National Aeronautics and Space Administration

BUDGET ESTIMATES

FISCAL YEAR 1974

Volume III

RESEARCH AND PROGRAM MANAGEMENT

SPECIAL ANALYSES

MATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1974 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

TABLE OF CONTENTS

VOLUME III

General Statement ..... SUM 1

Summary Tables

Appropriation language (proposed) ..... SUM 12

Program and financing schedule ..... SUM 13

Distribution of obligations by installation ..... SUM 14

Distribution of obligations by function by installation ..... SUM 15

Distribution of obligations by object classification by function ..... SUM 16

Distribution of obligations by object classification by installation ..... SUM 17

Summary of permanent positions by installation ..... SUM 18

Distribution of permanent positions by program ..... SUM 19

Installation Justification

Manned Space Flight Installations

John F. Kennedy Space Center, NASA ..... RPM 1
Manned Spacecraft Center ..... RPM 27
Marshall Space Flight Center ..... RPM 48

Space Science Installations

Goddard Space Flight Center ..... RPM 80
Wallops Station ..... RPM 101

Aeronautics and Space Technology Installations

Ames Research Center..... RPM 121
Flight Research Center..... RPM 141
Langley Research Center..... RPM 160
Lewis Research Center..... RPM 187

NASA Headquarters..... RPM 211

Special Analyses

Jet Propulsion Laboratory..... SA 1

Summary of aeronautical research and technology..... SA 9

Analysis of equipment estimates - FY 1974..... SA 10

Automatic data processing equipment..... SA 17

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

GENERAL STATEMENT

The Research and Program Management appropriation includes funding for research in Government laboratories, management of programs, and other activities of the National Aeronautics and Space Administration. Principally, it is intended to:

Provide the civil service staff necessary for in-house research, and to plan, manage, and support the Research and Development programs.

Provide other elements of operational capability to the laboratories and facilities such as logistics support, (travel and transportation, maintenance, and operation of facilities), and technical and administrative support.

Installations are under the management direction of the Associate Administrator having primary responsibility for the research and development programs conducted at the installation. The Associate Administrator for Manned Space Flight is responsible for the Kennedy Space Center, Manned Spacecraft Center, and Marshall Space Flight Center; the Associate Administrator for Space Science is responsible for the Goddard Space Flight Center and Wallops Station; and the Associate Administrator for Aeronautics and Space Technology is responsible for the Ames Research Center, Flight Research Center, Langley Research Center, and the Lewis Research Center. The Associate Administrator for Organization and Management acts as the institutional director for NASA Headquarters.

The following table summarizes the distribution of the Research and Program Management appropriation by installation:

SUMMARY OF OBLIGATIONS BY INSTALLATION

	1972	1973	1974
MANNED SPACE FLIGHT.....	$352,547,000	$336,666,000	$332,468,000
John F. Kennedy Space Center....	92,604,000	91,440,000	90,361,000
Manned Spacecraft Center.....	112,997,000	109,938,000	109,250,000
Marshall Space Flight Center....	146,946,000	135,288,000	132,857,000
SPACE SCIENCE.....	$107,365,000	$105,103,000	$104,594,000
Goddard Space Flight Center.....	96,456,000	94,469,000	93,657,000
Wallops Station.....	10,909,000	10,634,000	10,937,000

	1972	1973	1974
AERONAUTICS AND SPACE TECHNOLOGY..	$218,764,000	$213,167,000	$209,651,000
Ames Research Center.....	42,217,000	41,980,000	42,819,000
Flight Research Center.....	11,655,000	11,286,000	11,124,000
Langley Research Center.....	80,196,000	78,002,000	79,251,000
Lewis Research Center.....	84,696,000	81,899,000	76,457,000
SUPPORTING OPERATIONS			
NASA Headquarters.....	$61,636,000	$60,064,000	$60,287,000
TOTAL.....	$740,312,000	$715,000,000	$707,000,000

The Research and Program Management appropriation request may be categorized into five functional areas, as follows:

1. Personnel and Related Costs includes salaries and benefits for civil service personnel, and for personnel of other government agencies detailed to NASA. Costs in this category also include supporting personnel costs; i.e., the costs of moving expenses (as provided by law), recruiting and personnel investigation services provided by the Civil Service Commission, and personnel training.

2. Travel includes the cost of transportation, per diem, and related expenses required for direction, coordination, and management of research and development and construction of facilities program activities; for contract management and flight mission support; for overseas travel to launch and tracking sites; and for travel to meetings and technical seminars.

3. Facilities Services includes the cost of maintenance and related services, custodial services, minor rehabilitation and modification and construction, and facility operations.

4. Technical Services includes the cost of automatic data processing, institutional engineering services, the dissemination of scientific and technical information derived from the various R&D programs, and educational/informational program activities.

5. Administrative Support includes the cost of communications, administrative printing, administrative supplies, general purpose materials and equipment, transportation support, and other support activities.

The following summary table indicates the distribution of the total appropriation requirements by functional category:

Functions	1972	1973	1974
Personnel	$563,088,000	$557,419,000	$549,020,000
Travel	15,503,000	15,897,000	15,603,000
Facilities services	79,427,000	65,399,000	66,763,000
Technical services	38,349,000	33,411,000	32,974,000
Administrative support	43,945,000	42,874,000	42,640,000
Total	$740,312,000	$715,000,000	$707,000,000

The amounts requested in each functional category are further subdivided as follows:

	1972	1973	1974	Change in 1974
I. Personnel and Related Costs	$563,088,000	$557,419,000	$549,020,000	$-8,399,000

DESCRIPTION:

The estimate for personnel and related costs includes the regular pay, overtime, holiday, Sunday, and nightwork differential pay of NASA personnel in permanent, temporary, part-time, and intermittent positions, and the cost of military personnel and personnel of other agencies detailed to NASA. It also includes the Government's contribution to the Civil Service Retirement Fund for permanent employees, the Government's share of the cost of employees' life insurance and health benefits, incentive awards, and the cost of severance pay. The estimate provides for the cost of travel to initial duty station, and travel and shipment of household goods for transferred employees. Reimbursement to the Civil Service Commission for security investigations and payments to other agencies and non-Government institutions for personnel training are also included in this activity.

The following table shows the distribution of personnel and related costs by major category:

BASIS OF FUND REQUIREMENTS:

	1972	1973	1974
A. COMPENSATION AND BENEFITS			
1. Compensation			
a. Permanent positions	$503,106,000	$493,769,000	$481,546,000
b. Nonpermanent positions	5,187,000	6,268,000	6,148,000
c. Reimbursable details	2,390,000	2,460,000	2,458,000

	1972	1973	1974
d. Overtime & other compensation.....	$4,741,000	$5,442,000	$5,400,000
Subtotal, Compensation.....	$515,424,000	$507,939,000	$495,552,000
2. Benefits.....	$44,856,000	$45,656,000	$49,629,000
Subtotal, Compensation and Benefits.....	$560,280,000	$553,595,000	$545,181,000
B. SUPPORTING COSTS			
1. Transfer of personnel.....	$617,000	$1,201,000	$1,060,000
2. Civil Service Commission services.....	81,000	97,000	97,000
3. Personnel training.....	2,110,000	2,526,000	2,682,000
Subtotal, Supporting Costs.....	$2,808,000	$3,824,000	$3,839,000
Total, Personnel and Related Costs.....	$563,088,000	$557,419,000	$549,020,000

	1972	1973	1974	Change in 1974
II. Travel.....	$15,503,000	$15,897,000	$15,603,000	$-294,000

DESCRIPTION:

The estimate for travel includes the cost of transportation, per diem, and incidental costs required for employee travel for the purpose of direction and coordination of Research and Development and Construction of Facilities program activities; travel for contract management and flight mission support; travel to launching sites and tracking stations; and for administrative travel. It also includes the cost of travel to NASA-sponsored meetings and conferences, as well as meetings sponsored outside NASA, when such travel is in the interest of the agency; of travel by non-NASA employees (31 USC 22a); and of travel by unpaid members of research advisory committees. Charter, contract, or lease of passenger aircraft and the cost of local transportation by taxi, bus, or private automobile for which the employee is reimbursed are included in the estimate. Costs for travel to initial duty station and for permanent change of station are excluded from these estimates and are included under Personnel and Related Costs.

BASIS OF FUND REQUIREMENTS:

SUMMARY OF TRAVEL BY MAJOR CATEGORY

	1972	1973	1974
Program Related Travel			
Direction, coordination, and management of Research and Development and Construction of Facilities program activities.....	$9,042,000	$9,680,000	$9,483,000
Flight mission support.....	1,629,000	1,550,000	1,582,000
Overseas travel to launch and tracking sites.....	768,000	737,000	696,000
Subtotal.....	$11,439,000	$11,967,000	$11,761,000
Meetings and Technical Seminars			
Government-sponsored meetings...	$1,284,000	$1,214,000	$1,212,000
Other than government-sponsored meetings and technical seminars	934,000	790,000	782,000
Subtotal.....	$2,218,000	$2,004,000	$1,994,000
Administrative Travel.....	$1,846,000	$1,926,000	$1,848,000
Total, Travel.....	$15,503,000	$15,897,000	$15,603,000

	1972	1973	1974	Change in 1974
III. Facilities Services	$79,427,000	$65,399,000	$66,763,000	$+1,364,000

DESCRIPTION:

The estimate for facilities services includes the procurement of electricity, water, gas, and other utilities; maintenance of buildings and grounds; and minor construction and facility rentals. It also includes custodial services consisting of security services, janitorial services, cleaning, exterminating, refuse handling, laundry, and fire protection. Funds required also provide for the maintenance and repair of general purpose instruments, research equipment, and shop equipment. Requirements for general purpose building materials, hardware, electronics supplies and materials, as well as mechanical, laboratory, and shop equipment are also included in this estimate. The requirements for major contractual service effort at the Merritt Island Area and reimbursement to the Air Force for services provided to the Kennedy Space Center are also covered in this category.

BASIS OF FUND REQUIREMENTS:

SUMMARY OF FACILITIES SERVICES

	1972	1973	1974
Acquisition of Facilities			
Rental of real property.....	$254,000	$171,000	$197,000
Minor rehabilitation and modification, and construction.....	1,294,000	282,000	177,000
Subtotal.....	$1,548,000	$453,000	$374,000
Maintenance and Related Services			
Maintenance, repair, and alteration of buildings and grounds..	$20,516,000	$18,465,000	$20,298,000
Maintenance and repair of equipment.....	2,742,000	2,316,000	2,284,000
Custodial services.....	19,067,000	18,239,000	16,840,000
Subtotal.....	$42,325,000	$39,020,000	$39,422,000
Operation of Facilities			
Utilities.....	$19,229,000	$19,193,000	$19,756,000
Supplies and equipment.....	8,279,000	6,733,000	7,211,000
Subtotal.....	$27,508,000	$25,926,000	$26,967,000
MTF Support.....	$8,046,000	---	---
Total, Facilities Services.....	$79,427,000	$65,399,000	$66,763,000

	1972	1973	1974	Change in 1974
IV. Technical services...	$38,349,000	$33,411,000	$32,974,000	$-437,000

DESCRIPTION:

The estimates for technical services provide for the costs of (1) automatic data processing (ADP) support, (2) engineering services, and (3) scientific and technical and educational/informational programs. Funds included for ADP support provide for the acquisition of ADP equipment by lease or purchase, maintenance of NASA-owned equipment, and the procurement of programming and operation services. Both electronic data processing and ancillary electric accounting machine equipment are included. The overall requirement for ADP is divided by appropriation in accordance with the purpose served by the equipment. The Research and Program Management appropriation provides for the general purpose scientific and business data processing which support the overall installation operations, and scientific and technical applications

where it is impractical to distribute the funding to a directly supported program or project. Other appropriations provide for data processing systems and operations which are dedicated to specific programs or projects, or are integrated into larger systems.

Funds for engineering services provide for engineering design and reliability and quality assurance studies. The scientific and technical programs, which furnish up-to-date reporting of scientific and technical developments, provide for the support of the technical libraries located at various installations, the acquisition and dissemination of scientific and technical literature, and for educational/informational programs, which disseminate information to the public on aeronautics and space accomplishments and their applications to life on earth.

BASIS OF FUND REQUIREMENTS:

SUMMARY OF TECHNICAL SERVICES

	1972	1973	1974
Automatic Data Processing			
Lease of equipment.....	$4,762,000	$4,440,000	$4,518,000
Purchase of equipment.....	3,934,000	1,542,000	127,000
Maintenance of equipment.....	1,294,000	1,383,000	1,388,000
Subtotal, equipment.....	$9,990,000	$7,365,000	$6,033,000
Programming and operation services.....	$10,956,000	$10,889,000	$11,706,000
Subtotal.....	$20,946,000	$18,254,000	$17,739,000
Engineering Services.....	$615,000	$467,000	$469,000
Scientific and Technical Information and Educational Programs			
Operation of NASA technical libraries.....	$1,078,000	$727,000	$841,000
Educational/informational programs.....	4,646,000	4,452,000	4,359,000
Scientific and technical information.....	11,064,000	9,511,000	9,566,000
Subtotal.....	$16,788,000	$14,690,000	$14,766,000
Total.....	$38,349,000	$33,411,000	$32,974,000

491-316 O - 73 - 2

	1972	1973	1974	Change in 1974
V. Administrative support services.....	$43,945,000	$42,874,000	$42,640,000	$-234,000

DESCRIPTION:

Included in administrative support services are general services which support overall installation operations. The administrative expenses for communications, printing and reproduction, supplies, materials and equipment, transportation (motor pool and administrative aircraft services and operations), and medical services, are provided for in this function.

