director, Public Relations
P. O. Box 482
Fort Worth, Texas 76101

The Bendix Corporation
E. E. Fox
Vice President, Public Relations
& Advertising
1104 Fisher Building
Detroit, Michigan 48202

Bendix Missile Systems Division
John Coxeter
400 Beiger Street
Mishawaka, Indiana 46544

Bendix Radio Division
W. W. Price
East Joppa Road
Towson, Baltimore, Maryland
21204

Bendix Aerospace Systems
Division
D. H. Schurz
Ann Arbor, Michigan 48107

Navigation & Control Division
F. C. Smith
Teterboro, New Jersey 07608

Energy Controls Division
John Coxeter
401 Bendix Drive
South Bend, Indiana

Electrodynamics Division
Park Irvine
Manager-Communications
11600 Sherman Way
North Hollywood, California
91605

Launch Support Division
L. P. Clark Jr.
P. O. Box 21086
Kennedy Space Center,
Florida 32815

Bendix Corporation Group,
Public Relations Manager-
Aerospace
J. B. McLean
Carl Byoir & Associates, Inc.
800 Second Avenue
New York, New York 10017

The Boeing Company
Carl M. Cleveland
Director, Public Relations
and Advertising
Box 3707
Seattle, Washington 98124

Peter Bush
Assistant Director, Public
Relations
Box 3707
Seattle, Washington 98124

Robert S. Mansfield
17 Avenue Matignon
Paris 8, France

Mark E. Nevils
Suite 3562 International Bldg.
45 Rockefeller Plaza
New York, New York

Aero-Space Group
William Jury
P. O. Box 3707
Seattle, Washington 98124

Michoud Plant
W. W. Clarke
P. O. Box 26088
New Orleans, Louisiana

Vertol Division
Tom MacNew
Morton, Pennsylvania

Commercial Airplane Division
Gordon S. Williams
P. O. Box 707
Renton, Washington

Gregg Reynolds
1200 Commonwealth Bldg.
1625 K Street, N. W.
Washington, D. C. 20006

Wichita Division
H. D. Hollinger
3801 S. Oliver
Wichita, Kansas

Cessna Aircraft Company
William G. Robinson
Director of Corporate Public Relations
P. O. Box 1521
Wichita, Kansas 67201

Chandler Evans, Inc.
Control System Division of
Colt Industries, Inc.
D. C. Eaton
Vice President-Marketing
Charter Oak Blvd.
West Hartford, Conn. 06101

Continental Motors Corporation
D. H. Bennett
Executive Assistant for Corporate Communications
205 Market Street
Muskegon, Michigan 49443

Don Fairchilds
Director of Market Support
12700 Kercheval Avenue
Detroit, Michigan 48215

Cook Electric Company
Bruce Z. Shaeffer
Director of Corporate Public Relations
6401 Oakton Street
Morton Grove, Illinois 60053

Curtiss-Wright Corp.
Ronald S. Gall
Corporate Director of Public Relations and Asst. to the President
One Passaic Place
Wood-Ridge, New Jersey 07075

Douglas Aircraft Co.
(a component of McDonnell Douglas Corp.)
Richard J. Davis
Vice President-Public Relations
3000 Ocean Park Blvd.
Santa Monica, California 90406

Missile & Space Systems Group
Walter C. Cleveland
Director of Public Relations
5301 Bolsa Avenue
Huntington Beach, California 92646

Aircraft Group
Raymond L. Towne
Director of Public Relations
3855 Lakewood Blvd.
Long Beach, California 92646

Tulsa Division
Jess Hightower
Manager of Public Relations
2000 North Memorial Drive
Tulsa, Oklahoma 74115

Washington Office
Howard Maginniss
Washington Public Relations Manager
1100 17th Street, N. W.
Washington, D. C. 20036

New York Office
E. Theodore Stern
New York Counsel
Chrysler Building
405 Lexington Avenue
New York, New York 10017

Geneva Office
Donald R. Stiess
91 Rue de La Servette
Geneva, Switzerland

Fairchild Hiller Corporation
H. S. Phillips
Director of Public Relations
Sherman Fairchild Technology Center
Fairchild Drive
Germantown, Maryland 20767

Steven C. Paton
Manager, Information Services
Sherman Fairchild Technology Center
Fairchild Drive
Germantown, Maryland 20767

