National Aeronautics and Space Administration

BUDGET ESTIMATES

FISCAL YEAR 1967

SPECIAL ANALYSIS OF REQUIREMENTS
AUTOMATIC DATA PROCESSING EQUIPMENT

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Fiscal Year 1967 Estimates

Automatic Data Processing Equipment

TABLE OF CONTENTS

	Page Number
General Statement	1
Analysis of Estimates	
Agency Summaries	2
General Purpose Use	8
Special Purpose Use	14
End of Year Inventory	
Agency Summaries	20
General Purpose Use	22
Special Purpose Use	30
Summary of Requirements by NASA Installation	
Ames Research Center	38
Electronics Research Center	40
Flight Research Center	42
Goddard Space Flight Center	44
Headquarters	47
Jet Propulsion Laboratory	49
Kennedy Space Center	52
Langley Research Center	55
Lewis Research Center	57
Manned Spacecraft Center	59
Marshall Space Flight Center	61
Space Nuclear Propulsion Office	64
Wallops Station	66

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Automatic Data Processing Equipment
General Statement

In the conduct of the space program, the computer has been and will continue to be a vital and essential tool. Without computers, it would have been impossible to conceive, design, test, or fly our present complex spacecraft, or to achieve rendezvous between Gemini VI and VII. As NASA extends its missions to Apollo and beyond to operations around and on the planets, the computer will become an even more vital part of the mission. Control and accuracy requirements become more critical as mission complexity increases. Requirements are increasing and computer costs represent a growing portion of the NASA budget. It is important, therefore, that there be an understanding of the computer effort and that close coordination and control of this effort be achieved.

NASA has realized that close central control of this essential resource is necessary and in July of this year, NHB 2410.1 (Management Procedures for Automatic Data Processing Equipment) was issued in draft form and a revised version will be ready soon. This handbook spells out the basic responsibilities of all levels of management for requirements control, equipment acquisition, utilization and disposal.

Our computer uses extend into every phase of the space program. The more familiar uses are for solution of scientific/engineering problems, data reduction, simulation, mission control and administrative applications. The large, general purpose computers are utilized for these tasks. Within NASA, equipment utilized for such uses are placed in Category A and close control is maintained on acquisition and utilization. Computers are also utilized for other than just computational tools. It has become economical to utilize the switching and decision making abilities in large electronic systems, where use of the computer is tied completely to the actual system and cannot easily be divorced from it for other uses. In NASA, such equipment is placed in Category B and control of these systems are not separated from the overall systems. However, control is exercised over the placement in Category B because of the gray area that may exist between the two categories.

NASA intends to place strong emphasis on planning in depth in the use of ADP. It has recognized the importance of achieving the most economic utilization of its ADP resources and intends to probe every possible method of achieving this result.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Analysis of Automatic Data Processing Equipment

FY 1965 - Summary (Categories A & B)

(In Thousands of Dollars)

	Purchase	Lease	Maintenance	Total
Research and Development				
Ames Research Center	496	61	3	560
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	17	17
Goddard Space Flight Center	16,727	---	1,337	18,064
Headquarters	---	---	---	---
Jet Propulsion Laboratory	3,917	3,251	220	7,388
Kennedy Space Center	216	318	34	568
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	1,144	7,990	101	9,235
Marshall Space Flight Center	346	5,686	3	6,035
Space Nuclear Propulsion Office	---	71	---	71
Wallops Station	---	---	---	---
Total, R&D	22,846	17,377	1,715	41,938
Administrative Operations				
Ames Research Center	---	1,850	---	1,850
Electronics Research Center	---	---	---	---
Flight Research Center	951	181	25	1,157
Goddard Space Flight Center	30,977	5,121	228	36,326
Headquarters	675	364	12	1,051
Jet Propulsion Laboratory	17,034	---	---	17,034
Kennedy Space Center	---	701	---	701
Langley Research Center	1,018	2,386	38	3,442
Lewis Research Center	4,145	1,094	33	5,272
Manned Spacecraft Center	8,710	4,515	26	13,251
Marshall Space Flight Center	7,053	6,084	60	13,197
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	1,731	184	1	1,916
Total, AO	72,294	22,480	423	95,197

FY 1965 Summary (Categories A & B) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	3,505	---	---	3,505
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	3,505	---	---	3,505
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	496	1,911	3	2,410
Electronics Research Center	---	---	---	---
Flight Research Center	951	181	42	1,174
Goddard Space Flight Center	51,209	5,121	1,565	57,895
Headquarters	675	364	12	1,051
Jet Propulsion Laboratory	20,951	3,251	220	24,422
Kennedy Space Center	216	1,019	34	1,269
Langley Research Center	1,018	2,386	38	3,442
Lewis Research Center	4,145	1,094	33	5,272
Manned Spacecraft Center	9,854	12,505	127	22,486
Marshall Space Flight Center	7,399	11,770	63	19,232
Space Nuclear Propulsion Office	---	71	---	71
Wallops Station	1,731	184	1	1,916
Total	98,645	39,857	2,138	140,640

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Analysis of Automatic Data Processing Equipment

FY 1966 - Summary (Categories A & B)

(In Thousands of Dollars)

	Purchase	Lease	Maintenance	Total
Research and Development				
Ames Research Center	1,065	69	116	1,250
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	17	17
Goddard Space Flight Center	6,096	---	1,305	7,401
Headquarters	---	---	---	---
Jet Propulsion Laboratory	6,503	4,011	565	11,079
Kennedy Space Center	260	792	347	1,399
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	2,301	12,106	182	14,589
Marshall Space Flight Center	---	6,915	37	6,952
Space Nuclear Propulsion Office	---	176	---	176
Wallops Station	314	---	---	314
Total, R&D	16,539	24,069	2,569	43,177
Administrative Operations				
Ames Research Center	344	1,767	20	2,131
Electronics Research Center	---	27	---	27
Flight Research Center	---	78	28	106
Goddard Space Flight Center	161	5,650	88	5,899
Headquarters	---	98	24	122
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	---	806	---	806
Langley Research Center	4,638	2,954	146	7,738
Lewis Research Center	2,821	365	80	3,266
Manned Spacecraft Center	---	5,489	332	5,821
Marshall Space Flight Center	---	4,415	330	4,745
Space Nuclear Propulsion Center	---	---	---	---
Wallops Station	---	63	50	113
Total, AO	7,964	21,712	1,098	30,774

FY 1966 - Summary (Categories A & B) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	1,091	---	---	1,091
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	5,581	---	---	5,581
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	6,672	---	---	6,672
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	1,409	1,836	136	3,381
Electronics Research Center	---	27	---	27
Flight Research Center	---	78	45	123
Goddard Space Flight Center	7,348	5,650	1,393	14,391
Headquarters	---	98	24	122
Jet Propulsion Laboratory	6,503	4,011	565	11,079
Kennedy Space Center	5,841	1,598	347	7,786
Langley Research Center	4,638	2,954	146	7,738
Lewis Research Center	2,821	365	80	3,266
Manned Spacecraft Center	2,301	17,595	514	20,410
Marshall Space Flight Center	---	11,330	367	11,697
Space Nuclear Propulsion Office	---	176	---	176
Wallops Station	314	63	50	427
Total	31,175	45,781	3,667	80,623

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Analysis of Automatic Data Processing Equipment

FY 1967 - Summary (Categories A & B)

(In Thousands of Dollars)

	Purchase	Lease	Maintenance	Total
Research and Development				
Ames Research Center	2,580	54	219	2,853
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	22	22
Goddard Space Flight Center	686	---	1,929	2,615
Headquarters	---	---	---	---
Jet Propulsion Laboratory	3,027	5,878	611	9,516
Kennedy Space Center	1,130	114	300	1,544
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	5,686	11,005	416	17,107
Marshall Space Flight Center	---	7,108	50	7,158
Space Nuclear Propulsion Office	---	226	---	226
Wallops Station	200	---	---	200
Total, R&D	13,309	24,385	3,547	41,241
Administrative Operations				
Ames Research Center	---	2,195	10	2,205
Electronics Research Center	---	543	---	543
Flight Research Center	---	---	19	19
Goddard Space Flight Center	862	7,100	144	8,106
Headquarters	---	89	24	113
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	---	828	---	828
Langley Research Center	1,982	3,277	402	5,661
Lewis Research Center	---	121	123	244
Manned Spacecraft Center	---	5,070	430	5,500
Marshall Space Flight Center	---	5,152	400	5,552
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	46	75	121
Total, AO	2,844	24,421	1,627	28,892