BASIS OF FUND REQUIREMENTS:

SUMMARY OF ADMINISTRATIVE SUPPORT SERVICES

	1972	1973	1974
Communications			
Leased lines and long distance tolls.....	$4,594,000	$4,624,000	$4,779,000
Local telephone service.....	5,576,000	5,658,000	5,567,000
Other communications.....	2,542,000	2,770,000	2,771,000
Subtotal.....	$12,712,000	$13,052,000	$13,117,000
Administrative Printing.....	$2,546,000	$2,643,000	$2,695,000
Supplies, Materials, and Equipment			
Supplies and materials.....	$5,855,000	$5,410,000	$5,316,000
Equipment.....	2,355,000	1,685,000	1,816,000
Subtotal.....	$8,210,000	$7,095,000	$7,132,000
Transportation			
Center operations.....	$5,157,000	$5,600,000	$5,036,000
Common carrier.....	2,059,000	1,989,000	2,091,000
Subtotal.....	$7,216,000	$7,589,000	$7,127,000
Administrative Support Services			
Installation support services...	$10,761,000	$10,151,000	$9,949,000
Medical services.....	2,500,000	2,344,000	2,620,000
Subtotal.....	$13,261,000	$12,495,000	$12,569,000
Total, Administrative Support Services.....	$43,945,000	$42,874,000	$42,640,000

1973 OPERATING BUDGET

The operating budget for 1973 is $715,000,000, which is $14,450,000 less than the amount appropriated. This savings results primarily because the employment levels at the beginning of 1973 were lower than those assumed in the 1973 budget, which enabled NASA to reduce significantly personnel and related costs.

For 1974, $707,000,000 is requested, a decrease of $8,000,000 from 1973. The reduction represents overall decreases in personnel and related costs, and is directly related to the additional reduction of 1,880 civil service positions planned by the end of 1974. These personnel and cost reductions are consistent with the programmatic reductions contained in the 1974 Research and Development budget estimates. The 1974 budget request for R&PM contains no provisions to cover the increased cost of revised salary rates effective January 7, 1973, implemented by Executive Order 11691.

PERMANENT CIVIL SERVICE POSITIONS

The 1974 budget provides for a further reduction in the level of civil service personnel of 1,880 to a new level of 24,970. The distribution by installation is shown in the following table:

Number of Permanent Civil Service Positions

	1972	1973	1974
Manned Space Flight.....	11,625	11,350	10,525
John F. Kennedy Space Center.....	2,467	2,409	2,309
Manned Spacecraft Center.....	3,817	3,727	3,652
Marshall Space Flight Center.....	5,341	5,214	4,564
Space Science.....	4,509	4,403	4,228
Goddard Space Flight Center.....	4,061	3,966	3,808
Wallops Station.....	448	437	420
Aeronautics and Space Technology...	9,594	8,984	8,636
Ames Research Center.....	1,771	1,729	1,699
Flight Research Center.....	493	482	482
Langley Research Center.....	3,495	3,411	3,371
Lewis Research Center.....	3,835	3,362	3,084
NASA Headquarters.....	1,772	1,731	1,581
Unfilled positions.....	---	382	---
Total, Permanent Positions.....	27,500	26,850	24,970

	1972	1973	1974
Other than Permanent Positions.....	2,300	2,300	2,150
Total Positions.....	29,800	29,150	27,120

Recapitulation of Reductions:

	Year in which accomplished		
	1973	1974	Total
Planned Reduction in 1973 Budget	-650	---	-650
Planned Reduction in 1974 Budget	-382	-1,498	-1,880

History of Reductions

The 1974 reduction in permanent civil service positions of 1,880 will bring the cumulative reduction in filled positions to 10,171 from the peak employment reached in July 1967 (as adjusted for 1,015 positions added for functions performed by NASA which were previously performed by support contractors). This reduction, which amounts to about one-third, will bring the civil service employment to its lowest level since 1962.

Actions Planned in 1974

The 1974 budget plan for NASA is based on reducing an additional 1,880 positions from the level planned for in the 1973 budget. This reduction will be accomplished in two parts: during 1973 the manpower reductions (382) associated with the phase-out of the nuclear propulsion and power program and the initial phase of the closing of the Plum Brook Station will be carried out. The balance of the reductions, 1,498 positions, will be taken in 1974. The reduction will be accomplished by (1) completing the closing up of Plum Brook Station (278), and (2) making the planned reductions of 1,220 at other installations based on specific programmatic changes as described below.

John F. Kennedy Space Center: -100
Manned Spacecraft Center: -75

The reductions result from the phase-out of Skylab not fully being offset by the build-up from the Apollo Soyuz Test project and the Space Shuttle program.

Marshall Space Flight Center: -650

The reduction in MSFC civil service positions is related to the phase-out of Skylab not fully being offset by the build-up from the Apollo Soyuz Test project and the Space Shuttle Program, the suspension of HEAO, the phase-out of the communications program, the curtailment of other space research programs, along with a related reduction in support positions.

Goddard Space Flight Center: -158

The reduction in Goddard civil service positions is related to the suspension of HEAO, and the phase-out of the communications program, including the cancellation of ATS-G.

Wallops Station: -17

The change at Wallops is related to the reduction in support provided to the communications and other supporting space research programs.

Ames Research Center: -30
Langley Research Center: -40

The changes are related to the reduction in the level of support provided to the space research programs.

Headquarters: -150

The Headquarters reduction is in consonance with the overall reduction of R&D program related activities.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PROPOSED APPROPRIATION LANGUAGE

Research and Program Management

For necessary expenses of research in Government laboratories, management of programs and other activities of the National Aeronautics and Space Administration, not otherwise provided for, including uniforms or allowances therefor, as authorized by law (5 U.S.C. 5901–5902); awards; [purchase (not to exceed one for replacement only),] hire, maintenance and operation of administrative aircraft; purchase (not to exceed [twenty-seven] *twenty-six* for replacement only) and hire of passenger motor vehicles; and maintenance and repair of real and personal property, and not in excess of $10,000 per project for construction of new facilities and additions to existing facilities, and not in excess of $25,000 per project for rehabilitation and modification of facilities; [$729,450,000] *$707,000,000*: *Provided,* That contracts may be entered into under this appropriation for maintenance and operation of facilities, and for other services, to be provided during the next fiscal year: *Provided further,* That not to exceed $35,000 of the foregoing amount shall be available for scientific consultations or extraordinary expense, to be expended upon the approval or authority of the Administrator and his determination shall be final and conclusive. (*42 U.S.C. 2451, et seq.; Department of Housing and Urban Development; Space, Science, Veterans, and Certain Other Independent Agencies Appropriation Act, 1973; additional authorizing legislation to be proposed.*)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Research and Program Management

Program and Financing (in thousands of dollars)

Identification code 27-00-0103-0-1-250	Budget plan			Costs and obligations		
	1972 actual	1973 estimate	1974 estimate	1972 actual	1973 estimate	1974 estimate
Program by activities:						
Direct program:						
1. Manned space flight	341,555	306,200	285,900	341,311	306,200	285,900
2. Scientific investigations in space	107,803	112,600	121,200	107,401	112,600	121,200
3. Space applications	45,945	66,200	74,700	45,648	66,200	74,700
4. Space and nuclear research and technology	85,226	72,800	57,300	85,100	72,800	57,300
5. Aeronautical research and technology	119,062	122,000	132,400	118,325	122,000	132,400
6. Supporting activities	40,721	35,200	35,500	40,346	35,200	35,500
Total direct program costs, funded	740,312	715,000	707,000	738,131	715,000	707,000
Reimbursable program:						
1. Manned space flight	1,274	1,631	1,681	1,278	1,674	1,681
3. Space applications	1,656	1,370	1,508	1,680	1,370	1,508
4. Space and nuclear research and technology	557	725	730	494	774	730
6. Supporting activities	627	638	671	582	728	671
Total reimbursable program costs	4,114	4,364	4,590	4,034	4,546	4,590
Total program costs, funded	744,426	719,364	711,590	742,165	719,546	711,590
Change in selected resources [1]				2,261	−182	
10 Total	744,426	719,364	711,590	744,426	719,364	711,590
Financing:						
Receipts and reimbursements from:						
11 Federal funds				−3,408	−4,024	−4,227
14 Non-Federal sources				−706	−340	−363
21 Unobligated balance available, start of year [2]				−8,046		
25 Unobligated balance lapsing				325	14,435	
Budget authority				**732,591**	**729,435**	**707,000**
Budget authority:						
40 Appropriation				734,722	729,450	707,000
41 Transferred to other accounts				−2,131	−15	
43 **Appropriation (adjusted)**				**732,591**	**729,435**	**707,000**
Relation of obligations to outlays:						
71 Obligations incurred, net				740,312	715,000	707,000
72 Obligated balance, start of year				81,180	70,823	73,723
74 Obligated balance, end of year				−70,823	−73,723	−73,723
77 Adjustments in expired accounts				−1,285		
90 Outlays				749,383	712,100	707,000

[1] Selected resources as of June 30 are as follows: Undelivered orders, 1971, $28,054 thousand (1972 adjustments, $743 thousand); 1972, $29,572 thousand; 1973, $29,390 thousand; 1974, $29,390 thousand.

[2] Available until Sept. 30, 1971, pursuant to provisions in the Second Supplemental Appropriations Act, 1971, Public Law 92-18 (85 Stat. 44).

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1974 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

DISTRIBUTION OF OBLIGATIONS BY INSTALLATION

INSTITUTIONAL DIRECTOR AND INSTALLATION	Fiscal Year 1972	Fiscal Year 1973	Fiscal Year 1974
MANNED SPACE FLIGHT.....	$352,547,000	$336,666,000	$332,468,000
John F. Kennedy Space Center, NASA.....	92,604,000	91,440,000	90,361,000
Manned Spacecraft Center.....	112,997,000	109,938,000	109,250,000
Marshall Space Flight Center...	146,946,000	135,288,000	132,857,000
SPACE SCIENCE.....	$107,365,000	$105,103,000	$104,594,000
Goddard Space Flight Center....	96,456,000	94,469,000	93,657,000
Wallops Station.....	10,909,000	10,634,000	10,937,000
AERONAUTICS AND SPACE TECHNOLOGY.	$218,764,000	$213,167,000	$209,651,000
Ames Research Center.....	42,217,000	41,980,000	42,819,000
Flight Research Center.....	11,655,000	11,286,000	11,124,000
Langley Research Center.....	80,196,000	78,002,000	79,251,000
Lewis Research Center.....	84,696,000	81,899,000	76,457,000
NASA HEADQUARTERS.....	$61,636,000	60,064,000	60,287,000
TOTAL.....	$740,312,000	$715,000,000	$707,000,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1974 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

DISTRIBUTION OF OBLIGATIONS BY FUNCTION
BY INSTALLATION
(Thousands of dollars)

FUNCTION	Total NASA	Subtotal OMSF	J. F. Kennedy Space Center, NASA	Manned Spacecraft Center	Marshall Space Flight Center	Subtotal OSS	Goddard Space Flight Center	Wallops Station	Subtotal OAST	Ames Research Center	Flight Research Center	Langley Research Center	Lewis Research Center	Headquarters
Personnel														
1972	563,088	247,369	50,723	83,579	113,067	87,999	80,593	7,406	185,902	35,402	9,599	66,955	73,946	41,818
1973	557,419	244,170	50,726	83,202	110,242	87,831	80,447	7,384	184,086	35,471	9,510	66,496	72,609	41,332
1974	549,020	239,503	49,728	82,113	107,662	86,758	79,384	7,374	181,172	35,933	9,287	67,345	68,607	41,587
Travel														
1972	15,503	6,685	820	3,145	2,720	2,389	2,231	158	3,993	931	222	1,662	1,178	2,436
1973	15,897	6,941	790	3,360	2,791	2,439	2,255	184	3,850	771	230	1,665	1,184	2,667
1974	15,603	6,803	790	3,355	2,658	2,400	2,216	184	3,800	771	230	1,665	1,134	2,600
Facilities Services														
1972	79,427	51,042	24,006	10,160	16,876	7,811	5,463	2,348	20,123	4,121	1,562	6,401	8,039	451
1973	65,399	42,227	23,804	9,483	8,940	7,068	5,003	2,065	15,815	3,960	1,254	5,208	5,393	289
1974	66,763	42,941	23,474	10,292	9,175	7,498	5,169	2,329	16,051	4,189	1,292	5,354	5,216	273
Technical Services														
1972	38,349	21,981	6,607	8,006	7,368	4,111	3,984	127	1,765	339	34	1,146	246	10,492
1973	33,411	18,121	5,506	5,475	7,140	2,768	2,584	184	2,948	338	65	1,178	1,367	9,574
1974	32,974	18,151	5,667	5,486	6,998	2,737	2,540	197	2,057	391	65	1,290	311	10,029
Administrative Support														
1972	43,945	25,470	10,448	8,107	6,915	5,055	4,185	870	6,981	1,424	238	4,032	1,287	6,439
1973	42,874	25,207	10,614	8,418	6,175	4,997	4,180	817	6,468	1,440	227	3,455	1,346	6,202
1974	42,640	25,070	10,702	8,004	6,364	5,201	4,348	853	6,571	1,535	250	3,597	1,189	5,798
Total														
1972	740,312	352,547	92,604	112,997	146,946	107,365	96,456	10,909	218,764	42,217	11,655	80,196	84,696	61,636
1973	715,000	336,666	91,440	109,938	135,288	105,103	94,469	10,634	213,167	41,980	11,286	78,002	81,899	60,064
1974	707,000	332,468	90,361	109,250	132,857	104,594	93,657	10,937	209,651	42,819	11,124	79,251	76,457	60,287

401-316 O - 73 - 3

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1974 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

DISTRIBUTION OF OBLIGATIONS BY OBJECT CLASSIFICATION
BY FUNCTION

(Thousands of Dollars)