H. M. Siegel
Manager, Editorial Services
Sherman Fairchild Technology Center
Fairchild Drive
Germantown, Maryland 20767

Aircraft Division
A. Vernon Davis
Director of Public Relations
Hagerstown, Maryland 21740

Republic Aviation Division
Roy E. Wendell
Director of Public Relations
Farmingdale, L. I., New York
11735

The Garrett Corporation
Ted Burke
Director, Public Relations and Advertising
9851 Sepulveda Blvd.
Los Angeles, California 90009

AiResearch Mfg. Div., Arizona
J. Morton Newell
Manager, Public Relations
402 S. 36th Street
Phoenix, Arizona 85034

AiResearch Mfg. Div., Los Angeles
John W. Bold
Manager, Press Relations
9851 Sepulveda Blvd.
Los Angeles, California 90009

General Dynamics Corp.
P. J. Sullivan
Vice President
1 Rockefeller Plaza
New York, New York 10020

K. T. Simendinger
Washington Public Relations Manager
1710 H Street, N. W.
Washington, D. C. 20006

Convair Division
R. T. Blair, Jr.
Asst. to President
P. O. Box 1128
San Diego, California 92112

Fort Worth Division
Loyd L. Turner
Special Asst. to President
P. O. Box 748
Fort Worth, Texas 76101

Pomona Division
J. E. Sloan
Staff Asst., President's Office
P. O. Box 2507
Pomona, California 91769

General Electric Company
Missile and Space Division
J. C. Hoffman
P. O. Box 8555
Philadelphia, Pennsylvania

Flight Propulsion Division
W. A. Schoneberger
1000 Western Avenue
West Lynn, Massachusetts

Defense Electronics Division
E. E. Spencer
P. O. Box 2528 (UUB)
Schenectady, New York

Defense Programs Division
W. J. Wallace
777 14th Street, N. W.
Washington, D. C. 20005

News Bureau
R. B. Piorkowski
1 River Road
Building 23
Schenectady, New York

General Laboratory Associates, Inc.
Girard F. Oberrender, Jr.
Vice President of Research & Development
17 Midland Drive
Norwich, New York 13815

General Precision, Inc.
Norman Wicks
Director of Public Relations and Advertising
50 Prospect Avenue
Tarrytown, New York

GPL Division, Aerospace Group
Gary Singer
Manager, Advertising and Public Relations
63 Bedford Road
Pleasantville, New York

Aerospace Group
Gerald Toker
Director, Advertising and Sales Promotion
1150 McBride Avenue
Little Falls, New Jersey

Librascope Group
Al Erickson
Director, Public Relations and Advertising
808 Western Avenue
Glendale 1, California

Link Group
Robert Lyons
Manager, Advertising and Sales Promotion
Hillcrest
Binghamton, New York

The B. F. Goodrich Company
Aerospace and Defense Products
Jay Miller
Director, Public Relations-Corporate
Akron, Ohio

Goodyear Aerospace Corporation
William B. deMeza
Manager, Public Relations
1210 Massillon Road
Akron, Ohio 44315

Arizona Division
Gerald A. Kneisel
Goodyear Aerospace Corp.
Litchfield Park, Arizona 85340

Grumman Aircraft Engineering Corp.
J. B. Rettaliata
Vice President
Bethpage, Long Island, New York 11714

R. M. Voris
Director-Public Relations & Advertising
Bethpage, Long Island, New York 11714

H. E. Bockrath
Assistant Director-News and Communications
Bethpage, Long Island, New York 11714

E. V. Brookfield
Assistant Director-Special Programs and Promotions
Bethpage, Long Island, New York 11714

T. L. Connor
Assistant Director-Customer Affairs
Bethpage, Long Island, New York 11714

F. W. Hawkins
Assistant Director-Community Affairs
Bethpage, Long Island, New York 11714

N. G. MacKinnon
Assistant Director-Advertising
Bethpage, Long Island, New York 11714

Gyrodyne Co. of America, Inc.
William A. Parker
Director, Public Relations and Advertising
St. James, L. I., New York

Harvey Aluminum, Inc.
Gene Alfred
Director of Public Relations
19200 S. Western Avenue
Torrance, California