FY 1967 Summary (Categories A & B) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	---	---	---
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	---	---	---	---
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	2,580	2,249	229	5,058
Electronics Research Center	---	543	---	543
Flight Research Center	---	---	41	41
Goddard Space Flight Center	1,548	7,100	2,073	10,721
Headquarters	---	89	24	113
Jet Propulsion Laboratory	3,027	5,878	611	9,516
Kennedy Space Center	1,130	942	300	2,372
Langley Research Center	1,982	3,277	402	5,661
Lewis Research Center	---	121	123	244
Manned Spacecraft Center	5,686	16,075	846	22,607
Marshall Space Flight Center	---	12,260	450	12,710
Space Nuclear Propulsion Office	---	226	---	226
Wallops Station	200	46	75	321
Total	16,153	48,806	5,174	70,133

FY 1965 Category A (General Purpose Use) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	---	---	---
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	---	---	---	---
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	---	1,850	---	1,850
Electronics Research Center	---	---	---	---
Flight Research Center	951	181	25	1,157
Goddard Space Flight Center	30,482	4,360	343	35,185
Headquarters	675	364	12	1,051
Jet Propulsion Laboratory	17,034	3,115	121	20,270
Kennedy Space Center	216	1,019	34	1,269
Langley Research Center	1,018	2,386	38	3,442
Lewis Research Center	4,145	1,094	33	5,272
Manned Spacecraft Center	8,710	12,108	26	20,844
Marshall Space Flight Center	6,244	10,919	53	17,216
Space Nuclear Propulsion Office	---	71	---	71
Wallops Station	1,731	184	1	1,916
Total	71,206	37,651	686	109,543

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Analysis of Automatic Data Processing Equipment

FY 1966 Category A (General Purpose Use)

(In Thousands of Dollars)

	Purchase	Lease	Maintenance	Total
Research and Development				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	---	377	377
Headquarters	---	---	---	---
Jet Propulsion Laboratory	149	3,813	384	4,346
Kennedy Space Center	260	792	347	1,399
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	600	11,524	---	12,124
Marshall Space Flight Center	---	6,633	19	6,652
Space Nuclear Propulsion Office	---	176	---	176
Wallops Station	314	---	---	314
Total, R&D	1,323	22,938	1,127	25,388
Administrative Operations				
Ames Research Center	344	1,767	20	2,131
Electronics Research Center	---	27	---	27
Flight Research Center	---	78	28	106
Goddard Space Flight Center	161	4,974	58	5,193
Headquarters	---	98	24	122
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	---	806	---	806
Langley Research Center	4,638	2,954	146	7,738
Lewis Research Center	2,821	365	80	3,266
Manned Spacecraft Center	---	5,489	332	5,821
Marshall Space Flight Center	---	4,415	274	4,689
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	63	50	113
Total, AO	7,964	21,036	1,012	30,012

FY 1966 Category A (General Purpose Use) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	---	---	---
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	5,581	---	---	5,581
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	5,581	---	---	5,581
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	344	1,767	20	2,131
Electronics Research Center	---	27	---	27
Flight Research Center	---	78	28	106
Goddard Space Flight Center	161	4,974	435	5,570
Headquarters	---	98	24	122
Jet Propulsion Laboratory	149	3,813	384	4,346
Kennedy Space Center	5,841	1,598	347	7,786
Langley Research Center	4,638	2,954	146	7,738
Lewis Research Center	2,821	365	80	3,266
Manned Spacecraft Center	600	17,013	332	17,945
Marshall Space Flight Center	---	11,048	293	11,341
Space Nuclear Propulsion Office	---	176	---	176
Wallops Station	314	63	50	427
Total	14,868	43,974	2,139	60,981

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Analysis of Automatic Data Processing Equipment

FY 1967 Category A (General Purpose Use)

(In Thousands of Dollars)

	Purchase	Lease	Maintenance	Total
Research and Development				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	---	507	507
Headquarters	---	---	---	---
Jet Propulsion Laboratory	700	5,675	424	6,799
Kennedy Space Center	1,130	114	300	1,544
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	5,686	10,480	125	16,291
Marshall Space Flight Center	---	6,826	32	6,858
Space Nuclear Propulsion Office	---	226	---	226
Wallops Station	200	---	---	200
Total, R&D	7,716	23,321	1,388	32,425
Administrative Operations				
Ames Research Center	---	2,195	10	2,205
Electronics Research Center	---	543	---	543
Flight Research Center	---	---	19	19
Goddard Space Flight Center	862	6,504	114	7,480
Headquarters	---	89	24	113
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	---	828	---	828
Langley Research Center	1,982	3,277	402	5,661
Lewis Research Center	---	121	123	244
Manned Spacecraft Center	---	5,070	430	5,500
Marshall Space Flight Center	---	5,152	340	5,492
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	46	75	121
Total, AO	2,844	23,825	1,537	28,206

FY 1967 Category A (General Purpose Use) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	---	---	---
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	---	---		---
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	---	2,195	10	2,205
Electronics Research Center	---	543	---	543
Flight Research Center	---	---	19	19
Goddard Space Flight Center	862	6,504	621	7,987
Headquarters	---	89	24	113
Jet Propulsion Laboratory	700	5,675	424	6,799
Kennedy Space Center	1,130	942	300	2,372
Langley Research Center	1,982	3,277	402	5,661
Lewis Research Center	---	121	123	244
Manned Spacecraft Center	5,686	15,550	555	21,791
Marshall Space Flight Center	---	11,978	372	12,350
Space Nuclear Propulsion Office	---	226	---	226
Wallops Station	200	46	75	321
Total	10,560	47,146	2,925	60,631

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Analysis of Automatic Data Processing Equipment

FY 1965 Category B (Special Purpose Use)

(In Thousands of Dollars)

	Purchase	Lease	Maintenance	Total
Research and Development				
Ames Research Center	496	61	3	560
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	17	17
Goddard Space Flight Center	16,727	---	1,199	17,926
Headquarters	---	---	---	---
Jet Propulsion Laboratory	3,917	136	99	4,152
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	1,144	397	101	1,642
Marshall Space Flight Center	176	326	2	504
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, R&D	22,460	920	1,421	24,801
Administrative Operations				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	495	761	23	1,279
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	979	525	8	1,512
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, AO	1,474	1,286	31	2,791

*Category B equipment at KSC funded by other NASA installations.

FY 1965 Category B (Special Purpose Use) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	3,505	---	---	3,505
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	3,505	---	---	3,505
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	496	61	3	560
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	17	17
Goddard Space Flight Center	20,727	761	1,222	22,710
Headquarters	---	---	---	---
Jet Propulsion Laboratory	3,917	136	99	4,152
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	1,144	397	101	1,642
Marshall Space Flight Center	1,155	851	10	2,016
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total	27,439	2,206	1,452	31,097

*Category B equipment at KSC funded by other NASA installations.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Analysis of Automatic Data Processing Equipment

FY 1966 Category B (Special Purpose Use)

(In Thousands of Dollars)

	Purchase	Lease	Maintenance	Total
Research and Development				
Ames Research Center	1,065	69	116	1,250
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	17	17
Goddard Space Flight Center	6,096	---	928	7,024
Headquarters	---	---	---	---
Jet Propulsion Laboratory	6,354	198	181	6,733
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	1,701	582	182	2,465
Marshall Space Flight Center	---	282	18	300
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, R&D	15,216	1,131	1,442	17,789
Administrative Operations				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	676	30	706
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	56	56
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, AO	---	676	86	762

*Category B equipment at KSC funded by other NASA installations.

FY 1966 Category B (Special Purpose Use) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	1,091	---	---	1,091
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	1,091	---	---	1,091
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	1,065	69	116	1,250
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	17	17
Goddard Space Flight Center	7,187	676	958	8,821
Headquarters	---	---	---	---
Jet Propulsion Laboratory	6,354	198	181	6,733
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	1,701	582	182	2,465
Marshall Space Flight Center	---	282	74	356
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total	16,307	1,807	1,528	19,642

*Category B equipment at KSC funded by other NASA installations.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Analysis of Automatic Data Processing Equipment

FY 1967 Category B (Special Purpose Use)

(In Thousands of Dollars)

	Purchase	Lease	Maintenance	Total
Research and Development				
Ames Research Center	2,580	54	219	2,853
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	22	22
Goddard Space Flight Center	686	---	1,422	2,108
Headquarters	---	---	---	---
Jet Propulsion Laboratory	2,327	203	187	2,717
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	525	291	816
Marshall Space Flight Center	---	282	18	300
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, R&D	5,593	1,064	2,159	8,816
Administrative Operations				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	596	30	626
Headquarters	---	---	---	---
Jet Propulsion Laboratory	----	---	---	---
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	60	60
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, AO	---	596	90	686

*Category B equipment at KSC funded by other NASA installations.