Object Classification	Total NASA	Personnel	Travel	Facilities Services	Technical Services	Administrative Support
Fiscal Year 1972						
Personnel compensation	515,424	515,424	---	---	---	---
Personnel benefits	43,886	43,886	---	---	---	---
Benefits for former personnel	1,261	1,261	---	---	---	---
Travel & transportation of persons	17,323	127	15,503	---	---	1,693
Transportation of things	3,221	200	---	---	52	2,969
Rent, communications and utilities	38,278	---	---	20,008	4,676	13,594
Printing and reproduction	5,194	---	---	---	2,735	2,459
Other services	92,142	2,190	---	48,522	25,974	15,456
Supplies and materials	13,314	---	---	6,570	826	5,918
Equipment	7,472	---	---	1,612	4,086	1,774
Lands and structures	2,715	---	---	2,715	---	---
Grants, subsidies and contributions	45	---	---	---	---	45
Insurance claims and indemnities	37	---	---	---	---	37
Totals	740,312	563,088	15,503	79,427	38,349	43,945
Fiscal Year 1973						
Personnel compensation	507,939	507,939	---	---	---	---
Personnel benefits	44,117	44,117	---	---	---	---
Benefits for former personnel	2,130	2,130	---	---	---	---
Travel & transportation of persons	17,911	161	15,897	---	---	1,853
Transportation of things	3,409	437	---	---	45	2,927
Rent, communications, and utilities	37,966	---	---	19,373	4,355	14,238
Printing and reproduction	4,960	---	---	---	2,424	2.536
Other services	80,549	2,635	---	39,139	24,036	14,739
Supplies and materials	12,672	---	---	5,784	1,420	5,468
Equipment	2,987	---	---	826	1,131	1,030
Lands and structures	277	---	---	277	---	---
Grants, subsidies and contributions	50	---	---	---	---	50
Insurance claims and indemnities	33	---	---	---	---	33
Totals	715,000	557,419	15,897	65,399	33,411	42,874
Fiscal Year 1974						
Personnel compensation	495,552	495,552	---	---	---	---
Personnel benefits	43,450	43,450	---	---	---	---
Benefits for former personnel	6,689	6,689	---	---	---	---
Travel & transportation of persons	17,454	157	15,603	---	---	1,694
Transportation of things	3,428	372	---	---	45	3,011
Rent, communications, and utilities	38,836	---	---	19,953	4,433	14,450
Printing and reproduction	5,044	---	---	---	2,475	2,569
Other services	81,439	2,800	---	39,606	24,755	14,268
Supplies and materials	12,242	---	---	5,790	1,074	5,378
Equipment	2,602	---	---	1,237	132	1,183
Lands and structures	177	---	---	177	---	---
Grants, subsidies and contributions	50	---	---	---	---	50
Insurance claims and indemnities	37	---	---	---	---	37
Totals	707,000	549,020	15,603	66,763	32,974	42,640

NATIONAL AERONAUTICS AND SPACE ADMINISTRA

FISCAL YEAR 1974 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

DISTRIBUTION OF OBLIGATIONS BY OBJECT CLASSI
BY INSTALLATION

(Thousands of dollars)

Object Classification	Total NASA	Subtotal OMSF	J. F. Kennedy Space Center, NASA	Manned Spacecraft Center	Marshall Space Flight Center	Subtotal OSS	Goddard Space Flig Center
FISCAL YEAR 1972							
Personnel compensation	515,424	226,927	46,570	76,691	103,666	80,675	73,905
Personnel benefits	43,886	18,925	3,839	6,290	8,796	6,752	6,164
Benefits for former personnel	1,261	576	70	229	277	94	93
Travel & transportation of persons	17,323	8,118	1,997	3,343	2,778	2,474	2,243
Transportation of things	3,221	1,430	1,067	332	31	1,295	1,273
Rent, communications, and utilities	38,278	18,132	6,712	6,255	5,165	5,994	5,524
Printing and reproduction	5,194	3,780	2,413	843	524	187	124
Other services	92,142	61,469	25,906	14,033	21,530	6,482	4,869
Supplies and materials	13,314	7,245	3,111	2,212	1,922	2,003	1,081
Equipment	7,472	3,855	673	2,597	585	1,184	971
Lands and structures	2,715	2,077	241	168	1,668	223	207
Grants, subsidies & contributions	45	1	---	1	---	---	---
Insurance claims and indemnities	37	12	5	3	4	2	2
Totals	740,312	352,547	92,604	112,997	146,946	107,365	96,456
FISCAL YEAR 1973							
Personnel compensation	507,939	223,564	46,463	75,983	101,118	79,655	72,92
Personnel benefits	44,117	18,453	3,818	6,324	8,311	6,769	6,18
Benefits for former personnel	2,130	893	103	474	316	727	70
Travel and transportation of persons	17,911	8,591	2,084	3,582	2,925	2,548	2,29
Transportation of things	3,409	1,484	1,052	342	90	1,323	1,30
Rent, communications, and utilities	37,966	17,707	6,682	6,241	4,784	5,601	5,09
Printing and reproduction	4,960	3,708	2,325	870	513	188	1
Other services	80,549	53,662	24,742	13,613	15,307	5,778	4,3
Supplies and materials	12,672	7,212	3,384	2,053	1,775	1,971	1,1
Equipment	2,987	1,210	621	442	147	424	2
Lands and structures	277	160	150	10	---	117	
Grants, subsidies & contributions	50	---	---	---	---	---	-
Insurance claims and indemnities	33	22	16	4	2	2	
Totals	715,000	336,666	91,440	109,938	135,288	105,103	94,4
FISCAL YEAR 1974							
Personnel compensation	495,552	217,773	45,313	75,236	97,224	78,705	71,9
Personnel benefits	43,450	18,046	3,735	6,240	8,071	6,681	6,0
Benefits for former personnel	6,689	2,440	300	225	1,915	589	5
Travel & transportation of persons	17,454	8,268	1,918	3,587	2,763	2,513	2,
Transportation of things	3,428	1,380	1,000	335	45	1,436	1,

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1974 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

DISTRIBUTION OF OBLIGATIONS BY OBJECT CLASSIFICATION
BY INSTALLATION

(Thousands of dollars)

y ,	Manned Spacecraft Center	Marshall Space Flight Center	Subtotal OSS	Goddard Space Flight Center	Wallops Station	Subtotal OAST	Ames Research Center	Flight Research Center	Langley Research Center	Lewis Research Center	HDQTR
	76,691	103,666	80,675	73,905	6,770	170,356	32,495	8,815	61,318	67,728	37,46
	6,290	8,796	6,752	6,164	588	14,423	2,734	738	5,207	5,744	3,78
	229	277	94	93	1	535	127	14	75	319	5
	3,343	2,778	2,474	2,243	231	4,283	939	222	1,881	1,241	2,44
	332	31	1,295	1,273	22	390	90	13	221	66	1(
	6,255	5,165	5,994	5,524	470	10,254	3,213	223	2,875	3,943	3,89
	843	524	187	124	63	239	23	10	133	73	98
	14,033	21,530	6,482	4,869	1,613	12,521	2,192	1,327	4,763	4,239	11,67
	2,212	1,922	2,003	1,081	922	3,564	334	214	2,327	689	5(
	2,597	585	1,184	971	213	1,761	69	53	991	648	6
	168	1,668	223	207	16	415	---	26	384	5	-
	1	---	---	---	---	---	---	---	---	---	
	3	4	2	2	---	23	1	---	21	1	-
	112,997	146,946	107,365	96,456	10,909	218,764	42,217	11,655	80,196	84,696	61,6
	75,983	101,118	79,655	72,926	6,729	168,021	32,475	8,710	60,375	66,461	36,6
	6,324	8,311	6,769	6,189	580	14,841	2,821	746	5,491	5,783	4,0
)	474	316	727	707	20	510	11	4	215	280	.
	3,582	2,925	2,548	2,293	255	4,083	785	230	1,880	1,188	2,
	342	90	1,323	1,301	22	464	113	20	240	91	
	6,241	4,784	5,601	5,099	502	10,241	3,333	213	3,082	3,613	4,
	870	513	188	130	58	234	25	4	125	80	
	13,613	15,307	5,778	4,328	1,450	10,474	2,022	1,159	4,615	2,678	10,
	2,053	1,775	1,971	1,117	854	3,166	340	150	1,590	1,086	
	442	147	424	285	139	1,132	55	50	389	638	
	10	---	117	92	25	---	---	---	---	---	
	---	---	---	---	---	---	---	---	---	---	
6	4	2	2	2	---	1	---	---	---	1	
0	109,938	135,288	105,103	94,469	10,634	213,167	41,980	11,286	78,002	81,899	60,
3	75,236	97,224	78,705	71,971	6,734	162,825	32,951	8,532	61,191	60,151	36,
5	6,240	8,071	6,681	6,098	583	14,384	2,818	705	5,534	5,327	4,
0	225	1,915	589	589	---	3,235	---	---	210	3,025	
8	3,587	2,763	2,513	2,254	259	4,051	771	230	1,900	1,150	2
0	335	45	1,436	1,413	23	474	120	21	242	91	

Benefits for former personnel	1,261	576	70	229	277	94	93
Travel & transportation of persons	17,323	8,118	1,997	3,343	2,778	2,474	2,243
Transportation of things	3,221	1,430	1,067	332	31	1,295	1,273
Rent, communications, and utilities	38,278	18,132	6,712	6,255	5,165	5,994	5,524
Printing and reproduction	5,194	3,780	2,413	843	524	187	124
Other services	92,142	61,469	25,906	14,033	21,530	6,482	4,869
Supplies and materials	13,314	7,245	3,111	2,212	1,922	2,003	1,081
Equipment	7,472	3,855	673	2,597	585	1,184	971
Lands and structures	2,715	2,077	241	168	1,668	223	207
Grants, subsidies & contributions	45	1	---	1	---	---	---
Insurance claims and indemnities	37	12	5	3	4	2	2
Totals	740,312	352,547	92,604	112,997	146,946	107,365	96,456
FISCAL YEAR 1973							
Personnel compensation	507,939	223,564	46,463	75,983	101,118	79,655	72,926
Personnel benefits	44,117	18,453	3,818	6,324	8,311	6,769	6,189
Benefits for former personnel	2,130	893	103	474	316	727	707
Travel and transportation of persons	17,911	8,591	2,084	3,582	2,925	2,548	2,293
Transportation of things	3,409	1,484	1,052	342	90	1,323	1,301
Rent, communications, and utilities	37,966	17,707	6,682	6,241	4,784	5,601	5,099
Printing and reproduction	4,960	3,708	2,325	870	513	188	130
Other services	80,549	53,662	24,742	13,613	15,307	5,778	4,328
Supplies and materials	12,672	7,212	3,384	2,053	1,775	1,971	1,117
Equipment	2,987	1,210	621	442	147	424	285
Lands and structures	277	160	150	10	---	117	92
Grants, subsidies & contributions	50	---	---	---	---	---	---
Insurance claims and indemnities	33	22	16	4	2	2	2
Totals	715,000	336,666	91,440	109,938	135,288	105,103	94,469
FISCAL YEAR 1974							
Personnel compensation	495,552	217,773	45,313	75,236	97,224	78,705	71,971
Personnel benefits	43,450	18,046	3,735	6,240	8,071	6,681	6,098
Benefits for former personnel	6,689	2,440	300	225	1,915	589	589
Travel & transportation of persons	17,454	8,268	1,918	3,587	2,763	2,513	2,254
Transportation of things	3,428	1,380	1,000	335	45	1,436	1,413
Rent, communications, and utilities	38,836	17,836	6,352	6,325	5,159	5,891	5,363
Printing and reproduction	5,044	3,730	2,303	887	540	195	136
Other services	81,439	54,927	25,783	14,006	15,138	6,044	4,394
Supplies and materials	12,242	6,988	3,193	2,095	1,700	1,967	1,156
Equipment	2,602	948	348	300	300	504	247
Lands and structures	177	110	100	10	---	67	34
Grants, subsidies & contributions	50	---	---	---	---	---	---
Insurance claims and indemnities	37	22	16	4	2	2	2
Totals	707,000	332,468	90,361	109,250	132,857	104,594	93,657

9	277	94	93	1	535	127	14	75	319	56
3	2,778	2,474	2,243	231	4,283	939	222	1,881	1,241	2,448
2	31	1,295	1,273	22	390	90	13	221	66	106
5	5,165	5,994	5,524	470	10,254	3,213	223	2,875	3,943	3,898
3	524	187	124	63	239	23	10	133	73	988
3	21,530	6,482	4,869	1,613	12,521	2,192	1,327	4,763	4,239	11,670
2	1,922	2,003	1,081	922	3,564	334	214	2,327	689	502
7	585	1,184	971	213	1,761	69	53	991	648	672
8	1,668	223	207	16	415	---	26	384	5	---
1	---	---	---	---	---	---	---	---	---	44
3	4	2	2	---	23	1	---	21	1	---
7	146,946	107,365	96,456	10,909	218,764	42,217	11,655	80,196	84,696	61,636
3	101,118	79,655	72,926	6,729	168,021	32,475	8,710	60,375	66,461	36,699
4	8,311	6,769	6,189	580	14,841	2,821	746	5,491	5,783	4,054
4	316	727	707	20	510	11	4	215	280	---
2	2,925	2,548	2,293	255	4,083	785	230	1,880	1,188	2,689
2	90	1,323	1,301	22	464	113	20	240	91	138
1	4,784	5,601	5,099	502	10,241	3,333	213	3,082	3,613	4,417
0	513	188	130	58	234	25	4	125	80	830
3	15,307	5,778	4,328	1,450	10,474	2,022	1,159	4,615	2,678	10,635
3	1,775	1,971	1,117	854	3,166	340	150	1,590	1,086	323
2	147	424	285	139	1,132	55	50	389	638	221
0	---	117	92	25	---	---	---	---	---	---
-	---	---	---	---	---	---	---	---	---	50
4	2	2	2	---	1	---	---	---	1	8
38	135,288	105,103	94,469	10,634	213,167	41,980	11,286	78,002	81,899	60,064
6	97,224	78,705	71,971	6,734	162,825	32,951	8,532	61,191	60,151	36,249
0	8,071	6,681	6,098	583	14,384	2,818	705	5,534	5,327	4,339
5	1,915	589	589	---	3,235	---	---	210	3,025	425
7	2,763	2,513	2,254	259	4,051	771	230	1,900	1,150	2,622
5	45	1,436	1,413	23	474	120	21	242	91	138
5	5,159	5,891	5,363	528	10,634	3,462	244	3,584	3,344	4,475
7	540	195	136	59	254	30	5	139	80	865
5	15,138	6,044	4,394	1,650	9,837	2,272	1,187	4,472	1,906	10,631
5	1,700	1,967	1,156	811	3,030	340	150	1,590	950	257
0	300	504	247	257	922	55	50	389	428	228
0	---	67	34	33	---	---	---	---	---	---
-	---	---	---	---	---	---	---	---	---	50
4	2	2	2	---	5	---	---	---	5	8
0	132,857	104,594	93,657	10,937	209,651	42,819	11,124	79,251	76,457	60,287