Hercules Incorporated
Richard B. Douglas
Manager, Missile and Space Publicity
910 Market Street
Wilmington, Delaware 19899

Honeywell Inc.
Forler Massnick
Director of Public Relations
2701 4th Avenue S.
Minneapolis, Minnesota 55408

Military Products Group
Richard T. Saunders
2600 Ridgway Road
Minneapolis, Minnesota 55413

Hughes Aircraft Company
E. J. Beam
Director of Public Relations and Advertising
Centinela Avenue & Teale Street
Culver City, California 90230

Aerospace Group
J. E. Lynch
Manager, Public Relations
Culver City, California 90230

Ground Systems Group
H. R. Dentz
Manager, Public Relations
P. O. Box 3310
Fullerton, California 92634

Hughes Tool Company
Aircraft Division
Carl D. Perry
Asst. to the Vice President and General Manager
Centinela Avenue & Teale Street
Culver City, California 90230

International Business Machines Corp.
Federal Systems Division
W. B. Jones
Director of Communications
18100 Frederick Pike
Gaithersburg, Maryland 20760

A. J. Cella
Information Manager
1322 Space Park Drive
Houston, Texas 77058

International Telephone & Telegraph Corp.
Edward J. Gerrity
Senior Vice President
320 Park Avenue
New York, New York

William Merriam
Asst. Vice President
1707 L Street, N. W.
Washington, D. C.

Joseph A. Abbott
Director, Public Relations
Defense Space Group
500 Washington Avenue
Nutley, New Jersey 07110

Kaiser Aerospace & Electronics Corp.
Harold V. Lauth
Manager, Public Relations
900 17th Street, N. W.
Washington, D. C. 20006

Kaman Corporation
W. B. Haskell, Jr.
Director of Public Relations
Bloomfield, Connecticut

Kollsman Instrument Corp.
J. G. Anderson
Vice President-Marketing
80-08 - 45th Avenue
Elmhurst, New York

Al Langer
Public Relations Director
80-08 - 45th Avenue
Elmhurst, New York

Lear Jet Industries, Inc.
James R. Greenwood
Director of Public Relations
P. O. Box 1280
Wichita, Kansas 67201

Allan K. Higdon
Manager of Information Services
P. O. Box 1280
Wichita, Kansas 67201

Lear Siegler, Inc.
William M. O'Hern
Vice President-Public Relations & Advertising
3171 South Bundy Drive
Santa Monica, California 90406

George A. Moak
Assistant to Vice President Public Relations & Advertising
3171 S. Bundy Drive
Santa Monica, California 90406

K. C. Hallamore
Director, Governmental Relations
1120 Connecticut Avenue, N. W.
Washington, D. C. 20006

Instrument Division
H. R. Walton
Product Information Manager
4141 Eastern Ave., S. E.
Grand Rapids, Michigan 49508

Astek Division
R. S. Hultmark
Vice President-Marketing
Armonk, New York

Power Equipment Division
C. M. Ong, Manager, Marketing Services
P. O. Box 6719
Cleveland, Ohio 44101

Power Equipment Division
ROMEC Facility
R. B. Moore
Manager, Advertising and Publicity
241 S. Abbe Road
Elyria, Ohio 44036

Astronics Division
Kenneth C. Kramer
Vice President-Marketing
3171 South Bundy Drive
Santa Monica, California 90406

Data and Controls Division
N. Cohen
Director-Systems Marketing
532 Broad Hollow Road
Melville, New York 11746

Electronic Instrumentation Div.
C. B. Smith
Director-Marketing
714 N. Brookhurst Street
Anaheim, California 92803

C. G. Hokanson Division
B. M. Hokanson
Vice President
3333 W. Warner Avenue
Santa Ana, California 92704

LSI Service Corporation
George A. Moak
3171 S. Bundy Drive
Santa Monica, California 90406

Ling-Temco-Vought, Inc.
John W. Johnson
Vice President-Public Relations
P. O. Box 5003
Dallas, Texas

Lockheed Aircraft Corporation
William R. Wilson
Vice President-Public Relations
Burbank, California 91503

Lockheed-California Company
Benjamin H. Cook
Burbank, California 91503

Lockheed Propulsion Co.
Everett A. Hayes
P. O. Box 111
Redlands, California 92373