FY 1967 Category B (Special Purpose Use) Cont'd

	Purchase	Lease	Maintenance	Total
Construction of Facilities				
Ames Research Center	---	---	---	---
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	---	---
Goddard Space Flight Center	---	---	---	---
Headquarters	---	---	---	---
Jet Propulsion Laboratory	---	---	---	---
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	---	---	---
Marshall Space Flight Center	---	---	---	---
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total, CoF	---	---	---	---
SUMMARY ALL APPROPRIATIONS				
Ames Research Center	2,580	54	219	2,853
Electronics Research Center	---	---	---	---
Flight Research Center	---	---	22	22
Goddard Space Flight Center	686	596	1,452	2,734
Headquarters	---	---	---	---
Jet Propulsion Laboratory	2,327	203	187	2,717
*Kennedy Space Center	---	---	---	---
Langley Research Center	---	---	---	---
Lewis Research Center	---	---	---	---
Manned Spacecraft Center	---	525	291	816
Marshall Space Flight Center	---	282	78	360
Space Nuclear Propulsion Office	---	---	---	---
Wallops Station	---	---	---	---
Total	5,593	1,660	2,249	9,502

*Category B equipment at KSC funded by other NASA installations.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Summary (Categories A & B)

		Large	Medium	Small	Total
6/30/64	Purchase	---	6	73	79
	Lease	20	22	64	106
	P/L	9	2	7	18
	Total	29	30	144	203
6/30/65	Purchase	4	27	121	152
	Lease	14	24	64	102
	P/L	15	5	8	28
	Total	33	56	193	282
6/30/66	Purchase	8	52	252	312
	Lease	15	31	54	100
	P/L	22	6	9	37
	Total	45	89	315	449
6/30/67	Purchase	10	58	284	352
	Lease	16	25	49	90
	P/L	26	5	8	39
	Total	52	88	341	481

Explanation of terminology

Large refers to large scale computers costing more than $1,500,000,
Medium $450,000 to $1,500,000,
Small less than $450,000.

Purchase refers to equipment that is owned,
Lease to equipment leased and
P/L denotes a combination of components, some owned, some leased.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Summary Category A (General Purpose Use)

		Large	Medium	Small	Total
6/30/64	Purchase	---	---	2	2
	Lease	20	21	55	96
	P/L	7	2	5	14
	Total	27	23	62	112
6/30/65	Purchase	4	2	16	22
	Lease	14	22	54	90
	P/L	13	3	5	21
	Total	31	27	75	133
6/30/66	Purchase	7	3	19	29
	Lease	15	28	47	90
	P/L	17	3	5	25
	Total	39	34	71	144
6/30/67	Purchase	9	3	20	32
	Lease	16	21	43	80
	P/L	21	2	4	27
	Total	46	26	67	139

Summary Category B (Special Purpose Use)

6/30/64	Purchase	---	6	71	77
	Lease	---	1	9	10
	P/L	2	---	2	4
	Total	2	7	82	91
6/30/65	Purchase	---	25	105	130
	Lease	---	2	10	12
	P/L	2	2	3	7
	Total	2	29	118	149
6/30/66	Purchase	1	49	233	283
	Lease	---	3	7	10
	P/L	5	3	4	12
	Total	6	55	244	305
6/30/67	Purchase	1	55	264	320
	Lease	---	4	6	10
	P/L	5	3	4	12
	Total	6	62	274	342

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category A (General Purpose Use)

		Large	Medium	Small	Total
Ames Research Center Moffett Field, Calif.					
6/30/64	Purchase	---	---	---	---
	Lease	1	2	3	6
	P/L	---	---	---	---
	Total	1	2	3	6
6/30/65	Purchase	---	---	---	---
	Lease	1	2	6	9
	P/L	---	---	---	---
	Total	1	2	6	9
6/30/66	Purchase	---	---	---	---
	Lease	---	2	8	10
	P/L	1	---	---	1
	Total	1	2	8	11
6/30/67	Purchase	---	---	---	---
	Lease	---	2	13	15
	P/L	1	---	---	1
	Total	1	2	13	16
Electronics Research Center Cambridge, Mass.					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/65	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/66	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/67	Purchase	---	---	---	---
	Lease	1	1	---	2
	P/L	---	---	---	---
	Total	1	1	---	2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category A (General Purpose Use)

		Large	Medium	Small	Total
Flight Research Center Edward Air Base Base, Calif.					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	1	1	2
	Total	---	1	1	2
6/30/65	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	1	1	2
	Total	---	1	1	2
6/30/66	Purchase	---	1	---	1
	Lease	---	---	---	---
	P/L	---	1	1	2
	Total	---	2	1	3
6/30/67	Purchase	---	1	---	1
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	1	---	1
Goddard Space Flight Center Greenbelt, Md.					
6/30/64	Purchase	---	---	---	---
	Lease	---	1	3	4
	P/L	6	1	4	11
	Total	6	2	7	15
6/30/65	Purchase	---	---	---	---
	Lease	1	1	4	6
	P/L	6	2	4	12
	Total	7	3	8	18
6/30/66	Purchase	---	---	---	---
	Lease	---	1	6	7
	P/L	9	2	4	15
	Total	9	3	10	22
6/30/67	Purchase	---	---	---	---
	Lease	---	---	4	4
	P/L	13	2	4	19
	Total	13	2	8	23

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category A (General Purpose Use)

		Large	Medium	Small	Total
Goddard Space Flight Center Institute for Space Studies New York, N. Y.					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	1	1
	P/L	1	---	---	1
	Total	1	---	1	2
6/30/65	Purchase	---	---	---	---
	Lease	---	---	1	1
	P/L	1	---	---	1
	Total	1	---	1	2
6/30/66	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	1	---	---	1
	Total	1	---	---	1
6/30/67	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	1	---	---	1
	Total	1	---	---	1
NASA Headquarters Washington, D. C.					
6/30/64	Purchase	---	---	---	---
	Lease	---	1	2	3
	P/L	---	---	---	---
	Total	---	1	2	3
6/30/65	Purchase	---	1	---	1
	Lease	---	---	2	2
	P/L	---	---	---	---
	Total	---	1	2	3
6/30/66	Purchase	---	1	---	1
	Lease	---	---	2	2
	P/L	---	---	---	---
	Total	---	1	2	3
6/30/67	Purchase	---	1	---	1
	Lease	---	---	1	1
	P/L	---	---	---	---
	Total	---	1	1	2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category A (General Purpose Use)

		Large	Medium	Small	Total
Jet Propulsion Laboratory Pasadena, Calif.					
6/30/64	Purchase	---	---	1	1
	Lease	3	1	4	8
	P/L	---	---	---	---
	Total	3	1	5	9
6/30/65	Purchase	---	---	1	1
	Lease	---	1	6	7
	P/L	3	---	---	3
	Total	3	1	7	11
6/30/66	Purchase	---	---	1	1
	Lease	1	1	9	11
	P/L	3	---	---	3
	Total	4	1	10	15
6/30/67	Purchase	---	---	3	3
	Lease	1	1	7	9
	P/L	3	---	---	3
	Total	4	1	10	15
Kennedy Space Center, NASA Kennedy Space Center, Fla.					
6/30/64	Purchase	---	---	---	---
	Lease	---	2	---	2
	P/L	---	---	---	---
	Total	---	2	---	2
6/30/65	Purchase	---	---	---	---
	Lease	1	3	1	5
	P/L	---	---	---	---
	Total	1	3	1	5
6/30/66	Purchase	1	---	1	2
	Lease	---	5	2	7
	P/L	---	---	---	---
	Total	1	5	3	9
6/30/67	Purchase	1	---	2	3
	Lease	---	4	2	6
	P/L	---	---	---	---
	Total	1	4	4	9

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category A (General Purpose Use)

		Large	Medium	Small	Total
Langley Research Center Hampton, Va.					
6/30/64	Purchase	---	---	---	---
	Lease	1	1	5	7
	P/L	---	---	---	---
	Total	1	1	5	7
6/30/65	Purchase	---	---	2	2
	Lease	1	2	1	4
	P/L	---	---	---	---
	Total	1	2	3	6
6/30/66	Purchase	1	---	2	3
	Lease	2	1	1	4
	P/L	---	---	---	---
	Total	3	1	3	7
6/30/67	Purchase	2	---	2	4
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	2	---	2	4
Lewis Research Center Cleveland, Ohio					
6/30/64	Purchase	---	---	---	---
	Lease	1	1	4	6
	P/L	---	---	---	---
	Total	1	1	4	6
6/30/65	Purchase	1	1	5	7
	Lease	---	---	1	1
	P/L	---	---	---	---
	Total	1	1	6	8
6/30/66	Purchase	1	1	5	7
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	1	1	5	7
6/30/67	Purchase	2	1	3	6
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	2	1	3	6

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category A (General Purpose Use)