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1974 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

SUMMARY OF PERMANENT POSITIONS BY INSTALLATION

INSTITUTIONAL DIRECTOR AND INSTALLATION	Fiscal Year 1972	Fiscal Year 1973	Fiscal Year 1974
MANNED SPACE FLIGHT.....	11,625	11,350	10,525
John F. Kennedy Space Center, NASA.....	2,467	2,409	2,309
Manned Spacecraft Center.....	3,817	3,727	3,652
Marshall Space Flight Center.....	5,341	5,214	4,564
SPACE SCIENCE.....	4,509	4,403	4,228
Goddard Space Flight Center.....	4,061	3,966	3,808
Wallops Station.....	448	437	420
AERONAUTICS AND SPACE TECHNOLOGY....	9,594	8,984	8,636
Ames Research Center.....	1,771	1,729	1,699
Flight Research Center.....	493	482	482
Langley Research Center.....	3,495	3,411	3,371
Lewis Research Center.....	3,835	3,362	3,084
NASA HEADQUARTERS.....	1,772	1,731	1,581
UNFILLED POSITIONS.....	---	382	---
TOTAL.....	27,500	26,850	24,970

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1974 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

DISTRIBUTION OF PERMANENT POSITIONS BY PROGRAM

INSTITUTIONAL DIRECTOR AND PROGRAM	Fiscal Year 1972	Fiscal Year 1973	Fiscal Year 1974
MANNED SPACE FLIGHT	8,142	7,698	7,207
Space flight operations	4,240	5,370	3,675
Space shuttle	1,234	2,020	3,402
Advanced missions	122	104	99
Apollo	2,546	204	31
SPACE SCIENCE	2,922	2,896	2,750
Physics and astronomy	1,713	1,627	1,524
Lunar and planetary	659	718	727
Launch vehicle procurement	550	551	499
SPACE APPLICATIONS	1,219	1,614	1,566
AERONAUTICS AND SPACE TECHNOLOGY	6,182	5,422	5,109
Aeronautical research and technology	3,631	3,599	3,617
Space research and technology	2,001	1,625	1,492
Nuclear power and propulsion	550	198	---
TRACKING AND DATA ACQUISITION	981	878	854
TECHNOLOGY UTILIZATION	34	36	34
Subtotal, Direct Positions	19,480	18,544	17,520
Indirect Positions	8,020	7,924	7,450
Unfilled Positions	---	382	---
TOTAL, PERMANENT POSITIONS	27,500	26,850	24,970

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

JOHN F. KENNEDY SPACE CENTER

MISSION

The Kennedy Space Center was established at Cape Kennedy, Florida, as a separate NASA Center in July 1962. It serves as the primary Center within NASA for the test, checkout, and launch of space vehicles. This presently includes launch of manned and unmanned vehicles at the Kennedy Space Center, the Air Force Eastern Test Range, and the Air Force Western Test Range. The Center is now concentrating on preparations for Skylab launches, Apollo Soyuz Test Project, Space Shuttle launch facilities and launch site peculiar ground support equipment, as well as research and operational unmanned launches. The Kennedy Space Center is specifically responsible for:

1. Launch vehicle checkout and preparation.

2. Spacecraft and payload checkout and preparation.

3. Launch facility design, construction, maintenance, and operations, including advanced planning and studies leading to development of new launch operation concepts and techniques.

4. Final integration and integrated checkout of vehicle, spacecraft and launch facilities, and the conduct of actual launch operations.

5. Operation and coordination of supporting facilities, ground support equipment, and tracking and data acquisition and logistics support required for operation of all NASA activities at the Eastern and Western Test Ranges.

6. Technical and administrative support services for all NASA elements located in the area.

DESCRIPTION

Operations of the John F. Kennedy Space Center are conducted at two primary locations:

1. The Kennedy Space Center is situated approximately 50 miles east of Orlando, Florida, in northeast Brevard County. The total land and water area occupied by the installation is 140,393 acres. Breakdown of this acreage is as follows:

NASA-Owned	84,031
Easement, Banana River Causeway	271
Easement, Indian River Causeway	296
Deed of Dedication, Florida-Owned, Submerged Lands	55,795
Total	140,393

In addition, the Kennedy Space Center is responsible for the operation and maintenance of certain facilities within the national Eastern Test Range launch area.

2. The Western Test Range is located at Vandenberg Air Force Base, in Santa Barbara County, and is six miles west of Lompoc, California and 160 miles north of Los Angeles, California. Unmanned launch operations are accomplished through a host-tenant agreement with the Air Force, which owns the real property occupied by NASA.

The total capital investment at the Kennedy Space Center, and the Western Range including fixed assets in progress and contractor-held facilities at various locations as of June 30, 1972, was $1,310,793,000.

SUMMARY OF RESOURCES REQUIREMENTS

	FUNDS		
Functions	1972	1973	1974
Personnel	$50,723,000	$50,726,000	$49,728,000
Travel	820,000	790,000	790,000
Facilities services	24,006,000	23,804,000	23,474,000
Technical services	6,607,000	5,506,000	5,667,000
Administrative support	10,448,000	10,614,000	10,702,000
Total, fund requirements	$92,604,000	$91,440,000	$90,361,000

	1972	1973	1974	Change in 1974
I. PERSONNEL	$50,723,000	$50,726,000	$49,728,000	$-998,000

Basis of Fund Requirements

	1972	1973	1974
A. Compensation and Benefits:			
1. Compensation:			
a. Permanent positions....	$45,526,000	$45,209,000	$44,086,000
b. Nonpermanent positions.	619,000	613,000	593,000
c. Reimbursable details...	---	---	---
d. Overtime and other compensation.....	425,000	641,000	634,000
Subtotal, Compensation.	$46,570,000	$46,463,000	$45,313,000
2. Benefits.....	$3,909,000	$3,921,000	$4,035,000
Subtotal, Compensation and Benefits.....	$50,479,000	$50,384,000	$49,348,000
B. Supporting Costs:			
1. Transfer of personnel.....	$11,000	$43,000	$30,000
2. Personnel training.....	233,000	299,000	350,000
Subtotal, Supporting Costs.....	$244,000	$342,000	$380,000
Total, Personnel and Related Costs.....	$50,723,000	$50,726,000	$49,728,000
1. Compensation.....	$46,570,000	$46,463,000	$45,313,000
a. Permanent Positions.....	$45,526,000	$45,209,000	$44,086,000

The cost of compensation for permanent positions is the largest part of personnel and related costs. The funds shown will support 2,409 permanent positions in 1973 and 2,309 in 1974, a reduction of 158 from the 1972 level. The change in 1974, a reduction of 100, results from the phase-out of Skylab not fully being offset by the build-up from the Apollo Soyuz Test Project and the Space Shuttle program.

	1972	1973	1974
Permanent Positions by Program:			
Manned Space Flight			
Space flight operations.....	435	1,299	959
Shuttle.....	94	230	595
Advanced missions.....	10	13	15
Apollo.....	1,118	50	0

	1972	1973	1974
Space Science			
Launch vehicle procurement....	151	175	179
Applications			
Space applications.....	4	6	28
Subtotal, positions by program.	1,812	1,773	1776
Indirect Positions			
Director and staff.....	98	93	93
Administrative support.....	502	488	385
Research and development support.....	55	55	55
Subtotal, indirect positions	655	636	533
Total, permanent positions.....	2,467	2,409	2,309
Other than permanent positions..	177	177	152
Total positions.....	2,644	2,586	2,461

The above table illustrates the allocation of positions as well as the proposed distribution. Upon completion of the Skylab program, the KSC work force will step up Shuttle program planning and design of launch site facilities and launch site peculiar GSE. The Center, at the same time, will maintain the capability to support the Apollo Soyuz Test Project.

KSC will continue to maintain approximately 50% of its workforce as professional scientists and engineers with technicians comprising about 15% of the work force. The following table portrays the actual and planned distribution by occupational group.

	1972		1973		1974	
Occupational Group	Number	Percent	Number	Percent	Number	Percent
Professional scientists and engineers.....	1,278	51.9	1,261	52.3	1,232	53.4
Technicians.....	354	14.4	343	14.2	317	13.7
Wage Board.....	3	.1	4	.2	4	.2
Professional Administrative.....	469	18.9	443	18.4	398	17.2
Clerical.....	363	14.7	358	14.9	358	15.5
Total.....	2,467	100.0	2,409	100.0	2,309	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the start of the year, within grade advances, career development, etc. After these modifications, the year-end position structure is established and the cost effect for the year is calculated based on the estimated period that these modifications are in effect.

In 1974 the cost of permanent positions will be $44,086,000, a reduction of $1,123,000 from 1973. This reduction results as follows:

Cost of Permanent Positions in 1973.....		$45,209,000
Cost Increases in 1974.....		656,000
Within grade advances and career development:		
Full Year Effect of 1973 Actions.....	386,000	
Partial Year Effect of 1974 Actions.....	270,000	
Cost Decreases in 1974.....		-1,779,000
Abolished Positions:		
Full Year Effect of 1973 Actions.....	-480,000	
Partial Year Effect of 1974 Actions.....	-978,000	
Turnover Savings.....	-321,000	
Cost of Permanent Positions in 1974.....		$44,086,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent Positions.....	$619,000	$613,000	$593,000

The 1974 plan includes 152 positions. These positions will be used to support the following programs at approximately the levels indicated:

Program	Positions
College Cooperative Training	47
Summer Employment	28
Youth Opportunity	57
Temporary Clerical	20

The College Cooperative Training Program provides alternating work and study periods providing the student with practical experience and academic training. This program permits many students to attend college who could otherwise not afford to by providing them an income during their work period. This program has been a principal source of recruitment for young and experienced professional personnel.

The Summer Employment Program at KSC employs high school and college

401-216 O - 73 - 4

students and faculty members, and in consonance with the Federal Government policies and objectives provides them an insight into Government operations. The Center benefits from the useful and productive work performed by these highly motivated individuals.

The Youth Opportunity Campaign Program is conducted within the National policy which enables disadvantaged youths to work at unskilled jobs both during the summer and throughout the regular school year.

The Temporary Clerical Program is necessary to provide short-term support in positions occupied by permanent employees who are absent from work because of illness, vacation, maternity, or training.

	1972	1973	1974
c. Reimbursable Details.....	---	---	---
d. Overtime and Other Compensation.....	$425,000	$641,000	$634,000

The bulk of the Center overtime requirement is in direct support of test, integration and checkout of vehicle subsystems and systems, and in preparation of the total vehicle including spacecraft for launch. Thus, the amount of overtime required in each fiscal year is substantially a function of the launch rate activity at the Cape. KSC has continued its emphasis on reducing costs in this category to the lowest level consistent with mission and legal requirements.

2. Benefits.....	$3,909,000	$3,921,000	$4,035,000

In addition to compensation, KSC makes an employer's contribution to personnel benefits as authorized and required by law. The net increase in benefits costs of $114,000 in 1974 is related to the increase in severance pay, because of the reductions in civil service personnel in 1973 and 1974. The following table indicates the costs of personnel benefits by the major categories:

Category of Cost	1972	1973	1974
Contribution to the Civil Service Retirement Fund...	$3,195,000	$3,200,000	$3,130,000
Contribution for employee life insurance.....	169,000	163,000	160,000
Contribution for employee health insurance.....	446,000	431,000	422,000
Contribution to FICA.....	19,000	16,000	15,000
Incentive awards.....	10,000	8,000	8,000
Severance pay.....	70,000	103,000	300,000
Total.....	$3,909,000	$3,921,000	$4,035,000

	1972	1973	1974
B. Supporting Costs.....	$244,000	$342,000	$380,000

Supporting personnel costs provide for the expenses of moving employees to their initial duty station or reassignment and for training to maintain and expand the skills of our employees. These costs are summarized as follows:

1. Transfer of personnel.....	$11,000	$43,000	$30,000

The 1966 legislation provided that the government would pay for certain relocation costs, such as the expenses of selling and buying a home, the cost of one trip to the new duty station to secure housing, and the cost of family relocation allowances. The estimated cost in 1973 is based on the number and historical average cost of relocations for this Center.

2. Personnel training.....	$233,000	$299,000	$350,000

The maintenance and expansion of the skills of personnel is essential in carrying out the agency's many complex technical programs. Such training is provided within the framework of the Government Employees Training Act of 1958. The training provided through colleges, universities, technical institutes and related institutions; and the cost of seminars and workshops in which groups of NASA employees receive training in subjects of agency-wide interest. The estimate is based on continuation of current training programs and the growing requirement to reorient skills of employees into channels related to familiarization with Skylab flight hardware and associated ground support equipment. Part of this training consists of courses offered by other government agencies, usually for a fee. The increase in FY 1974 results from the deferral of FY 1973 requirements which are being delayed due to limitations of time and an active launch schedule. Training needs peculiar to the Shuttle program are expected to be met during FY 1974.

	1972	1973	1974	Change in 1974
II. TRAVEL.....	$820,000	$790,000	$790,000	$ -0-

Basis of Fund Requirements

Summary of Travel by Major Category

	1972	1973	1974
A. Program Related Travel			
1. Direction, coordination and management of Research and Development and Construction of Facilities program activities.....	$589,000	$567,000	$573,000

	1972	1973	1974
2. Flight mission support.....	$85,000	$80,000	$84,000
Subtotal.....	$674,000	$647,000	$657,000
B. Meetings and Technical Seminars			
1. Government-sponsored meetings..	$13,000	$11,000	$11,000
2. Other than government-sponsored meetings and technical seminars.....	7,000	9,000	7,000
Subtotal.....	$20,000	$20,000	$18,000
C. Administrative Travel.....	$126,000	$123,000	$115,000
Total, Travel.....	$820,000	$790,000	$790,000
A. Program Related Travel.....	$674,000	$647,000	$657,000

Program related travel is the travel most directly related to the KSC mission. It is the largest part of the travel function and accounts for approximately 83% of the travel requirements for 1974.