Lockheed-Georgia Company
A. Lee Rogers
Marietta, Georgia 30060

Lockheed-Missiles & Space Company
J. B. Riffel
P. O. Box 504
Sunnyvale, California 94088

Lockheed Electronics Company
George W. Mulhern
U. S. Highway 22
Plainfield, New Jersey 07061

Lockheed Air Terminal, Inc.
G. W. Stanton
Burbank, California 91502

Lockheed Aircraft Service Co.
James S. Bull
Ontario International Airport
Ontario, California 91764

The Marquardt Corporation
Kenneth E. Allen
Manager, Public Relations
16555 Saticoy
Van Nuys, California 91409

Carlos Villarreal
Vice President-Marketing
888 - 17th Street, N. W.
Washington, D. C. 20006

Martin Marietta Corporation
Roy Calvin
Corporate Director, Public Relations and Advertising
277 Park Avenue
New York, New York 10017

Washington Office
Martin Marietta Aerospace Group
W. D. McBride
815 Connecticut Avenue, N. W.
Washington, D. C. 20006

Baltimore Division
W. B. Harwood
Baltimore, Maryland 21203

Orlando Division
E. J. Cottrell
P. O. Box 5837
Orlando, Florida 32805

Denver Division
John H. Boyd, Jr.
P. O. Box 179
Denver, Colorado 80201

RIAS (Research Institute for Advanced Studies)
E. H. Miller
1450 South Rolling Road
Baltimore, Maryland 21227

McDonnell Douglas Corporation
Michael Witunski
Director of External Relations
P. O. Box 516
St. Louis, Missouri 63166

Me sco Manufacturing Co.
Jay K. Palmer
Director, Sales & Contracts
Corporate Offices
805 S. San Fernando Blvd.
Burbank, California 91503

Mrs. Jeri Turpin
Administrative Assistant to the President-Public Relations
Corporate Offices
805 S. San Fernando Blvd.
Burbank, California 91503

North American Aviation, Inc.
Leland R. Taylor
Vice President and Assistant to the President
General Offices
1700 East Imperial Highway
El Segundo, California 90246

F. D. Tappaan
Vice President-Public Relations
1700 E. Imperial Highway
El Segundo, California 90246

John J. Oswald
Corporate Director-Public Relations
1700 East Imperial Highway
El Segundo, California 90246

Atomics International
Garland C. Ladd
Assistant to the President
Public Relations
8900 DeSoto Street
Canoga Park, California

Autonetics Division
Richard P. Lytle
Public Relations Director
3370 Miraloma Avenue
Anaheim, California

Los Angeles Division
J. M. Syverson
Public Relations Director
International Airport
Los Angeles, California

Rocketdyne Division
David Juenke
Assistant to the President
Public Relations
6633 Canoga Avenue
Canoga Park, California

Space and Information Systems Division
Earl Blount
Public Relations Director
12214 Lakewood Blvd.
Downey, California

Columbus Division
George Snodgrass
Public Relations Director
4300 East 5th Avenue
Columbus, Ohio

Rocketdyne Division
John Buerger
Assistant to Plant Manager
P. O. Box 511
Neosho, Missouri

Rocketdyne Division
Richard Moore
Assistant to the Vice President
P. O. Box 548
McGregor, Texas

Southwestern Office
Harry Herranen
Public Relations Representative
Houston, Texas

Science Center
James F. Scheer
Public Relations Manager
1049 Camino Dos Rios
Thousand Oaks, California

Washington Office
W. E. Van Dyke
Assistant to the Vice President
1629 K Street, N. W.
Washington, D. C. 20006

James H. Higgs
4 Place de la Concorde
Paris 8E, France

Northrop Corporation
Norman Warren
Director, Public Relations and Advertising
9744 Wilshire Blvd.
Beverly Hills, California 90212

Charley Barr
Asst. Director of Public Relations
9744 Wilshire Blvd.
Beverly Hills, California 90212

Thomas P. Nelson
Public Relations Manager, Eastern Regional Office
Riddell Building, Suite 905
1730 K Street, N. W.
Washington, D. C. 20006

Northrop Norair
Richard Hachten
Public Relations Manager
3901 West Broadway
Hawthorne, California 90250

Northrop Nortronics
Earl C. Parker
Public Relations Manager
1 Research Park
Palos Verdes Peninsula,
California 90274