		Large	Medium	Small	Total
Manned Spacecraft Center Houston, Texas					
6/30/64	Purchase	---	---	---	---
	Lease	9	2	---	11
	P/L	---	---	---	---
	Total	9	2	---	11
6/30/65	Purchase	3	---	---	3
	Lease	7	2	2	11
	P/L	---	---	---	---
	Total	10	2	2	14
6/30/66	Purchase	4	---	---	4
	Lease	9	3	2	14
	P/L	---	---	---	---
	Total	13	3	2	18
6/30/67	Purchase	4	---	---	4
	Lease	8	1	1	10
	P/L	---	---	---	---
	Total	12	1	1	14
Marshall Space Flight Center Hunstville, Alabama					
6/30/64	Purchase	---	---	---	---
	Lease	3	5	27	35
	P/L	---	---	---	---
	Total	3	5	27	35
6/30/65	Purchase	---	---	7	7
	Lease	1	5	24	30
	P/L	2	---	---	2
	Total	3	5	31	39
6/30/66	Purchase	---	---	9	9
	Lease	1	6	11	18
	P/L	2	---	---	2
	Total	3	6	20	29
6/30/67	Purchase	---	---	9	9
	Lease	3	7	10	20
	P/L	2	---	---	2
	Total	5	7	19	31

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category A (General Purpose Use)

		Large	Medium	Small	Total
Marshall Space Flight Center Michoud Assembly Facility New Orleans, La.					
6/30/64	Purchase	---	---	1	1
	Lease	2	5	5	12
	P/L	---	---	---	---
	Total	2	5	6	13
6/30/65	Purchase	---	---	1	1
	Lease	2	5	5	12
	P/L	---	---	---	---
	Total	2	5	6	13
6/30/66	Purchase	---	---	1	1
	Lease	2	8	6	16
	P/L	---	---	---	---
	Total	2	8	7	17
6/30/67	Purchase	---	---	1	1
	Lease	3	4	5	12
	P/L	---	---	---	---
	Total	3	4	6	13
Space Nuclear Propulsion Office Jackass Flats, Nevada					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/65	Purchase	---	---	---	---
	Lease	---	1	---	1
	P/L	---	---	---	---
	Total	---	1	---	1
6/30/66	Purchase	---	---	---	---
	Lease	---	1	---	1
	P/L	---	---	---	---
	Total	---	1	---	1
6/30/67	Purchase	---	---	---	---
	Lease	---	1	---	1
	P/L	---	---	---	---
	Total	---	1	---	1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category A (General Purpose Use)

		Large	Medium	Small	Total
Wallops Station Wallops Island, Va.					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	1	1
	P/L	---	---	---	---
	Total	---	---	1	1
6/30/65	Purchase	---	---	---	---
	Lease	---	---	1	1
	P/L	1	---	---	1
	Total	1	---	1	2
6/30/66	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	1	---	---	1
	Total	1	---	---	1
6/30/67	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	1	---	---	1
	Total	1	---	---	1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category B (Special Purpose Use)

		Large	Medium	Small	Total
Ames Research Center Moffett Field, Calif.					
6/30/64	Purchase	---	---	3	3
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	3	3
6/30/65	Purchase	---	---	6	6
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	6	6
6/30/66	Purchase	---	---	8	8
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	8	8
6/30/67	Purchase	---	---	8	8
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	8	8
Electronics Research Center Cambridge, Mass.					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/65	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/66	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/67	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category B (Special Purpose Use)

		Large	Medium	Small	Total
Flight Research Center Edwards Air Force, Calif.					
6/30/64	Purchase	---	---	1	1
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	1	1
6/30/65	Purchase	---	---	2	2
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	2	2
6/30/66	Purchase	---	---	4	4
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	4	4
6/30/67	Purchase	---	---	4	4
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	4	4
Goddard Space Flight Center Greenbelt, Md.					
6/30/64	Purchase	---	---	13	13
	Lease	---	---	6	6
	P/L	---	---	2	2
	Total	---	---	21	21
6/30/65	Purchase	---	---	17	17
	Lease	---	---	5	5
	P/L	---	1	3	4
	Total	---	1	25	26
6/30/66	Purchase	---	6	25	31
	Lease	---	---	5	5
	P/L	---	1	4	5
	Total	---	7	34	41
6/30/67	Purchase	---	6	26	32
	Lease	---	---	4	4
	P/L	---	1	4	5
	Total	---	7	34	41

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category B (Special Purpose Use)

		Large	Medium	Small	Total
Goddard Space Flight Center Tracking Stations					
6/30/64	Purchase	---	---	23	23
	Lease	---	---	3	3
	P/L	---	---	---	---
	Total	---	---	26	26
6/30/65	Purchase	---	---	27	27
	Lease	---	---	3	3
	P/L	---	---	---	---
	Total	---	---	30	30
6/30/66	Purchase	---	---	90	90
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	90	90
6/30/67	Purchase	---	---	97	97
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	97	97
Goddard Space Flight Center Other Location					
6/30/64	Purchase	---	---	10	10
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	10	10
6/30/65	Purchase	---	---	11	11
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	11	11
6/30/66	Purchase	---	---	10	10
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	10	10
6/30/67	Purchase	---	---	10	10
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	10	10

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category B (Special Purpose Use)

		Large	Medium	Small	Total
Jet Propulsion Laboratory Pasadena, Calif.					
6/30/64	Purchase	---	---	10	10
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	10	10
6/30/65	Purchase	---	---	14	14
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	14	14
6/30/66	Purchase	---	---	23	23
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	23	23
6/30/67	Purchase	---	---	24	24
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	24	24
Jet Propulsion Laboratory Tracking Stations					
6/30/64	Purchase	---	3	1	4
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	3	1	4
6/30/65	Purchase	---	5	7	12
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	5	7	12
6/30/66	Purchase	---	5	27	32
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	5	27	32
6/30/67	Purchase	---	5	33	38
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	5	33	38

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category B (Special Purpose Use)

		Large	Medium	Small	Total
Kennedy Space Center, NASA Kennedy Space Center, Fla.					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/65	Purchase	---	---	2	2
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	2	2
6/30/66	Purchase	---	---	14	14
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	14	14
6/30/67	Purchase	---	---	26	26
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	26	26
Langley Research Center Hampton, Va.					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/65	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/66	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/67	Purchase	---	---	3	3
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	3	3

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category B (Special Purpose Use)

		Large	Medium	Small	Total
Lewis Research Center Cleveland, Ohio					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/65	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/66	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/67	Purchase	---	---	1	1
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	1	1
Manned Spacecraft Center Houston, Texas					
6/30/64	Purchase	---	2	6	8
	Lease	---	---	---	---
	P/L	2	---	---	2
	Total	2	2	6	10
6/30/65	Purchase	---	18	14	32
	Lease	---	1	2	3
	P/L	2	1*	---	3
	Total	2	20	16	38
6/30/66	Purchase	1	35	27	63
	Lease	---	3	2	5
	P/L	5	2*	---	7
	Total	6	40	29	75
6/30/67	Purchase	1	41	27	69
	Lease	---	3	2	5
	P/L	5	2*	---	7
	Total	6	46	29	81

* 1 - CEC 3200 located at White Sands Test Facility, New Mexico.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category B (Special Purpose Use)

		Large	Medium	Small	Total
Marshall Space Flight Center Huntsville, Alabama					
6/30/64	Purchase	---	1	2	3
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	1	2	3
6/30/65	Purchase	---	2	3	5
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	2	3	5
6/30/66	Purchase	---	2	3	5
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	2	3	5
6/30/67	Purchase	---	2	3	5
	Lease	---	1	---	1
	P/L	---	---	---	---
	Total	---	3	3	6
Marshall Space Flight Center Michoud Assembly Facility New Orleans, La.					
6/30/64	Purchase	---	---	1	1
	Lease	---	1	---	1
	P/L	---	---	---	---
	Total	---	1	1	2
6/30/65	Purchase	---	---	1	1
	Lease	---	1	---	1
	P/L	---	---	---	---
	Total	---	1	1	2
6/30/66	Purchase	---	1	1	2
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	1	1	2
6/30/67	Purchase	---	1	1	2
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	1	1	2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Year Inventory of Computers
Category B (Special Purpose Use)

		Large	Medium	Small	Total
Space Nuclear Propulsion Office Jackass Flats, Nevada					
6/30/64	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/65	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/66	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
6/30/67	Purchase	---	---	---	---
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	---	---
Wallops Station Wallops Island, Va.					
6/30/64	Purchase	---	---	1	1
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	1	1
6/30/65	Purchase	---	---	1	1
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	1	1
6/30/66	Purchase	---	---	1	1
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	1	1
6/30/67	Purchase	---	---	1	1
	Lease	---	---	---	---
	P/L	---	---	---	---
	Total	---	---	1	1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	496	1,409	2,580
Lease	1,911	1,836	2,249
Maintenance	3	136	229
Total	2,410	3,381	5,058
Number of Personnel:			
Civil Service	65	65	65
Contracting Firm	27	40	51

Contractor Identification

Name of Firm	Service Performed
Computer Services Corp.	Programming
Massey Temp. Services	Key Punching
Massey Temp. Services	Data Processing
EAI	Maintenance
Honeywell	Maintenance
IBM	Maintenance

NARRATIVE EXPLANATION

FY 1965

ADP requirements at Ames include wind tunnel data reduction and analysis, and studies in areas of flight simulation, theoretical aerodynamics and Supersonic Transport. Computer work load requirements show a steady growth with increased research engineering and management support particularly for projects Pioneer and Biosatellite. The large scale 7094 direct coupled computer system is used for implementing mathematical models representing specific problem areas of investigations. Wind tunnel data reduction and analysis requires full time utilization of the H 800/200 system. Administrative support activities utilizes the 1401 system on a share basis with the U.S. Naval Air Station. Present equipment was being utilized on a 2½ shift basis, Monday through Friday.