1. Direction, coordination and management of programs.....	$589,000	$567,000	$573,000

The largest individual part of program related travel is for direction, coordination, and management of research and development program activities. Because of the complexity of the programs and the distribution of other NASA Centers and contractor and subcontractor effort throughout the entire United States, coordination and management of activities require frequent review by personnel responsible for the program. For example: As a "one of a kind" program, Skylab requires an extensive program of subsystem and system reviews, checkout and test. The initial launch is an "all up" launch and every reasonable effort must be made to insure the success of that launch. Since there are no developmental launches prior to the launch of the mission, it is essential that detailed tests and reviews be conducted throughout the development and prelaunch period to provide the necessary confidence for launching of the mission. The philosophy which has been applied in Skylab is that available facilities located at other government or contractor installations are utilized rather than construction of similar facilities by NASA. This is the most economical approach in total program costs. A similar situation exists with respect to the Apollo Soyuz Test Project. The complete coordination required will necessitate many trips. During this period of time, we will also become heavily involved in the Shuttle facility development. This Center's involvement includes ground support equipment and design support to the development Centers and contractors during Phase C efforts, as well as operational program reviews. This activity will require travel to many locations across the entire United States.

	1972	1973	1974
2. Flight mission support.....	$85,000	$80,000	$84,000

As projects reach the flight stage, support is required for pre-launch and postlaunch activities. The largest part of the travel in this category supports unmanned programs. This includes travel of a team to the Western Test Range for launch of space vehicles from KSC facilities located at Vandenberg Air Force Base.

B. Meetings and Technical Seminars.....	$20,000	$20,000	$18,000

Travel to meetings and technical seminars permits employees engaged in program activities to particpate at both government sponsored and non-government sponsored meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to advances in the field which arise outside KSC, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the government sponsored meetings are made up of working panels convened to solve certain problems for the benefit of the government. Authorization to attend meetings of the types described is granted only after assurance that attendance will be in the best interest of NASA.

C. Administrative Travel.....	$126,000	$123,000	$115,000

Administrative travel includes travel for the direction and coordination of general management matters. It includes travel by managers in such areas as personnel, financial management and procurement activities. Travel of Center officials is provided in this category for trips to Headquarters, other Centers, and to off-site locations and contractor plants.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES..	$24,006,000	$23,804,000	$23,474,000	$-330,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Rental of real property....	$6,000	$38,000	$63,000
2. Minor rehabilitation and modification, and construction.....	241,000	150,000	100,000
Subtotal.....	$247,000	$188,000	$163,000

	1972	1973	1974
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds	$10,407,000	$10,213,000	$10,724,000
2. Maintenance of equipment	423,000	383,000	329,000
3. Custodial services	6,608,000	6,326,000	6,011,000
Subtotal	$17,438,000	$16,922,000	$17,064,000
C. Operation of Facilities			
1. Utilities	$3,944,000	$3,963,000	$3,872,000
2. Supplies and Equipment	2,377,000	2,731,000	2,375,000
Subtotal	$6,321,000	$6,694,000	$6,247,000
Total, Facilities Services	$24,006,000	$23,804,000	$23,474,000

Funding requirements in this category cover the cost of operating and maintaining the institutional facilities of the Kennedy Space Center. Included are facilities on the Kennedy Space Center and NASA facilities on the Air Force Eastern Test Range, Cape Kennedy Air Force Station, Florida, and the Air Force Western Test Range, Vandenberg AFB, California. The dry land area of the above is in excess of 130 square miles. The overall size and the wide geographical distribution of facilities within KSC boundaries generates extremely heavy demand for facility-type services. Structural facilities contain 4.7 million square feet and require 25,000 tons of air conditioning; 17 heating plants; 200 linear miles of electrical lines and 149 substations; 23,000 linear feet of sewer lines, 12 sewage treatment plants, and 18 sewage lift stations; 17 elevators; 4 water storage tanks with a total capacity of 2.5 million gallons; and 230,000 linear feet of water lines. The roadway system includes 239 miles of highways and roads.

Included within KSC boundaires are 87 square miles of submerged lands. Funding requirements in this category cover the cost of maintaining 3 bridges, including 2 over the Intracoastal Waterway, and 18 miles of navigable canals.

Costs in this category are also severly impacted by the large contractor population. KSC contractors involved with the preparation and launch of space vehicles are located within KSC boundaries. As a cost reduction measure, KSC provides all routine base support to these contractor personnel in the same manner that we provide support to civil service personnel. This large population requires a level of support in such areas as buildings and grounds services, non-program equipment maintenance, and custodial services, considerably beyond that associated with the Kennedy civil service population.

As noted above, funding requirements in this category are oriented to non-launch facilities; however, there are certain services, also funded in this category, that are influenced by launch activity. The most significant of these is security which is impacted by the special security requirements

associated with space vehicle processing.

Since the majority of facilities services are accomplished through support contractor personnel, funding requirements are continually impacted by wage escalation. We are able to minimize this impact by continually reviewing operations to assure we are providing only those services needed to support the Center. Our 1974 requirement again reflects a downward cost trend of this continual effort.

	1972	1973	1974
A. Acquisition of Facilities.....	$247,000	$188,000	$163,000
1. Rental of real property.....	$6,000	$38,000	$63,000

Rental of real property is required to provide special short-use office space during launch activities, including an off-site news center during FY 1974.

2. Minor rehabilitation and modification, and construction	$241,000	$150,000	$100,000

This category provides for minor rehabilitation and modification and construction of KSC facilities which meet authorized criteria for projectized efforts. Funding is needed to provide timely response to modification needs which are generally safety and security oriented.

B. Maintenance and Related Services...	$17,438,000	$16,922,000	$17,064,000
1. Maintenance of buildings and grounds.....	$10,407,000	$10,213,000	$10,724,000

Requirements in this category are generated by the aging of institutional facilities. Ninety-six percent of this requirement covers services by major support service contractors, who maintain and repair all KSC institutional facilities and grounds. Support contractors provide a broad range of maintenance skills, such as air conditioning, plumbing, electrical, carpentry and painting. Cost estimates are based on numerous facility usage and population factors. The balance of the estimate in this category covers work which is outside the scope of major support service contractors. It is individually contracted for through various minor contracts, with the expense related to the size of the facility to be maintained. Some specific items which are accomplished from this category are painting of the bridges and other surface structures, and special roadway work. Expenditures in this category have been restricted to the absolute minimum required. The continual aging of the facility makes it necessary to expend effort beyond that experienced in the past. This is necessary to preserve the facility from excessive deterioration and prevent a major expenditure to rehabilitate.

	1972	1973	1974
2. Maintenance of equipment.....	$423,000	$383,000	$329,000

Funding requirements cover maintenance and repair of a wide variety of facility related heavy equipment; e.g., tractors, cranes, forklifts, trailers and pumps, beyond the capability of the support contractor responsible for the equipment. Maintenance and repair of office type equipment is also included. This equipment is utilized by civil service and contractor personnel. It includes approximately 3,800 individual machines, typewriters, varitypers, sorting machines and many other types of office equipment. The maintenance and repair is accomplished by about 30 different sources. 90% of these services are ordered on a Federal Support Schedule. The forecast for 1974 is based on equipment aging where more frequent maintenance is required. More major repairs, within economical limits, will occur as the service life of much of this equipment is extended; however, this will defer the purchase of replacement equipment.

3. Custodial services.....	$6,608,000	$6,326,000	$6,011,000

Services included in this category are security at KSC and CKAFS, fire protection at KSC, janitorial services for NASA facilities at CKAFS and WTR, and minor contracts for refuse handling and laundry services. Security, fire protection, and janitorial services are provided by major support service contractors. For janitorial, requirements are based on the 4.7 million square feet serviced; for fire protection and security, staffing required to meet safety and security standards for all areas, both institutional and operational. The major portion of this requirement covers the cost of security and fire protection. The 1974 estimate reflects reductions in staffing levels.

C. Operation of Facilities.....	$6,321,000	$6,694,000	$6,247,000
1. Utilities.....	$3,944,000	$3,963,000	$3,872,000

Funding requirements in this category cover the cost of electricity, water, sewage and other utilities, including locally generated electricity at CKAFS. Electricity, water and sewage were 258 million KWH, 330 million gallons, and 125 million gallons, respectively, during FY 1972. Estimates reflect the total utilities for all areas, both institutional and operational and are based on various consumption factors for facilities known or anticipated to be in service. The 1974 estimate reflects a minor decrease based on anticipated post-Skylab adjustments.

2. Supplies and equipment.....	$2,377,000	$2,731,000	$2,375,000

The supplies, materials, and equipment used in the maintenance and operation of KSC facilities are budgeted in this category. This includes those consumed by the support contractors in performance of their maintenance and operations responsibilities. The type of items are generally those used by

tradesmen in the maintenance activity; e.g., lumber, metals, pipes, valves, fittings, paint, wire, switches, lighting fixtures, and many others. In addition, it covers the cost of fuels used in the boiler plants and other fuels, lubricants and chemicals used in a variety of operations and in special purpose vehicles. The 1974 decrease is based on post-Skylab adjustments.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES..	$6,607,000	$5,506,000	$5,667,000	$+161,000

Basis of Fund Requirement

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment.....	$60,000	$14,000	$14,000
2. Purchase of equipment.....	329,000	43,000	1,000
3. Maintenance of equipment....	71,000	88,000	88,000
Subtotal, equipment.....	$460,000	$145,000	$103,000
4. Programming and operation services.....	2,836,000	2,611,000	2,630,000
Subtotal.....	$3,296,000	$2,756,000	$2,733,000
B. Scientific and Technical Information & Educational Programs			
1. Operation of NASA technical libraries.....	$191,000	$66,000	$176,000
2. Educational/informational programs.....	10,000	56,000	56,000
3. Scientific and technical information.....	3,110,000	2,628,000	2,702,000
Subtotal.....	$3,311,000	$2,750,000	$2,934,000
Total, Technical Services.....	$6,607,000	$5,506,000	$5,667,000
A. Automatic Data Processing.....	$3,296,000	$2,756,000	$2,733,000

This subcategory provides for the lease, purchase, and maintenance of general purpose data processing equipment which supports overall Center operations. Programming and operations support is provided by contract.

Business type applications include payroll, labor distribution and cost records, personnel data, logistics and procurement records and reports, and

491-316 O - 73 - 5

a data management system. All the business-type data processing is performed on an IBM 360-50 System which was purchased in 1971. In 1972 most of the punch card equipment was purchased, thereby reducing leased costs to minimal levels. The lower estimate in 1974 results from non-recurrence of purchase costs, offset by a slight increase in the cost programming and operations support. No increase in manning levels is proposed in 1974.

	1972	1973	1974
B. Scientific and Technical Information & Educational Programs..	$3,311,000	$2,750,000	$2,934,000

Included in these programs are the costs of the technical libraries, educational/informational programs, and the scientific and technical information services. The costs are summarized as follows:

1. Operation of technical libraries.....	$191,000	$66,000	$176,000

The technical library was established to serve employees and authorized contractor personnel with their information needs for books, periodicals, technical reports, and other documentation. The KSC library currently contains 31,000 volumes and 216,000 technical documents. The increase in 1974 reflects revision to the contract funding plan. There is no increase in manning levels in FY 1974.

2. Educational/informational programs.....	$10,000	$56,000	$56,000

The educational/informational programs provide for the gathering and dissemination of information about the agency's programs to the mass communications media, the general public, and to the educational community at the elementary and secondary levels. Assistance to the mass communications media includes the gathering and exposition of newsworthy material in support of their requests, and takes such form as press kits, news releases, television and radio information tapes and clips, and feature material. The level of activity at KSC in 1974 is expected to remain at about the 1973 level.

3. Scientific & technical information.....	$3,110,000	$2,628,000	$2,702,000

Scientific and technical information activities are provided to the total KSC population and include documentation, publication, photographic and translation services. This support includes the printing of test and check-out procedures, launch countdowns, microfilming, engineering drawings and telemetry data and other related technical material. Manpower levels do not change but previously negotiated wage rates cause an increase in dollar requirements for 1974.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT	$10,448,000	$10,614,000	$10,702,000	$+88,000

Basis of Fund Requirements

Summary of Administrative Support

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$1,045,000	$919,000	$933,000
2. Local telephone service.....	1,307,000	1,354,000	1,075,000
3. Other communications.....	122,000	126,000	126,000
Subtotal.....	$2,474,000	$2,399,000	$2,134,000
B. Administrative Printing.....	$317,000	$493,000	$451,000
C. Supplies, Materials, and Equipment			
1. Supplies and materials.....	$754,000	$794,000	$791,000
2. Equipment.....	331,000	478,000	414,000
Subtotal.....	$1,085,000	$1,272,000	$1,205,000
D. Transportation			
1. Center support.....	$2,239,000	$2,470,000	$2,146,000
2. Common carrier.....	136,000	133,000	119,000
Subtotal.....	$2,375,000	$2,603,000	$2,265,000
E. Administrative Support Services			
1. Installation support services	$3,423,000	$3,212,000	$3,619,000
2. Medical services.....	774,000	635,000	1,028,000
Subtotal.....	$4,197,000	$3,847,000	$4,647,000
Total, Administrative Support....	$10,448,000	$10,614,000	$10,702,000
A. Communications.....	$2,474,000	$2,399,000	$2,134,000

The costs of the local telephone service (9500 phones), Federal Telecommunications System (FTS), long distance tolls, and teletype services for the total complement are budgeted in this category. The funds requested will support all NASA personnel, contractor and civil service, located on the Kennedy Space Center, the Eastern Test Range and the Western Test Range. It covers all communications services required to conduct official business within NASA, industry, and institutions located throughout the country.

The wide geographical distribution of these institutions contributes to the level of costs in this category. A significant reduction is forecast in the 1974 requirement based on anticipated post-Skylab adjustments.