Northrop Ventura
C. Henry Still
Public Relations Manager
1515 Rancho Concjo Blvd.
Newbury Park, California 91320

Northrop International
Ben Scarpero
Public Relations Manager
9744 Wilshire Blvd.
Beverly Hills, California 90212

Public Relations Manager,
Europe
Les Daly
12 Rue Hamelin
Paris 16e, France

Pacific Airmotive Corporation
Roy Backman
Vice President
2940 North Hollywood Way
Burbank, California

Piper Aircraft Corporation
C. E. Bockstahler
Sales Promotion Manager
Lock Haven, Pennsylvania

W. D. Strohmeier
Davis, Parsons & Strohmeier
52 Vanderbilt Ave.
New York, New York 10016

Pneumo Dynamics Corporation
D. V. Sheehan
Director of Public Relations
3781 East 77th Street
Cleveland, Ohio 44105

Radio Corporation of America
Corporate Staff
Kenneth W. Bilby
Executive Vice President
Public Affairs
RCA, 30 Rockefeller Plaza
New York, New York 10020

Al S. Rylander
Staff Vice President
News & Information
RCA, 30 Rockefeller Plaza
New York, New York 10020

Hank J. Bechtold
Manager, News Services
RCA, 30 Rockefeller Plaza
New York, New York 10020

Mrs. F. Edward Cavin
Manager
Public Affairs-Washington
1725 K Street, N. W.
Washington, D. C. 20006

Defense Electronic Products
Nicholas F. Pensiero
Manager, DEP Public Affairs
Camden, N. J. 08102

Thomas L. Elliott
Manager, Product Information,
DEP
Camden, N. J. 08102

Joseph J. Fox
Manager, News Services, DEP
Camden, N. J. 08102

Aerospace Systems Division
Dave B. Dobson
Adm., Technical Publications
P. O. Box 588
Burlington, Massachusetts 01801

Astro-Electronics Division
Louis F. Slee
Adm., Customer Relations
P. O. Box 800
Princeton, N. J. 08540

Communications Systems Division
Joseph C. Belanger
Mgr., Marketing Administration
Camden, N. J. 08102

Missile and Surface Radar
Division
G. W. Van Citters
Adm., Public & Customer
Relations
Marne Highway & Borton
Landing Rd.
Moorestown, N. J. 08057

West Coast Division
Loyd D. Andrew
Adm., Marketing Services
8500 Balboa Boulevard
Van Nuys, California 91409

Aviation Equipment Department
William C. Moore
Mgr., Public Relations & Advertising
11819 W. Olympic Blvd.
Los Angeles, California 90064

Rohr Corporation
Larry Peeples
Manager of Public Relations and Advertising
P. O. Box 878
Chula Vista, California 92012

Ryan Aeronautical Company
William Wagner
Vice President, Public Relations
Lindbergh Field
San Diego, California 92112

George J. Becker, Jr.
Public Relations Manager
Lindbergh Field
San Diego, California 92112

Jack G. Broward
News Bureau Chief
Lindbergh Field
San Diego, California 92112

Solar, a Division of International Harvester Company
Payne B. Johnson
Manager of Communication
2200 Pacific Highway
San Diego, California 92112

Sperry Rand Corporation
Sperry Gyroscope Company
Carlyle H. Jones
Vice President for Public Relations
Great Neck, L. I., New York

Ken Brigham
Director of Public Relations
Great Neck, L. I., New York

Sperry Electronic Tube Division
Dave Musgrave
Public Relations Manager
Gainesville, Florida

Sperry Microwave Electronics Co. Div.
Dorothy FitzGerald
Public Relations Coordinator
Clearwater, Florida

Sperry Phoenix Company
Robert Schulman
Public Relations Manager
Phoenix, Arizona

Sperry Piedmont Co. Div.
Jack Pleasants
Public Relations Coordinator
Charlottesville, Virginia

Sperry Rand Research Center
Joseph Nangle
Public Relations Manager
Sudbury, Massachusetts

Sperry Semiconductor Division
Don Emden
Market Planning Manager
South Norwalk, Connecticut

Sperry Utah Co. Div.
Keith Russon
Public Relations Manager
322 N. 2100 West
Salt Lake City, Utah