FY 1966

Wind tunnel programs reflect a 15 to 20 percent increase in data reduction and analysis work load. Additional increases in data reduction work load will result from Biomedical experiments and from the Pioneer project as it progresses into flight phases. Increased requirements for scientific and engineering data processing result from expanded research projects, including human performance, planetary atmospheres and mission analysis.

The 7094 DCS was converted from lease to purchase and four high speed remote computing stations have been installed in strategic locations throughout the center. This action provides capability for direct use of the central computer complex by scientists, and increase their efficiency in research activity. Equipment was utilized on a 3 shift basis, Monday through Friday.

FY 1967

Data reduction work load will continue to increase during flight phases of projects Pioneer and Biosatellite. Data reduction work load from current wind tunnel projects will show some increase and tend to stabilize at a fairly constant level. Additional requirements for scientific and engineering ADP work include trajectory computations, support for space flight simulation and increased mission analysis demands.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ELECTRONICS RESEARCH CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	---	---	---
Lease	---	27	543
Maintenance	---	---	---
Total	---	27	543
Number of Personnel:			
Civil Service	2	8	18
Contracting Firm	---	11	36

Contractor Identification

Name of Firm	Service Performed
Wolfe R&D, Inc.	Numerical Analysis
Computer Applications, Inc.	Programming
Research Calculations, Inc.	Programming

NARRATIVE EXPLANATION

FY 1965

The major effort during FY 1965 was devoted to determining ERC computing requirements.

FY 1966

ADP applications at ERC are presently concentrated in two areas: scientific computation; and administrative data processing. In both of these areas there will exist significant requirements for data acquisition, and information storage and retrieval. Large scale data reduction tasks are now beginning to materialize as a result of the build-up of data acquisition installations within the individual laboratories. In the area of scientific applications, forty-two different mathematical programs are now being generated. They vary in size and complexity from auto-correlation/power spectra analysis of optics data to long-term complex studies in guidance and control. Ten administrative data programs of medium to large size are currently in the debugging and checkout stages.

FY 1967

A first-phase modular computer configuration capable of solving large-scale administrative/scientific problems is planned for acquisition and partial implementation in FY 1967. Basically the system will be a digital machine with about 35 consoles for remote on-line operations.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
FLIGHT RESEARCH CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	951	---	---
Lease	181	78	---
Maintenance	42	45	41
Total	1,174	123	41
Number of Personnel:			
Civil Service	19	19	19
Contracting Firm	5	5	6

Contractor Identification

Name of Firm	Service Performed
GE	Keypunching Data Processing Operations (FY 67 only)
IBM	Maintenance
GE	Maintenance
EAI	Maintenance

NARRATIVE EXPLANATION

FY 1965

ADP requirements are primarily data reduction, data analysis, and flight performance studies, using the IBM 704/GE 225 computer system. Data reduction results from aeronautics projects such as X-15 and B-70. Scientific work includes flight planning and general theoretical studies, and financial management applications. Action was taken this year to replace the IBM 704/GE 225 system with an IBM 360/40 computer system. Category B equipment is used for telemetry data acquisition, real time range data processing and display, and hybrid simulation.

FY 1966

During the year the new IBM 360/40 will be utilized for the same purposes as stated above for the IBM 704/GE 225 system with biomedical data reduction and analysis added. Category B equipment will include the full time usage of the GE 225 for real time range data processing and display. In addition, the SEL 810 will be utilized as an integral part of the high temperature loads calibration data acquisition facility. The IBM 704 will be disposed of through normal excess procedures.

FY 1967

Data reduction requirements continue to increase as a result of projects such as X-15, B-70, Supersonic Transport and hypersonic research. Improved data acquisition equipment (digital pulse code modulation) is expected to increase the flight data reduction workload by 50% to 100%, effective during FY 1967 and FY 1968. High-Temperature Loads Calibration Facility is expected to be fully operational by FY 1967, providing additional data reduction and analysis requirements. Feasibility studies are being made for a processor/controller to link the IBM 360/40 to the simulation facility with the capability for other real time applications in addition to the FY 1966 usages.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	51,209	7,348	1,548
Lease	5,121	5,650	7,100
Maintenance	1,565	1,393	2,073
Total	57,895	14,391	10,721
Number of Personnel:			
Civil Service	381	449	449
Contracting Firm	572	754	836

Contractor Identification

Name of Firm	Service Performed
Analytical Mechanics	Integrated Mission Analysis Program
Bunker Ramo Corporation	Programming Services
Control Data Corporation	Data Processing System
Datametrics Incorporated	Programming
Computer Applications	Operations and Programming
Computer Control	Maintenance Operation
Dynalectron	Data Processing Services
Datatrol Corporation	Programming Services
General Electric	Operations and Programming
IBM	Programming and Systems Operation
Merle Thomas	Programming Support
Keltec Industries	Data Reduction

NARRATIVE EXPLANATION

FY 1965

In the performance of its scientific and operational mission, GSFC has a vital need for computer support. FY 1965 funds were used for the purchase of both installed and future computing equipment. Purchase of installed equipment, which for FY 1965 consisted largely of the main

frames of three IBM 7094's and one Univac 1107 computer, enabled GSFC to reduce its lease costs by 5.8 million dollars during FY 1965, including the benefit of prior year purchases as well. As the work load grew to saturate the large-scale computing facilities, studies of needs for the next five years were made and these led to the plan for future installation of the next generation computers (super-speed system). The purchase of the main frames of this new equipment (eight IBM 360 computers) was accomplished in FY 1965. It is planned to phase-in the IBM 360 equipment over the next three fiscal years to replace all of the IBM 7094's at GSFC. The main frame of one Univac 1108 was purchased for future replacement of a leased Univac 1107 used for telemetry data processing. Additional purchases of small computers for tracking station and similar purposes were also made, the largest of which was for Univac 642-B computers for Apollo support in the Manned Space Flight Network. Many of the small computers are integral parts of operational systems, for example, the Univac 1218 computers installed in the Manned Space Flight Network for support of Gemini operations.

FY 1966

The requirements for increased large-scale computing facilities are being met by the installation of an IBM 360/75 and 360/65 this fiscal year, which are planned to replace one leased IBM 1410 and one leased IBM 7094 and its peripheral IBM 1401 computer. Increases in the telemetry data reduction requirements are to be provided for by the installation of the UNIVAC 1108 and of the Phase II Satellite Telemetry Automatic Reduction Systems (STARS), each of which incorporate a medium scale CDC 3200 computer.

Additional peripheral equipment and a number of small computers are required at the Manned Flight Tracking locations as part of the overall implementation of this network for the Manned Flight programs. Additional peripheral equipment and small computers are also required in support of NASA scientific satellite programs for ground station support and control center applications.

Civil Service personnel for the year are shown as projected ceiling. Contract personnel are increased due to additional operational requirements to meet Goddard's mission and includes 75 man years of IBM effort provided in support of the new system 360 facility.

FY 1967

Increased computing capability is required due to the normal growth associated with new projects, the fruition of major long-term projects such as the observatory satellites, the research efforts leading to whole new classes of problems, and the need to extend existing studies

to new levels of complexity (taking additional dimensions, and processes into account). As in previous years, computers will be used for orbit computations, telemetry data processing, real-time support for manned spacecraft design, integration and test, flight and other tracking operations, spacecraft operations and experiment control, scientific and applications data analysis, and theoretical studies in the space sciences.

Additional implementation of the super-speed computer plan will occur in FY 1967 when an IBM 360/91 and two IBM 360/65 computers (purchased main frames) will be installed at GSFC. As a result, two IBM 7094's (purchased main frames) will be phased out during this fiscal year. Additional lease funds are required because of overlapping operation of present IBM 7094 systems and their IBM 360 replacements during the period of transition so that on-going NASA operational programs can be adequately supported. (Note: The two super-speed computers, IBM 360/95 and the remaining 360/65, will be installed in FY 1968.)