	1972	1973	1974
B. Administrative Printing.....	$317,000	$493,000	$451,000

Estimates for administrative printing include funds for minor efforts such as the KSC house organ and miscellaneous special requirements for duplicating, photostating, blueprinting, microfilming, and other photographic reproductions. Services are performed by other government agencies, including the Government Printing Office and by commercial printing firms. A decrease in demand for these services is forecast for FY 1974.

C. Supplies, Materials, and Equipment.....	$1,085,000	$1,272,000	$1,205,000

The requirements in this subcategory cover a wide range of administrative supplies used by civil service and contractor personnel, including supplies and equipment used by all support contractors funded in the Administrative Support category in the performance of their functions. Another large item is printing supplies required to perform the printing function for the entire Center. Office-type equipment is also budgeted in this subcategory; however, this item has been held to an absolute minimum through extending the life of in-use items by repair within economical limits. A decrease in the level for 1974 is forecast based on anticipated post-Skylab adjustments. This reduction has been offset to some degree by price escalations.

D. Transportation.....	$2,375,000	$2,603,000	$2,265,000

The major item budgeted in this subcategory is the local motor pool operation and associated services provided by the General Services Administration. This operation involves the furnishing of 1,100 vehicles including trucks, sedans, station wagons, buses and ambulances. These vehicles are utilized by all personnel at the Center including contractors. The cost of aircraft operations and services, as well as the movement of all supplies, materials, equipment, and related items by common carrier is included. Based on anticipated post-Skylab adjustments and continuous emphasis on vehicle and mileage reduction, a significant decrease is forecast in the 1974 requirement.

E. Administrative Support Services..	$4,197,000	$3,847,000	$4,647,000

Administrative support services are those personnel-related support services which have wide application throughout the Center, including logistics services at KSC and NASA facilities at CKAFS, mail and distribution services, installation support services at the Western Test Range, and medical services described below. Logistics services are provided by a support contractor at KSC and by the ETR at CKAFS. Services include receipt, storage, and issue of supplies and equipment as well as maintaining various management systems,

such as cataloguing, repair, modification, and ordnance. Mail and distribution of inter-office mail, expedite service, classified document control and operation of the KSC branch post office. Other services provided in this category are numerous one-time special services such as stenographic and court reporting, and payment of claims for property damage. Medical services provided by a support services contractor include both occupational medicine and environmental health for all civil service and contractor personnel, amounting to 48,000 patient visits per year. The increase in 1974 results from revisions to support contract funding plan. No increase in support contractor manpower is forecast for FY 1974.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING
JOHN F. KENNEDY SPACE CENTER

STAFFING SUMMARY

	FY 73	FY 74
EXCEPTED	26	27
GS-16	12	12
GS-15	129	129
GS-14	267	267
ALL OTHER GS	1971	1870
WB	4	4
TOTAL PERM.	2409	2309

DIRECTOR

	FY 73	FY 74
EXCEPTED	3	3
GS-16	--	--
GS-15	--	--
GS-14	2	2
ALL OTHER GS	2	2
TOTAL PERM.	7	7

PUBLIC AFFAIRS OFFICE

	FY 73	FY 74
EXCEPTED	--	--
GS-16	--	--
GS-15	1	1
GS-14	4	4
ALL OTHER GS	18	18
TOTAL PERM.	23	23

EXECUTIVE STAFF

	FY 73	FY 74
EXCEPTED	1	1
GS-16	--	--
GS-15	1	1
GS-14	2	2
ALL OTHER GS	5	5
TOTAL PERM.	9	9

DIRECTOR QUALITY ASSURANCE

	FY 73	FY 74
EXCEPTED	--	--
GS-16	--	--
GS-15	1	1
GS-14	2	2
ALL OTHER GS	11	11
TOTAL PERM.	14	14

CHIEF COUNSEL

	FY 73	FY 74
EXCEPTED	1	1
GS-16	--	--
GS-15	1	1
GS-14	2	2
ALL OTHER GS	6	6
TOTAL PERM.	10	10

RANGE SAFETY OFFICE

	FY 73	FY 74
EXCEPTED	--	--
GS-16	1	1
GS-15	--	--
GS-14	1	1
ALL OTHER GS	2	2
TOTAL PERM.	4	4

SAFETY OFFICE

	FY 73	FY 74
EXCEPTED	1	1
GS-16	--	--
GS-15	1	1
GS-14	1	1
ALL OTHER GS	22	22
TOTAL PERM.	25	25

MANAGER SHUTTLE PROJECTS OFFICE

	FY 73	FY 74
EXCEPTED	1	1
GS-16	1	1
GS-15	10	9
GS-14	12	10
ALL OTHER GS	11	27
TOTAL PERM.	35	48

MANAGER APOLLO-SKYLAB PROGRAMS

	FY 73	FY 74
EXCEPTED	1	1
GS-16	--	--
GS-15	5	5
GS-14	12	12
ALL OTHER GS	28	12
TOTAL PERM.	46	30

DIRECTOR OF ADMINISTRATION

	FY 73	FY 74
EXCEPTED	3	3
GS-16	--	--
GS-15	10	10
GS-14	27	27
ALL OTHER GS	271	257
TOTAL PERM.	311	297

MANAGER SCIENCES & APPLICATIONS OFFICE

	FY 73	FY 74
EXCEPTED	0	1
GS-16	--	--
GS-15	1	1
GS-14	--	2
ALL OTHER GS	7	21
TOTAL PERM.	8	25

DIRECTOR OF LAUNCH OPERATIONS

	FY 73	FY 74
EXCEPTED	2	2
GS-16	--	--
GS-15	3	3
GS-14	1	1
ALL OTHER GS	11	11
TOTAL PERM.	17	17

DIRECTOR OF DESIGN ENGINEERING

	FY 73	FY 74
EXCEPTED	2	2
GS-16	--	--
GS-15	2	2
GS-14	1	1
ALL OTHER GS	12	12
TOTAL PERM.	17	17

DIRECTOR OF TECHNICAL SUPPORT

	FY 73	FY 74
EXCEPTED	1	1
GS-16	--	--
GS-15	2	2
GS-14	8	8
ALL OTHER GS	25	23
TOTAL PERM.	36	34

DIRECTOR OF INSTALLATION SUPPORT

	FY 73	FY 74
EXCEPTED	1	1
GS-16	--	--
GS-15	7	7
GS-14	12	12
ALL OTHER GS	190	180
WB	4	4
TOTAL PERM.	214	204

ASSOCIATE DIRECTOR FOR OPERATIONS

	FY 73	FY 74
EXCEPTED	1	1
GS-16	1	1
GS-15	4	4
GS-14	8	8
ALL OTHER GS	12	12
TOTAL PERM.	26	26

DIRECTOR OF LAUNCH VEHICLE OPERATIONS

	FY 73	FY 74
EXCEPTED	1	1
GS-16	1	1
GS-15	21	21
GS-14	33	33
ALL OTHER GS	298	279
TOTAL PERM.	354	326

DIRECTOR OF UNMANNED LAUNCH OPERATIONS

	FY 73	FY 74
EXCEPTED	1	1
GS-16	--	--
GS-15	7	7
GS-14	20	20
ALL OTHER GS	111	111
TOTAL PERM	139	139

DIRECTOR OF SPACECRAFT OPERATIONS

	FY 73	FY 74
EXCEPTED	3	3
GS-16	--	--
GS-15	19	19
GS-14	31	31
ALL OTHER GS	295	268
TOTAL PERM.	348	321

ASSOCIATE DIRECTOR FOR FACILITIES & SYS. MANAGEMENT

	FY 73	FY 74
EXCEPTED	1	1
GS-16	1	1
GS-15	5	5
GS-14	9	9
ALL OTHER GS	76	71
TOTAL PERM	92	87

ASSOCIATE DIRECTOR FOR DESIGN

	FY 73	FY 74
EXCEPTED	1	1
GS-16	3	3
GS-15	12	12
GS-14	30	30
ALL OTHER GS	180	190
TOTAL PERM	226	226

DIRECTOR OF INFORMATION SYSTEMS

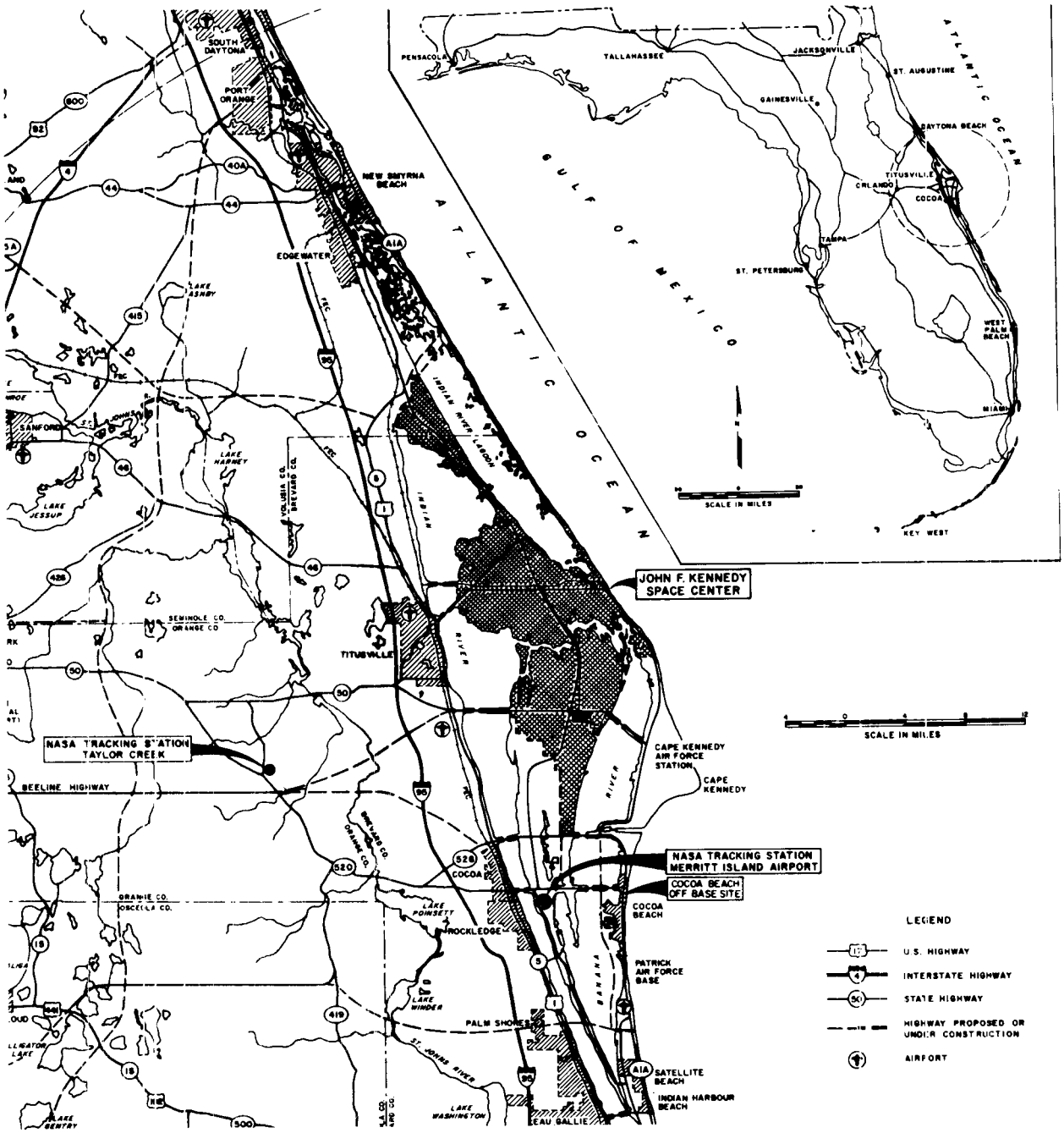
	FY 73	FY 74
EXCEPTED	1	1
GS-16	2	2
GS-15	9	9
GS-14	31	31
ALL OTHER GS	211	195
TOTAL PERM.	254	238