Sperry Gyroscope Company, Ltd.
A. P. Smallman
Publicity Services Manager
Brentford, Middlesex, England

Vickers, Inc.
E. J. Doucet
Director, Advertising & Public Relations
Detroit, Michigan

Sundstrand Corporation
Ralph Rothstein
Vice President-Personnel and Public Relations
2531 11th Street
Rockford, Illinois

W. R. Liddle
Director, Public Relations
2531 11th Street
Rockford, Illinois

Thiokol Chemical Corporation
T. J. Zack
Manager Adv. & Public Relations
Executive Offices
Bristol, Pennsylvania 19007

Astro-Met Division
Dale J. Craft
P. O. Box 1497
Ogden, Utah 84402

Elkton Division
Frank Hodgdon
P. O. Box 241
Elkton, Maryland 21921

Huntsville Division
Jack F. Neal
Huntsville, Alabama 35800

Wasatch Division
James Brown
P. O. Box 524
Brigham City, Utah 84302

Reaction Motors Division
J. Moriarty
Denville, New Jersey

Longhorn Division
Max Lale
Marshall, Texas 75671

Space Booster Division
W. L. Berry
Brunswick, Georgia 31520

TRW Inc.
Robert A. Newman
Director, Corporate Public Relations & Advertising
23555 Euclid Avenue
Cleveland, Ohio 44117

Arlen D. Southern
Assistant Director, Corporate Public Relations & Advertising
23555 Euclid Avenue
Cleveland, Ohio 44117

William J. Moran
Manager, Information Services
23555 Euclid Avenue
Cleveland, Ohio 44117

TRW Systems Group
Harold H. Litten
Director, Public Relations & Advertising
One Space Park
Redondo Beach, California 90278

Herbert H. Rosen
Manager, Public Relations
One Space Park
Redondo Beach, California 90278

TRW Electronics Group
Frank E. O'Brien
Director, Public Relations & Advertising
1100 Glendon Avenue
Los Angeles, California 90024

TRW Equipment Group
Ben M. Marino
Communications Manager
23555 Euclid Avenue
Cleveland, Ohio 44117

United Aircraft Corporation
Frank L. Murphy
Vice President
East Hartford, Connecticut 06108

Frank J. Giusti
Asst. Director of Public Relations
East Hartford, Connecticut 06108

John G. Fitzgerald
Assistant Director of Public Relations-New York
230 Park Avenue
New York, New York 10017

James R. Patterson
Assistant Director of Public Relations-Washington
1725 De Sales Street, N. W.
Washington, D. C. 20036

Pratt & Whitney Aircraft Division
R. H. Zaiman
Public Relations Manager
East Hartford, Connecticut

Hamilton Standard Division
Charles A. Anezis
Public Relations Manager
Windsor Locks, Connecticut 06096

Sikorsky Aircraft Division
Frank J. Delear
Public Relations Manager
Stratford, Connecticut 06497

Norden Division
George J. Flynn
Public Relations Manager
Norwalk, Connecticut 06854

United Technology Center
R. W. Larrick
Director of Public Relations
Sunnyvale, California 94086

Vector Division
John M. Millet
Publications Manager
Trevose, Pennsylvania 17881

United Aircraft Corporate Systems Center
Paul W. Burton
Public Relations Manager
Farmington, Connecticut 06032

United Aircraft Research Laboratories
Ralph I. Villers
East Hartford, Connecticut 06108

United Aircraft International
James E. Marquis
Assistant to the President-Public Relations
East Hartford, Connecticut 06108

United Aircraft of Canada Limited
G. M. Gauthier, Public Relations Manager
P. O. Box 10
Longueuil, Quebec, Canada

Westinghouse Electric Corporation
Robert A. Deasy
Director, Public Relations
Atomic, Defense & Space Group
1625 K Street, N. W.
Washington, D. C. 20006

C. F. Carroll
Mgr., Headquarters Public Relations
No. 3 Gateway Center
P. O. Box 2278
Pittsburgh, Pennsylvania 15230

P. E. Norton
Mgr., Public Relations
New York Office
200 Park Avenue
New York, New York 10017

Carl Albracht
Mgr., Public Relations
410 Bush Street
San Francisco, California 94108