Further increase in telemetry data reduction requirements will be met by the replacement of the Univac 1107 (purchased main frame) with the more capable 1108 (main frame to be purchased with FY 1967 funds). Additional peripheral equipment will be required to supplement the computers used for station ground support, spacecraft integration, and control center application.

Civil Service personnel for the year are shown as projected ceiling. Contract personnel are increased due to continuing support of the implementation of the system 360 plus increased effort for the manned space program.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
HEADQUARTERS
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	675	---	---
Lease	364	98	89
Maintenance	12	24	24
Total	1,051	122	113
Number of Personnel:			
Civil Service	13	12	12
Contracting Firm	44	71	77

Contractor Identification

Name of Firm	Service Performed
Bunker-Ramo	Systems analysis and programming (position management system)
Documentation, Inc.	Systems analysis, programming and computer operation (IBM 1410 - NASA-owned during FY 1966/FY 1967).
IBM	Maintenance and Repair
Bellcomm	Programming and operation

NARRATIVE EXPLANATION

FY 1965

Administrative Operations

During this year NASA Headquarters installed an IBM 1401 with a 16,000-bit memory for exclusive use in administrative operations application. The following general areas were covered: 1) Status of Contracts and Grants Reporting System; 2) Financial Status of Programs Reporting System; 3) Headquarters Accounting; 4) Payroll, and 5) Personnel and Security.

Responsibility for management of ADP administrative operations at Headquarters was consolidated in the Management Information Systems Division.

Scientific and Engineering

This computer installation performs general scientific calculations to support the manned space flight program. During this year extensive programming and check-out were conducted to prepare the equipment for Gemini engineering analysis that would be encountered during actual flight operations. An on-line printer was added to meet the increasing work load.

FY 1966

Administrative Operations

During this year NASA Headquarters purchased and installed an IBM 1410 system, which formerly had been located at NASA's Manned Spacecraft Center. The major components of the former IBM 1401 system above were transferred to the Office of Economic Opportunity under the GSA disposal service program. The increased capacity of the IBM 1410 installation has greatly expanded the ability to provide timely and current data needed for management decision making; e.g., procurement reports are now completed within one month following the end of the reporting period, whereas formerly there had been delays of up to two and one-half months after the cut-off date. In addition, the probability of requiring additional ADP services to satisfy peak work loads has been reduced to some extent.

Scientific and Engineering

During this year the most significant accomplishment has been to use the computer in mission planning for GT-3 in connection with which the pre-retro maneuver was analyzed by the equipment before incorporation into the final mission operations plan. Current analysis is related to calculation of Gemini versus LEM rendezvous modes in order to simulate an operational environment with the Gemini spacecraft that closely approximates the Apollo Lunar rendezvous requirements.

FY 1967

Administrative Operations

During this year a comprehensive reappraisal of operating systems will be initiated with the objective of optimizing machine utilization to acquire additional capacity sufficient to absorb the expected increase in the work load. This study could indicate the need for additional equipment; however, none is planned for procurement at this time.

Scientific and Engineering

During this year consideration will be given to replacement of the present installation with equipment that can be operated at lower cost and which will have the greater capacity needed to handle the computational requirements of the manned space flight technical staff. This would also permit larger participation by other Headquarters offices in such areas as PERT and funding analysis, space medicine and Apollo launch vehicle data reduction and Apollo mission planning. Over 5,000 separate computer runs are expected to be performed during the year.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JET PROPULSION LABORATORY
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	20,951	6,503	3,027
Lease	3,251	4,011	5,878
Maintenance	220	565	611
Total	24,422	11,079	9,516
Number of Personnel:			
JPL Employees	237	287	314
Contracting Firm	167	224	314

Contractor Identification

Name of Firm	Service Performed
Scientific Data Systems	Programming, Operation, Maintenance
RCA	Programming, Operation, Maintenance
IBM	Programming, Operation, System Analysts
Consultants and Designers	Maintenance
Mesa Scientific Corp. **	Programming, Operation
Bendix	Programming, Operation, Key Punch, Maintenance

** This is a task type contract. The work is performed off-Lab. Consequently, it is not reported on the JPL Monthly Summary Report for contractor resident personnel.

NARRATIVE EXPLANATION

FY 1965

The Jet Propulsion Laboratory is operated by the California Institute of Technology under contract to the National Aeronautics and Space Administration. JPL's primary area of responsibility is for the management of NASA's Lunar and Planetary (L&P) Exploration Projects and the Deep Space Network (DSN) required for spacecraft tracking and data acquisition. During FY 1965, JPL's assigned L&P Projects included Ranger (Lunar

photographs), Mariner '64 (Mars photographs) and Surveyor (Lunar Soft Landing and Surface Science). In addition, to the listed JPL Flight Projects, the DSN has tracking, data acquisition and mission control responsibility for the Lunar Orbiter and Pioneer missions. Five specific areas of Automatic Data Processing are required as an integral part of the assigned JPL tasks.

a. General Scientific and Engineering - A highly skilled staff of engineers and scientists are engaged in broad spectra of directly related Research and Development and Engineering activities, most of which generate problems which require computer solution.

b. Simulation - The generation and utilization of artificial data by computer for testing and "debugging" systems and collections of systems used in the spacecraft and associated ground based installations. Examples include checking out the DSN Mission Control Systems and their operating personnel.

c. Mission Control - Computers are essential to analyze in real time the spacecraft performance in order to generate the spacecraft commands needed to achieve the most successful spaceflight mission.

d. Data Reduction - Automatic Data Processing is used to reduce data produced from a wide range of scientific and research experiments and engineering tests. The other basic area of data reduction is concerned with the data produced by the spacecraft during flight operations.

e. Administration - Computers are used in business areas handling great quantities of financial, inventory, and personnel data and producing detailed reports. Thus a more economic administrative operation is made possible, while greatly decreasing the time needed for each job.

The major ADP acquisition activity in FY 1965 was the purchase of $14,554,000 of previously leased computers for the Space Flight Operations Facility and for the Scientific Computer Facility. This purchase makes possible a reduction of nearly $6,000,000 in leasing cost in FY 1966, and each year thereafter that the equipment is in use.

FY 1966

The Lunar and Planetary Projects presently assigned to the Jet Propulsion Laboratory are Surveyor, Mariner '64 (Mars), Mariner '67 (Venus), Mariner '69 (Mars) and Voyager. In addition to these Flight Projects, the JPL managed Deep Space Network has continuing support for Mission Control of Pioneer and Lunar Orbiter. A JPL breakthrough in the computer enhancement technique for improving telemetered spacecraft data during FY 1966, has resulted in a clarity of detail in the Mariner Mars pictures not previously obtained. Similar computer techniques can be applied to the Ranger Lunar photographs.

During FY 1966, eighteen small computers are being purchased for installation at the DSN tracking stations around the world to meet the increased Tracking and Command Data (TCD) and Digital Instrumentation Systems (DIS) functions required for Lunar Orbiter and Surveyor. The third direct coupled IBM 7094/7040/7044 computer system will be installed in the Space Flight Operations Facility (SFOF), on a lease basis near the end of FY 1966, to provide operational and backup capability for the Surveyor, Lunar Orbiter and Pioneer missions. A computer switching system to allow complete interchangeability of use for the three computer strings is being purchased. During FY 1966, arrangements were completed to transfer two NASA purchased Univac 490 computers from Goddard Space Flight Center to the JPL SFOF for Communications Processing. The additional peripheral ADPE required for the Com-Processors which must be purchased in the next few months is estimated in excess of $1,500,000. An IBM 360 Model 20/30/40 is being leased to replace the present IBM 1401/1410 Business Computer to permit the accomplishment of the administrative computing at lower cost.

The FY 1965 purchase of the large previously leased computer systems being used in the Space Flight Operations Facility and Scientific Computer Facility will result in a saving of nearly $6,000,000 in lease payments during FY 1966.