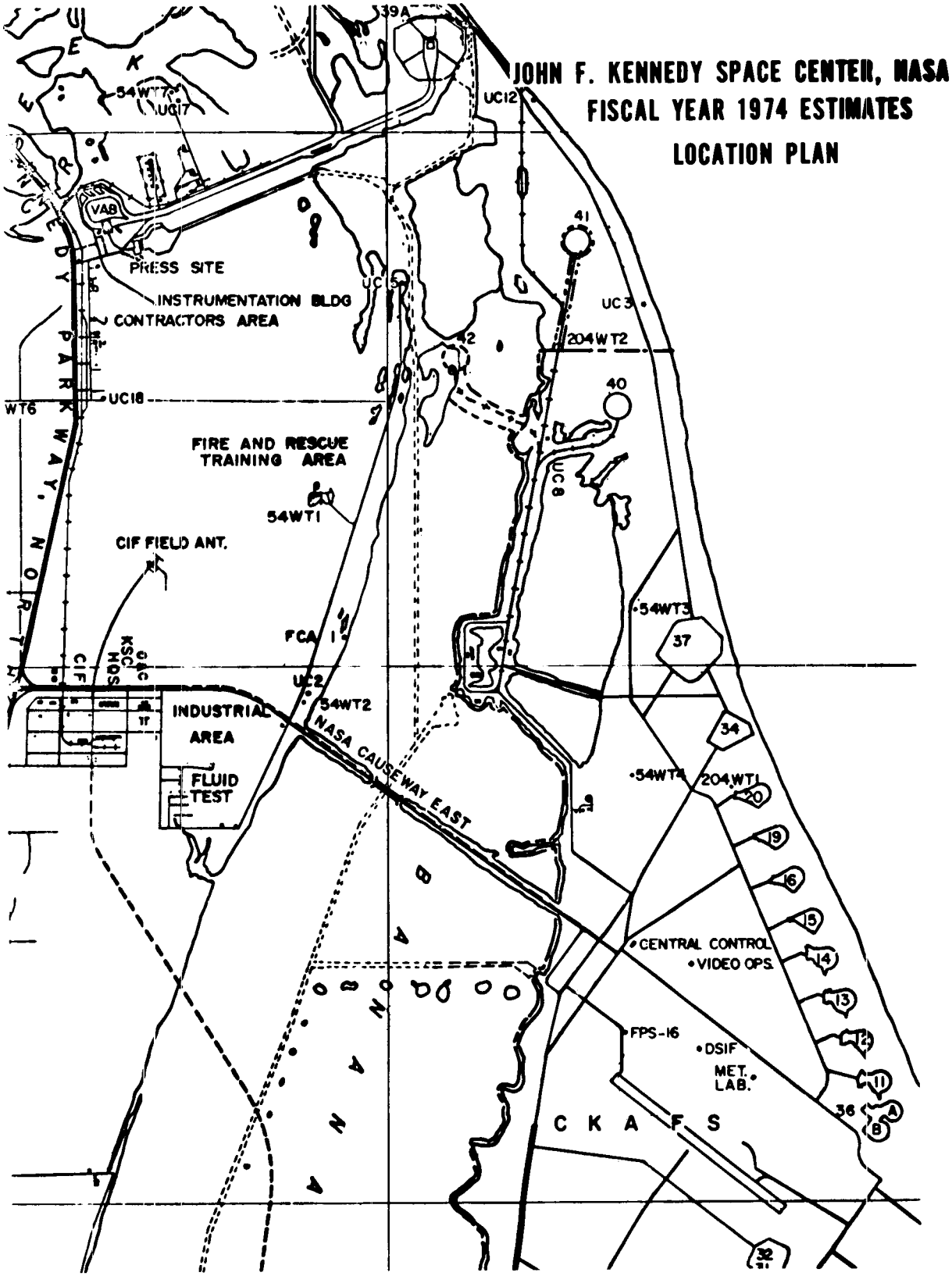
DIRECTOR OF SUPPORT OPERATIONS

	FY 73	FY 74
EXCEPTED	--	--
GS-16	2	2
GS-15	7	7
GS-14	17	17
ALL OTHER GS	168	156
TOTAL PERM.	194	182

424-316 O - 73 (Follows p. RPM 17) No. 2

JOHN F. KENNEDY SPACE CENTER, NASA
FISCAL YEAR 1974 ESTIMATES
AREA MAP

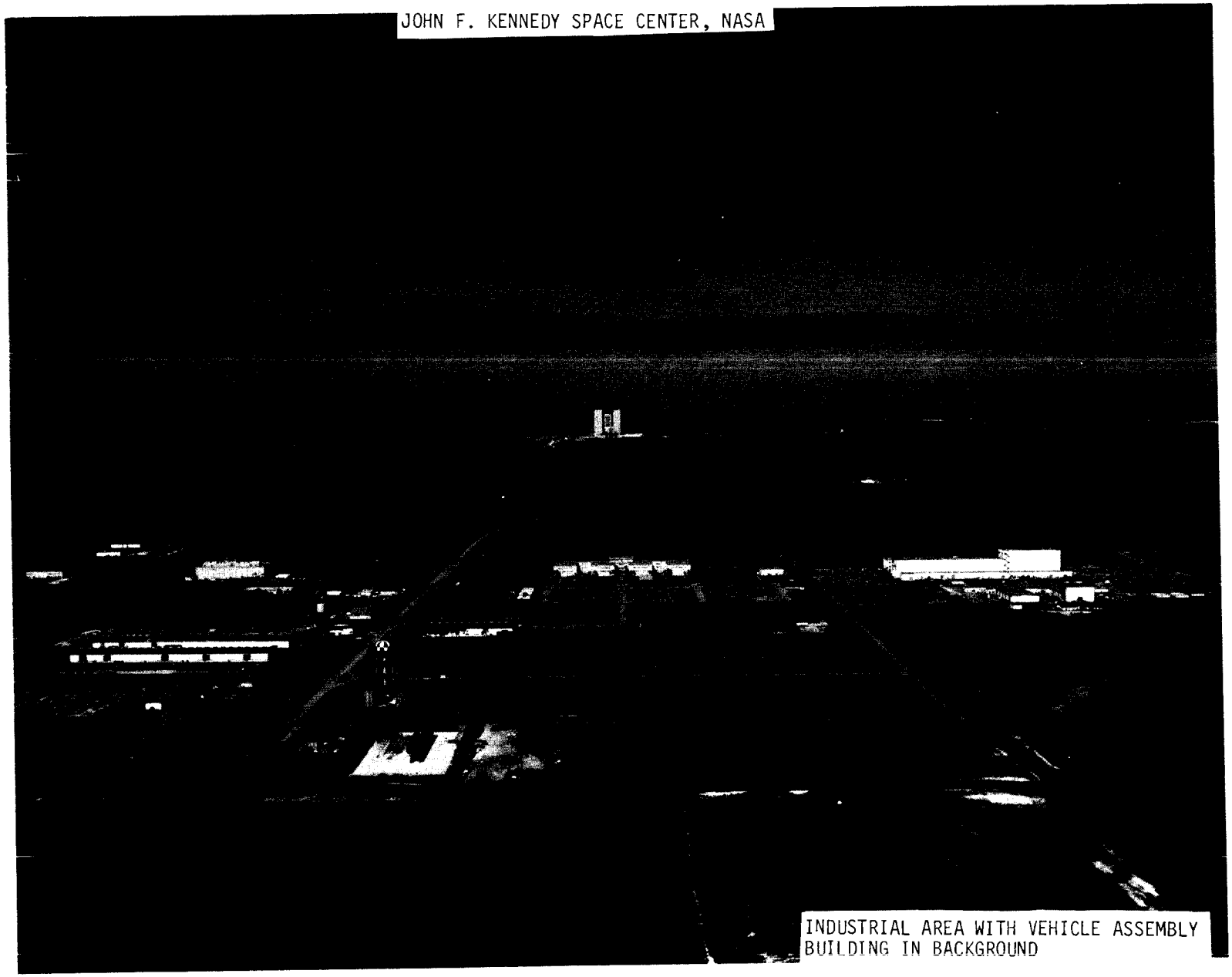



JOHN F. KENNEDY SPACE CENTER, NASA
FISCAL YEAR 1974 ESTIMATES
LOCATION PLAN
39A
54WT7
UC17
UC12
VAB
PRESS SITE
INSTRUMENTATION BLDG
CONTRACTORS AREA
UC15
41
UC3
204WT2
42
40
UC18
WT6
FIRE AND RESCUE
TRAINING AREA
UC8
54WT1
CIF FIELD ANT.
54WT3
37
FCA 1
UC2
54WT2
INDUSTRIAL
AREA
NASA CAUSEWAY EAST
34
54WT4
204WT1
20
FLUID
TEST
19
16
15
CENTRAL CONTROL
VIDEO OPS.
14
13
FPS-16
DSIF
MET.
LAB.
11
36
A
B
C K A F S
32