D. A. Poland
Supervisor, Public Relations
P. O. Box 1693
Baltimore, Maryland 21203

L. J. Brehl
Mgr., Internal Communications & Community Relations
Aerospace Electrical Div.
P. O. Box 989
Lima, Ohio 45802

AEROSPACE INDUSTRIES ASSOCIATION

1725 De Sales Street, N. W., Washington, D. C. 20036

Public Relations Service

Glen Bayless, *Public Relations Director*

Gerald J. McAllister

John J. Lee

Richard Balentine

Gerson Chanowitz, *Economist*

EXPLANATION OF TERMS AND ABBREVIATIONS

Accessions: new hires and rehires by industrial employer. Cumulated for a calendar month or year and expressed as a rate per 100 employees on the payroll.

Aerospace Industry: the industry primarily engaged in the manufacture of aircraft, guided missiles, spacecraft—i.e., all air and space vehicles and their related components and parts.

AIA: Aerospace Industries Association, formerly Aircraft Industries Association.

Air Carriers: see Airlines.

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. Part 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: the commercial system of air transportation. Consists of scheduled domestic and (U. S.) international air carriers, supplemental and other carriers.

Airplane: see Aircraft.

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

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

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

Development: the process or activity of working out a basic design, idea, or piece of equipment (see also Research).

DoD: Department of Defense.

Earnings: see Net Income.

Evaluation: determination of technical ıitability of material, equipment or a system.

Expenditures (Federal Budget): the actual disbursements or payments. They consist generally of checks issued and cash paid. The trans-

actions of business-type activities which generate their own receipts are normally recorded as net expenditures—that is, the excess of disbursements over receipts. If receipts exceed disbursements, the result is shown as a negative expenditure.

FAA: Federal Aviation Administration (formerly the Federal Aviation Agency).

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

Fiscal Year (Federal Budget): from July 1 to June 30, e.g., the 1967 fiscal year begins on July 1, 1966, and ends June 30, 1967; abbreviated FY.

Funding: setting aside funds for a particular purpose.

FY: see Fiscal Year.

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

Helicopter: A heavier-than-air aircraft supported in the air by power driven rotors about one or more substantially vertical axes.

ICBM: Intercontinental Ballistic Missile, range more than 5,000 miles.

Labor Turnover: the gross movement of wage and salary workers into and out of employment in individual manufacturing establishments, cumulated for a calendar month or year and expressed as a rate per 100 employees on the payroll.

Military Assistance: see Mutual Security Program.

Mutual Security Program: a program of the U. S. Government designed to maintain the 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.

Net Income: profit after depreciation, taxes and reserves for taxes, chargeoffs, other reserves, etc., but before dividends; also identified as earnings or net earnings.

New Obligational Authority (Federal Budget): authority provided by the Congress to obligate the federal government to pay out money. While usually voted each year, it may become available annually under a permanent law, as with interest on the public debt. "Appropriations" are the most common form of obligational authority.

Obligations (Federal Budget): commitments made by federal departments and agencies to pay out money—as distinct from the actual payments made for products, services, loans or other purposes.

The amounts must be within the maximum amounts provided by Congress.

Passenger Mile: one passenger moved one mile.

Procurement: the process whereby federal government agencies acquire material, services, and property from industry.

Profit: see Net Income.

R & D: Research and Development.

RDT&E: Research, Development, Test and Evaluation.

Research: "basic research" provides new knowledge and understanding; "applied research" puts the knowledge gained in basic research to some useful purpose. Applied research is often called development.

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.

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.

Separations: terminations of employment. Terminations may be initiated by the employee (quits) or the employer (layoff, other separations). Both employee and employer actions are accumulated for a calendar month or year and are expressed as a rate per 100 employees on the payroll.

STOL: short takeoff and landing aircraft.

Test: an experiment designed to assess progress in attainment or accomplishment of development objectives.

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.

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" and "turbo-jet."

U.K.: United Kingdom.

U.S.: United States.

USA: United States Army.

USAF: United States Air Force.

USCG: United States Coast Guard.

USN: United States Navy.

USSR: Union of Soviet Socialist Republics.

Utility Aircraft: an aircraft designed for general purpose work.

V/STOL: vertical or short takeoff and landing aircraft.

VTOL: vertical takeoff and landing aircraft.

INDEX

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1725 DE SALES STREET, N.W., WASHINGTON, D. C. 20036