FY 1967

All the JPL tasks listed for FY 1966 carry over into FY 1967. The Scientific Computer Facility (SCF) (IBM 7094/7044) is presently operating in excess of 2.5 shifts per day with a constantly increasing work load. The replacement of the SCF with a third generation computer is planned on a lease basis late in FY 1967 to meet the growing work load, which now includes the recently assigned Mariner '67 (Venus) and Mariner '69 (Mars) missions. During FY 1967, computer acquisitions to the DSN for the antenna pointing system and other increased performance features are required to meet the higher data rates needed for Mariner '69 (Mars) and later Voyager missions. As the detail scheduling of DSN operations relative to the assigned missions becomes more definite, it will be possible to define certain other ADPE which must be acquired during FY 1967. It is expected that the additional ADPE required to support the new Mariner missions can be defined in the next few months, as soon as the detailed project planning is completed.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
KENNEDY SPACECRAFT CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	216	5,841	1,130
Lease	1,019	1,598	942
Maintenance	34	347	300
Total	1,269	7,786	2,372
Number of Personnel:			
Civil Service	44	43	44
Contracting Firm	123	321	568

Contractor Identification

Name of Firm	Service Performed
Federal Electric Co.	Programming, Operation, Systems Analysis
Ling-Temco-Vought	Systems Analysis, Programming, Operation

NARRATIVE EXPLANATION

FY 1965

ADP equipment at KSC is used for scientific and engineering computation, for administrative applications, for automatic checkout work and for data reduction and mission control. The computer equipment at KSC is operated "on-line" as a part of the countdown and launch control system for a significant part of its total operating time.

All major vehicle projects are supported, with data reduction and mission control comprising the bulk of the workload. Requirements in this area include:

(a) preflight data reduction and simulation,

(b) real-time telemetry processing,

(c) postflight "quick look" formating and display of critical measurements, and

(d) prelaunch test support.

An additional important ADP function at KSC is the support of automatic checkout systems. The special purpose checkout computers must be supported by general purpose machines for assembling checkout programs, checkout evaluation and tabulating results.

During FY 1965 the above functions were transferred from a GE 415 and GE 235 to a more advanced GE 635. In addition, a Univac 1004 peripheral processor was purchased to provide the necessary input output support for the GE 635 system.

In the administrative area, financial management, supply accounting, automatic checkout support, vehicle configuration control and contractor support make up the bulk of the workload. During FY 1965 an IBM 1440 was leased to provide needed peripheral support to the IBM 1410 in this area.

FY 1966

A second IBM 1410 was leased to handle administrative functions and an IBM 1460 is scheduled for delivery. It may be necessary to upgrade the IBM 1410 to an IBM 7010 before the end of the year.

As reprogramming occurs, these applications are being transferred to the GE 635 because of the greater capacity of the GE machine. When converted, this consolidation should result in a substantial cost saving since separate computers will no longer be necessary for processing administrative functions.

FY 1967

In FY 1967, additional components will be required to upgrade the present GE 635 system. The expanded system will provide the capability of multiple test support and backup during critical phases of the KSC mission. This will readily permit rapid reconfiguration of the system in case of computer malfunction. Lack of this ability would seriously hamper the data reduction functions in the event of a failure during a critical launch phase. The additional equipment to be purchased consists of a disc system, MSU drum, a 128K core memory module and an additional processor.

Other ADP equipment actions planned for FY 1967 are as follows:

1. Microfilm equipment to record computer graphic output on film. Present equipment is unable to handle the load imposed by future requirements.

2. Univac 1004 peripheral processors (2). Lack of this equipment would result in input and output bottlenecks in operation of the GE 635 computer.

3. EAM equipment will be required for off-line card processing and key punching for input to the GE 635.

4. An IBM 7702 communications link is required for data transmission to other NASA centers and contractors concerned with vehicle launch data.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	1,018	4,638	1,982
Lease	2,386	2,954	3,277
Maintenance	38	146	402
Total	3,442	7,738	5,661
Number of Personnel:			
Civil Service	122	123	123
Contracting Firm	21	36	69

Contractor Identification

Name of Firm	Service Performed
Hampton Institute	Read-out
Hayes International Corp.	Key Punching
Hayes International Corp.	Key Punching
IBM	Maintenance
Unselected	Programming

NARRATIVE EXPLANATION

FY 1965

Langley Research Center's electronic digital computing is divided into four separate areas as follows:

a. Analytical and engineering studies. This activity is concerned with studies of structures, trajectories, aerodynamics, thermal analysis, dynamic loads, and system analysis.

b. Data Reduction. Applied to ground test facilities, flight tests, and statistical studies.

c. Administrative.

d. Simulation.

FY 1966

Procurement of new generation equipment to replace existing equipment will be initiated in FY 1966. Installation will cover three fiscal years. Presently, different equipment is used in each of the four areas mentioned above. The new generation equipment will enable LRC to combine all four areas into a single integrated operation. In FY 1966 an IBM 7094 - 7040 Direct Coupled System will be installed on an interim basis to augment the present computers until the installation of new-generation equipment.

FY 1967

The first two phases of the LRC integrated computer complex will be acquired in FY 1967. Installation of the first phase is planned for November 1966, and installation of the second phase is planned for February 1967. The interim IBM 7094 DCS will be discontinued about one month after acceptance of the phase two equipment.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LEWIS RESEARCH CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	4,145	2,821	---
Lease	1,094	365	121
Maintenance	33	80	123
Total	5,272	3,266	244
Number of Personnel:			
Civil Service	154	154	154
Contracting Firm	---	---	---

Contractor Identification

Name of Firm	Service Performed
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NARRATIVE EXPLANATION

FY 1965

The ADP requirements are primarily wind tunnel data reduction utilizing the modified 1103/160-A system, and scientific and engineering projects on the 7094 DCS system. Additional data reduction and analysis requirements result from taped data acquired from Centaur and Agena launches. Scientific and engineering work includes basic and applied research on space craft power systems. In addition, Lewis has development responsibility for the Atlas-Centaur and the Atlas-Agena launch vehicles. In order to provide adequate capability to process the LeRC experimental data, LeRC was authorized to acquire a new digital computer system to replace the existing system for data reduction.

FY 1966

ADP data reduction requirements include wind tunnel data and component testing of pumps, nozzles, injectors, turbines, etc. Installation of improved digital data recording equipment at Plum Brook increases

the volume of data for reduction and analysis. Additional units are scheduled for installation, with data flow increases as much as six times the present capacity. Scientific calculations utilize the 7094 DCS and support the following OART programs: Nuclear Rocket Propulsion, Research, Nuclear Electric, Space Power and Chemical Propulsion.

Funds were obligated in the first quarter for purchase of the new IBM 360/67, which will replace the 1103, 1401 and 160A.

FY 1967

ADP requirements continue to support research in the areas of advanced propulsion and space power generation systems. This includes data reduction and analysis generated by major research, tools ranging from atmospheric wind tunnels to large space environment facilities.

The FY 1967 scientific and engineering work load will show a 60% increase, to be divided equally on the 7094 DCS and the newly installed 360-67. The data reduction work load will be shifted from the 1103-160 A to the 360-67. Administrative work load will remain about the same and will be retained on the 1620 and 1401.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	9,854	2,301	5,686
Lease	12,505	17,595	16,075
Maintenance	127	514	846
Total	22,486	20,410	22,607
Number of Personnel:			
Civil Service	154	159	160
Contracting Firm	339	800	507

Contractor Identification

Name of Firm	Service Performed
Wolf Research and Development Corp.	Programming, Systems Analysis, Key Punching, Maintenance
Lockheed Missile and Space Corp.	Programming, Systems Analysis, Key Punching, Maintenance

NARRATIVE EXPLANATION

FY 1965

Flight operations or mission control is basically concerned with two things: (a) mission operations direction and (b) support of the vehicle operation. Direction is concerned primarily with ensuring optimum utilization of the vehicle, vehicle subsystem analysis, trajectory analyses, etc. Vehicle operation support consists of actual navigation, guidance and control of the space vehicle (e.g., turning engines on and off) and evaulation of crew status. All of these functions must be performed within limited time frames where frequently the safety margins and degree of optimization is determined by the computer equipment available. Five large scale IBM 7094 computers with associated peripheral and switching processors are assigned to the flight operations mission.

Administrative data processing, data reduction and scientific computations are all within the jurisdiction of the Computation and Analysis Division.

Administrative functions include the usual resources management work (PERT, cost analysis, personnel, payroll, inventory and supply accounting, procurement and contract status, etc.). In addition, there is a substantial work load concerning biomedical data, information systems, and management, administrative and technical services. During FY 1965 the IBM 1410 used for this work was upgraded to an IBM 7010.

FY 1966

Because of the critical nature of this work the IBM 7094's will be replaced by more advanced IBM 360 systems with conversion starting in late FY 1966. Interim small 360's will be installed first pending delivery of the larger equipment.

It may be necessary to supplement the IBM 7010 with another processor before the end of FY 1966 to accommodate the increased work load.

The Mission Planning and Analysis Division is greatly increasing its computational requirements. Increased work in this area required upgrading the Univac 1107 to an 1108 in FY 1966. The work concerns the development of large scale trajectory programs, the simulation of the ground-to-spacecraft loop and the development of software required for mission control.

Computation requirements have also increased in the Structures and Mechanics area. These computations involve space environment simulation, mechanical systems, thermo structures and landing technology. In the data reduction area, enormous amounts of data are obtained from the Gemini flights. This has required the addition of a CDC 3800 during FY 1966.

FY 1967

During FY 1967 all of the IBM 7094's are planned to be released. By the end of FY 1967 we expect to have the conversion completed with five IBM 360/75's and one IBM 360/50 installed for flight operations work.

Increased requirements in the Mission Planning and Analysis Division may require replacing the IBM 7094/7044 and IBM 7040 with a larger system. The two stand alone IBM 7094's may also be replaced in this time frame if forced by increasing work load.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MARSHALL SPACE FLIGHT CENTER
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	7,399	---	---
Lease	11,770	11,330	12,260
Maintenance	63	367	450
Total	19,232	11,697	12,710
Number of Personnel:			
Huntsville			
Civil Service	184	174	170
Contracting Firm	493	496	458
Michoud Assembly Facility			
Civil Service	8	10	10
Contracting Firm	658	1,009	900

Contractor Identification

Name of Firm	Service Performed
Huntsville	
General Electric Company	Systems Analysis, Programming, Operation, Maintenance
Michoud Assembly Facility	
The Boeing Company	Service, Programming, Operation, Systems Analysis
Chrysler Corporation Space Division	Systems Analysis, Programming, Operation
Telecomputing Services, Inc.	Operations, Systems Maintenance, Analysis
Ling-Temco-Vought	Systems Analysis, Operations, Maintenance
Mason-Rust	Programming, Operations
General Electric	Programming, Operations
North American Aviation	Programming

NARRATIVE EXPLANATION

FY 1965

MSFC has a wide variety of analog, hybrid and high-speed digital computers used primarily for data reduction, simulation, and general scientific and engineering applications. This equipment provides MSFC with the computation capability necessary for the research and development of space vehicles and for the efficient administrative management of the Center.

In the area of data reduction, the main computer system, a B5500, was upgraded with a second processor during FY 1965. For real time and post-flight analysis, an analog-to-digital converter system converts analog signals to sampled digital input form. A receiving and recording station receives and records TM and video signal via radio and microwave links from satellites, launch vehicles, and captive test. The system receives, smooths, calibrates and formats the output for over 1,000 measurements for each test or launch.

General scientific and engineering applications are performed on two IBM 7094 II systems. Applications include such problem studies as aerodynamic analysis, flight mechanics, flight performance, dynamics, thermo-dynamics, general support of automatic checkout, PERT, APT, management system models, vibration and acoustical studies, weather and wind tunnel, operations research, and numerical analysis research. In addition to the two main scientific computer systems there are five peripheral processors and 23 small and medium computers in engineering laboratories used for scientific computations.

The analog and hybrid computers are used to perform simulation studies in the areas of rendezvous, orbital docking, reusable boosters, mobile lunar lab., engine start-up, cut-off, including fuel flow, sloshing, heat transfer, flight simulation, lunar traverses and other operations using physical and mathematical models.

Typical administrative applications (supply, procurement, financial management, manpower and personnel accounting) are processed on two IBM 1410's. The peripheral 1401's in this area were replaced by Univac 1004's during FY 1965 at a substantial cost reduction.

The MSFC computer equipment at Slidell, Louisiana, is used to provide computation support for the stage contractors (Boeing and Chrysler) at the Michoud Assembly Facility and to support the Mississippi Test Facility. This installation also furnishes substantial support in the scientific area for MSFC/Huntsville and MSC/Houston during peak workload periods.

Scientific computation primarily concerns structural design, manufacture, evaluation and checkout of the various Saturn vehicle components. The equipment used for scientific computation consists of an IBM 7094/7040 Direct Couple System and an IBM 7094 stand alone. These machines are operated on a three shift basis, six days per week. Computer equipment at Slidell used for administrative functions consists of two H 1800's, two H 800's, two H 200's, and IBM 1401 and an IBM 1440. The contractors generate most of the requirement for this equipment with applications including: financial accounting, PERT, work order control, configuration control, reliability, personnel and procurement.

FY 1966

Increased workload in the administrative area has required the upgrading of the two IBM 1410's to two IBM 7010's. In the scientific area several equipment actions are planned for replacing older leased equipment with newer more capable machines at less cost. Two ASI 210's, an RPC 4000, a RecompII and at least four IBM 1620's are scheduled for replacement with small scientific computers. In addition, a study is underway to determine if savings could be realized by replacing the remaining IBM 1401 peripheral processors with less expensive machines.

An additional computer capacity is needed in the administrative data processing area prior to the end of FY 1966. This could be an additional Honeywell computer or some other machine not yet determined. The stand along 7094 is planned to be replaced by an IBM7094/7040 DCS late in the year.

FY 1967

During FY 1966 the decision was made to centralize all computations into a large computer complex. Phase-in is expected to start in late FY 1967. The centralized configuration should permit expansion if necessary and should substantially reduce costs while increasing reliability. Plans call for the central complex to eventually replace 27 computers in addition to the IBM 7094's.

Increasing workload in both the administrative and scientific areas make it necessary to plan for new computer equipment prior to the end of FY 1967. Because of backup considerations, sharing of resources and similar missions, the large procurements for Huntsville and Slidell scheduled for FY 1967 have been combined. All programming at Slidell is coded in Fortran IV and Cobal to facilitate conversion to the new equipment.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SPACE NUCLEAR PROPULSION OFFICE
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	---	---	---
Lease	71	176	226
Maintenance	---	---	---
Total	71	176	226
Number of Personnel:			
Civil Service	---	---	---
Contracting Firm	17	17	17

Contractor Identification

Name of Firm	Service Performed
Pan American World Airways, Inc.	All ADP Services, e.g., operations, key punching, programming, etc. 1/

1/ Pan American is the Support Services Contractor at NRDS, and ADP is one area of service provided under that contract.

NARRATIVE EXPLANATION

FY 1965

ADP requirements are: (a) data reduction from two Nuclear Rocket Reactor Tests Cells and one Nuclear Rocket Engine Test Stand, (b) data analysis and scientific and engineering calculations supporting development of nuclear rocket systems, (c) administrative applications provide ADP services for channel engineering for approximately 7,000 data and controls channels in three test facilities, and to provide services for general cost accounting, payroll, and warehouse inventory control.

This requirement is met by a CDC 3200 digited computer.

FY 1966

ADP requirements are identified primarily with the PHOEBUS and NERVA projects. The first involves testing advanced nuclear rocket reactors to develop advanced reactor technology. A similar project is responsible for testing a reactor for the NERVA engine. ADP services are required by NERVA to convert raw test data to engineering units as a function of time.

Equipment action scheduled will increase the magnetic tape capability on the CDC 3200 computer system with a corresponding reduction in program operating time.

FY 1967

ADP requirements show a steady increase as development work progresses toward engine systems development phases.

Equipment actions scheduled for FY 1967 are directed to further expansion of the CDC 3200 computer system. The following equipment actions are scheduled:

a. Multi-Channel Controller

b. Additional 16K core storage

c. Two additional I/O channels

d. Fully Buffered Card Punch

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WALLOPS STATION
SUMMARY OF REQUIREMENTS

	FY 1965	FY 1966	FY 1967
Computer Cost (In thousands of dollars):			
Purchase	1,731	314	200
Lease	184	63	46
Maintenance	1	50	75
Total	1,916	427	321
Number of Personnel:			
Civil Service	14	14	14
Contracting Firm	14	28	29

Contractor Identification

Name of Firm	Service Performed
Technitrol, Inc.	Operations
General Electric	Programming and Maintenance

NARRATIVE EXPLANATION

FY 1965

The GE-625 Computer was purchased during the second quarter of Fiscal Year 1965. This system was obtained to provide Wallops with an impact prediction system for range safety and to increase the capabilities for general data processing by replacing the IBM-650. (The IBM-650 was operating on a three-shift basis but the work backlog was steadily increasing.)

FY 1966

The GE-625 was made operational during the first quarter of Fiscal Year 1966 and the IBM-650 was removed. General data processing went back to a one-shift operation. The second shift was used for the real-time system checkout. The computer was expanded by the addition of a 32,000 word memory, an additional printer and two tape handlers. These additional units were needed to effectively utilize the G.E. executive program and give true multiprogramming capability to the system.

FY 1967

The time sharing capability is one of the outstanding features of the GE-625 computer system. System changes to further utilize this capability will greatly expand computer usage and decrease the "data turn around time" of our ADP Center. To provide administrative and engineering organizational groups direct access to the computer, the addition of remote terminal facilities are needed in Fiscal Year 1967. This will allow these people to have simultaneous access to the computer with no apparent interference from any other users. The resulting benefits are savings in time and expense for both the user and the data processing operation.

GPO 902-536