JOHN F. KENNEDY SPACE CENTER, NASA

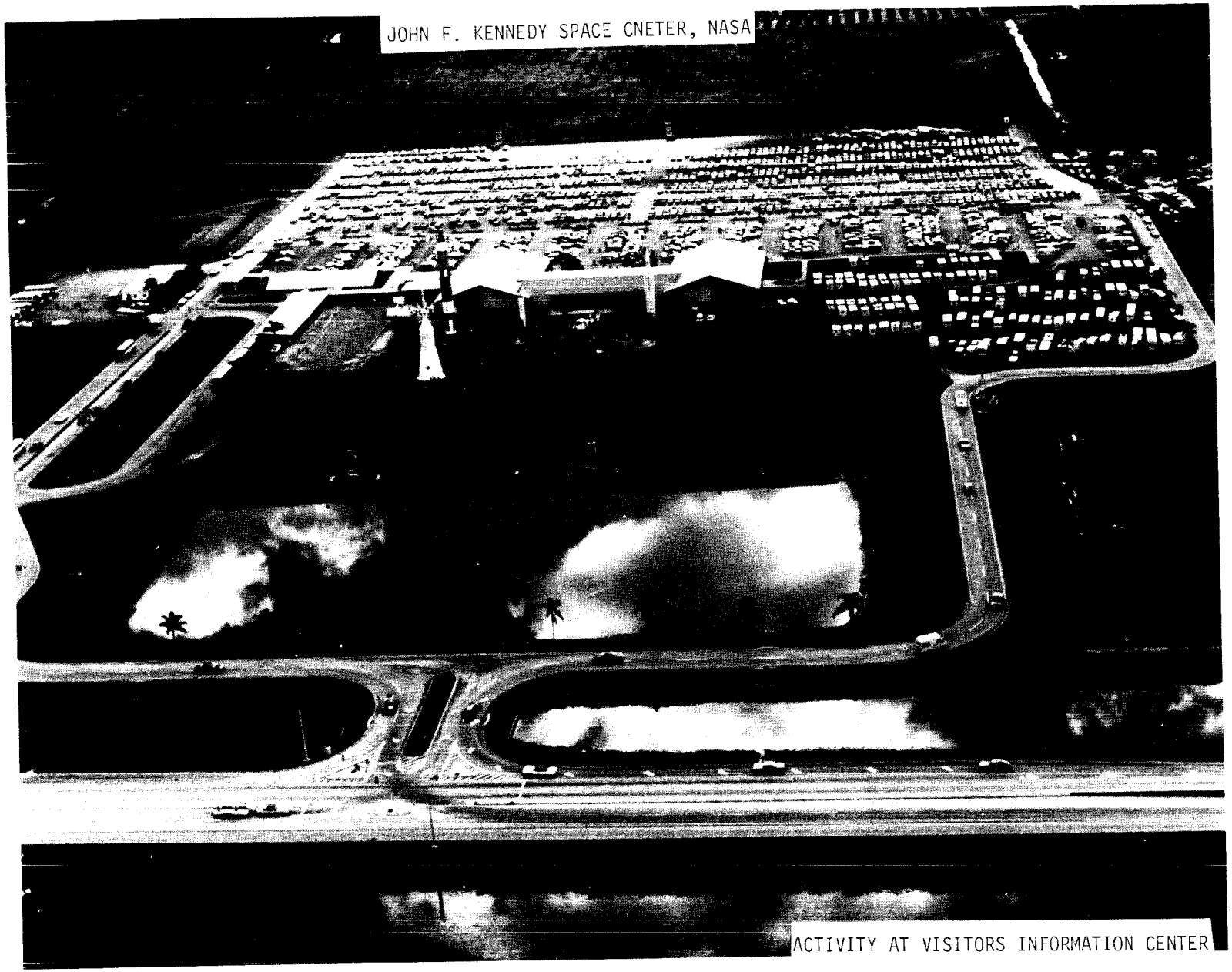
CAPE KENNEDY AIR FORCE STATION
INDUSTRIAL AREA WITH COMPLEX 41
IN FOREGROUND

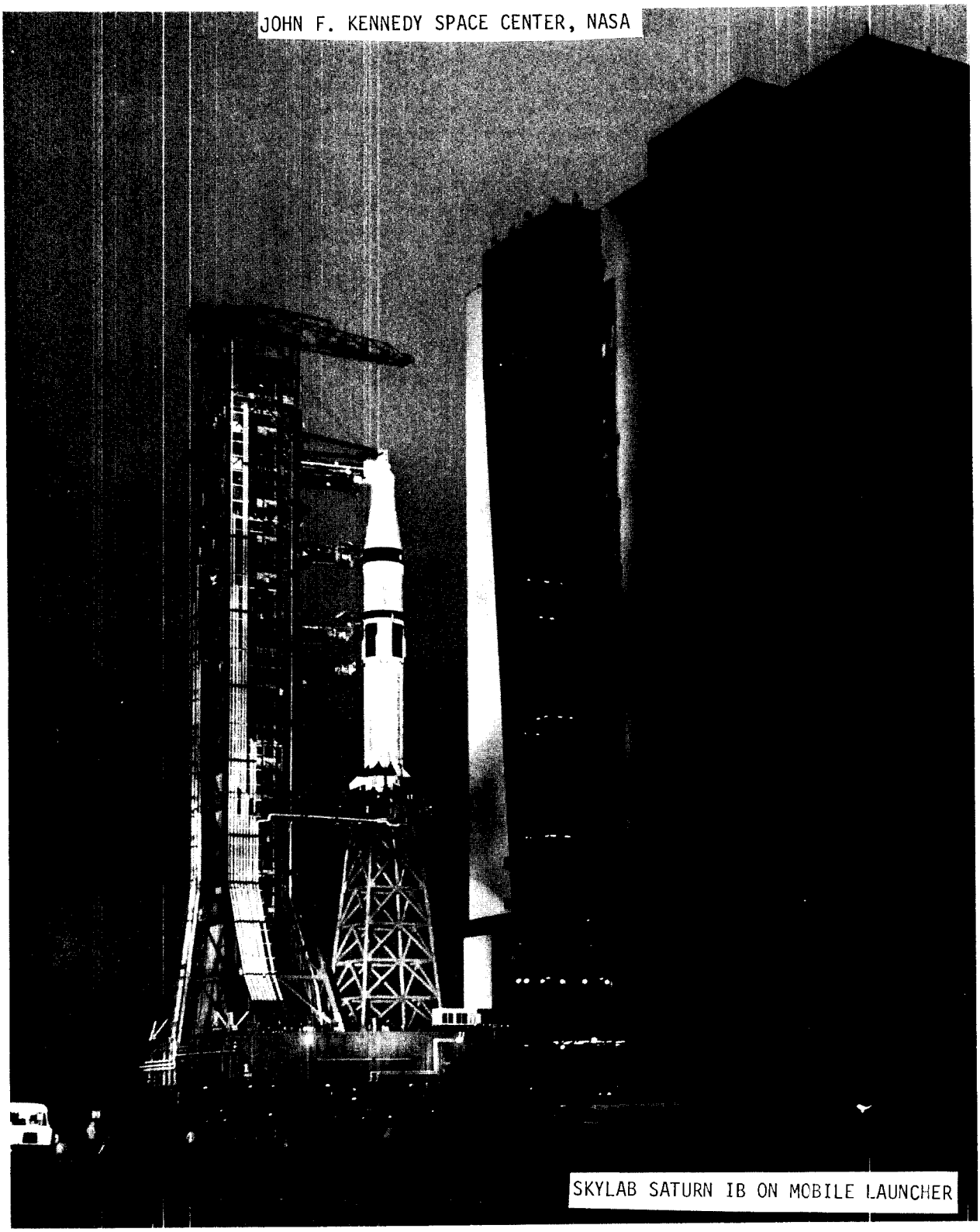
JOHN F. KENNEDY SPACE CENTER, NASA



INDUSTRIAL AREA WITH VEHICLE ASSEMBLY BUILDING IN BACKGROUND

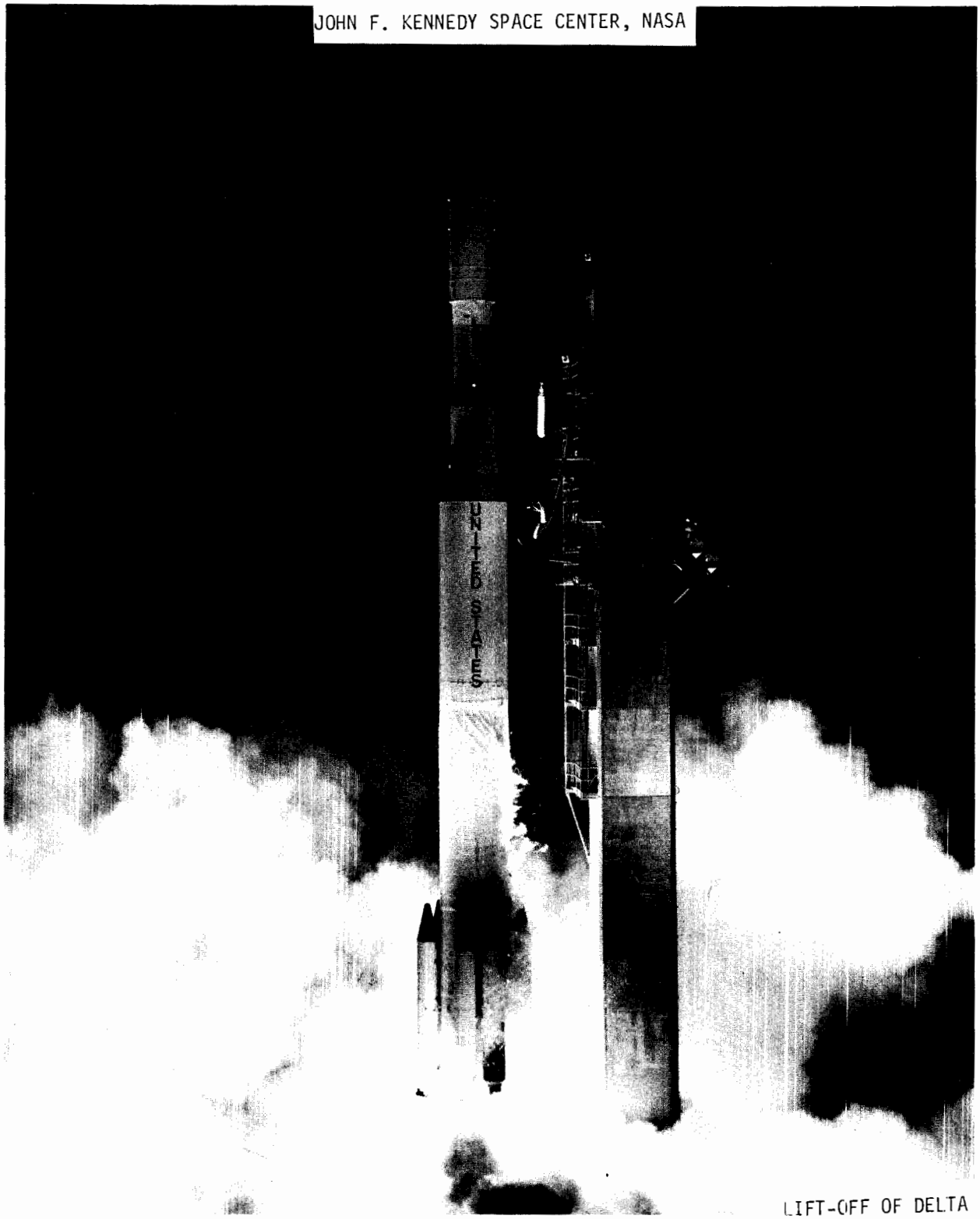
491-316 O - 73 - 6


JOHN F. KENNEDY SPACE CNETER, NASA
ACTIVITY AT VISITORS INFORMATION CENTER


JOHN F. KENNEDY SPACE CENTER, NASA
SKYLAB SATURN IB ON MOBILE LAUNCHER

JOHN F. KENNEDY SPACE CENTER, NASA
LIFT-OFF OF ATLAS CENTAUR

JOHN F. KENNEDY SPACE CENTER, NASA



LIFT-OFF OF DELTA

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

MANNED SPACECRAFT CENTER

MISSION

The Manned Spacecraft Center (MSC) was established in November 1961, in Houston, Texas, as NASA's primary Center to manage the design, development, and manufacture of manned spacecraft, and for selection and training of astronaut crews and the conduct of space flight missions. The MSC mission embraces an engineering, medical, space science, and operations capability to generate the knowledge required to support current programs and to advance the technology of space flight. Engineering and development efforts focus on: systems definition, development, evaluation and test support for spacecraft development programs; on applied research and technology development, and advanced studies for future spacecraft systems, payloads and programs. Space science and technology efforts are devoted to the development of flight experiments, evaluation of results from scientific lunar exploration, research on returned lunar material, space environment studies, development of a capability for surveying earth resources from space, and application of space technology in public use. The medical capabilities include in-flight experiments, flight crew monitoring, and development of physiological requirements for manned spacecraft systems. The application of NASA developed space technology to the public domain includes cooperative efforts with other Federal Government agencies and with several state and local governments.

Lunar landing missions were completed in December 1972. Apollo spacecraft are being modified to support the requirements of the Skylab program and the Apollo Soyuz Test Project. MSC has been designated as the lead NASA Center for the agency's earth observations program and the multiple facets of that program are progressing. MSC is responsible for:

1. The design, development, and fabrication of the manned spacecraft including the command and service modules for Skylab and the Apollo Soyuz Test Project, as well as Space Shuttle.

2. Overall program management and control of the spacecraft programs in areas such as module integration, testing, and qualification, including the management integration of the space shuttle vehicle.

3. Selection and training of astronauts and preparation of primary and backup crews for each mission.

4. Operation of the Mission Control Center and control of space flight missions from lift-off to recovery.

5. Development and integration of scientific, medical and techno-

logical experiments to be flown as payloads on manned space flight missions including space shuttle payloads both manned and unmanned.

6. Development and exploitation of aeronautical and aerospace photographic, remote sensing, and information management systems for aircraft and satellites to provide and interpret scientific data on the physical sciences and resources of the earth.

7. The application of NASA developed space technology, including energy conservation and improved medical services, to the public domain in cooperation with other Government agencies and centers.

8. Conduct of a program of spacecraft environmental testing.

9. Operation of the Lunar Receiving Laboratory, which provides a central complex where samples of materials that have been brought to earth by the Apollo lunar exploration teams are received, quarantined, processed, undergo limited experiments, and are stored until distributed to the scientific community for further analysis.

MSC, as the lead Center for the Space Shuttle, is responsible for developing and keeping current the agency's integrated funding requirements for the total Shuttle program for Headquarters management and Shuttle program officials.

DESCRIPTION

The Manned Spacecraft Center is located two miles east of the town of Webster, Texas. The site is approximately 20 miles southeast of downtown Houston, and 25 miles northwest of Galveston, Texas. Total NASA-owned land at Houston consists of 1,620 acres. The Center also occupies an additional 66,861 acres at the White Sands Test Facility, Las Cruces, New Mexico. The Center's mission in earth observations also includes the activities of the Earth Resources Laboratory located at the Mississippi Test Facility, Bay St. Louis, Mississippi. The total capital investment of the Manned Spacecraft Center, including fixed assets in progress and contractor-held facilities at various locations, and the White Sands Test Facility, as of June 30, 1972, was $874,365,000.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

Functions	1972	1973	1974
Personnel.....	$83,579,000	$83,202,000	$82,113,000
Travel.....	3,145,000	3,360,000	3,355,000

	1972	1973	1974
Facilities services.....	$10,160,000	$9,483,000	$10,292,000
Technical services.....	8,006,000	5,475,000	5,486,000
Administrative support.....	8,107,000	8,418,000	8,004,000
Total fund requirements.....	$112,997,000	$109,938,000	$109,250,000

	1972	1973	1974	Change in 1974
I. PERSONNEL.....	$83,579,000	$83,202,000	$82,113,000	$-1,089,000

Basis of Fund Requirements

	1972	1973	1974
A. Compensation and Benefits:			
1. Compensation:			
a. Permanent positions.....	$73,387,000	$72,215,000	$71,501,000
b. Nonpermanent positions...	730,000	1,128,000	1,108,000
c. Reimbursable details.....	1,553,000	1,448,000	1,446,000
d. Overtime and other compensation.....	1,021,000	1,192,000	1,181,000
Subtotal, Compensation...	$76,691,000	$75,983,000	$75,236,000
2. Benefits.....	6,432,000	6,641,000	6,330,000
Subtotal, Compensation and Benefits.....	$83,123,000	$82,624,000	$81,566,000
B. Supporting Costs:			
1. Transfer of personnel.....	$144,000	$251,000	$220,000
2. Personnel training.....	312,000	327,000	327,000
Subtotal, Supporting Costs.	$456,000	$578,000	$547,000
Total, Personnel and Related Costs.....	$83,579,000	$83,202,000	$82,113,000
1. Compensation.....	$76,691,000	$75,983,000	$75,236,000
a. Permanent positions.....	$73,387,000	$72,215,000	$71,501,000

The cost of compensation for permanent positions is the largest part of Personnel and Related Costs. The funds shown above will support 3,652 permanent positions in 1974, a reduction of 165 permanent positions from 1972. The change in 1974, a reduction of 75 from 1973, results from the phase-out of Skylab not being fully offset by the build-up for the Apollo Soyuz Test Project and the Space Shuttle program.

	1972	1973	1974
Permanent Positions by Program:			
Manned Space Flight			
Space flight operations.....	1,178	1,740	1,241
Space shuttle.....	538	724	1,177
Advanced manned missions.....	22	19	22
Apollo.....	998	26	---
Space Sciences			
Physics and astronomy.....	17	17	17
Lunar and planetary exploration..	64	72	70
Applications			
Space applications.....	199	372	392
Aeronautics and Space Technology			
Aeronautical research & technology	6	5	4
Space research and technology....	22	4	4
Subtotal, positions by program.	3,044	2,979	2,927
Indirect Positions			
Director and staff.....	112	110	108
Administrative support.....	409	391	383
Research and technology support..	252	247	234
Subtotal, indirect positions...	773	748	725
Total, permanent positions.....	3,817	3,727	3,652
Other than permanent positions.....	321	321	296
Total positions.....	4,138	4,048	3,948

The above table illustrates the use of civil service positions. Excluded are the reimbursable detailees who each fill a critical, necessary position and contribute to the work force available. The distribution by occupation of these positions illustrates a significant characteristic of the Manned

491-316 O - 73 - 7

Spacecraft Center work force. Professional engineers and scientists comprise approximately 60% of the Center work force. Technicians and technically oriented wage board employees, working in direct support of the professional technical staff make up another 12% of the complement. The following table summarizes by occupational group the Center's work force.

Occupational Group	1972 Number	1972 Percent	1973 Number	1973 Percent	1974 Number	1974 Percent
Professional scientists and engineers.....	2,234	58.5	2,205	59.0	2,185	59.8
Technicians.....	427	11.2	415	11.1	400	11.0
Wage Board.....	33	.8	27	.8	27	.8
Professional administrative.....	537	14.1	548	14.7	530	14.5
Clerical.....	586	15.4	532	14.4	510	13.9
Total.....	3,817	100.0	3,727	100.0	3,652	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the beginning of the year as modified by the various actions that take place within the year. These actions are normal progression, (i.e. within grade, career development, recognition of outstanding performance or contributions, etc.) and abolishment of existing positions. After these modifications have been estimated, the year-end position structure is established. The cost effect for the year is calculated based on the estimated period these modifications are in effect.

In 1974 the cost of permanent positions will be $71,501,000. This is a decrease of $714,000 from 1973. This decrease results from the following.

Cost of permanent positions in 1973.....		$72,215,000
Cost of increases in 1974.....		1,444,000
Within grade advances and career development:		
Full year effect of 1973 actions.....	$827,000	
Partial year effect of 1974 actions.....	617,000	
Cost decreases in 1974.....		-2,158,000
Abolished positions:		
Full year effect of 1973 actions.....	$-1,756,000	
Partial year effect of 1974 actions.....	-68,000	
Turnover savings.....	-334,000	
Cost of permanent positions in 1974.....		$71,501,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent Positions.....	$730,000	$1,128,000	$1,108,000

The 1974 plan includes 296 positions which is the same level as 1973. These positions will be used to support the following programs at approximately the levels indicated:

Program	Positions
College Cooperative Training	73
Summer Employment	100
Youth Opportunity	62
Temporary Clerical	61

The College Cooperative Training Program provides alternating work and study periods providing the student with practical experience and academic training. This program permits many students to attend college who could otherwise not afford to by providing them an income during their work period. This program has been a principal source of recruitment for young and experienced professional personnel.

The Summer Employment Program at MSC employs high school and college students and faculty members, and in consonance with the Federal Government policies and objectives provides them an insight into Government operations. The Center benefits from the useful and productive work performed by these highly motivated individuals.

The Youth Opportunity Campaign Program is conducted within the National policy, which enables disadvantaged youths to work at unskilled jobs both during the summer and throughout the regular school year.

The Temporary Clerical Program is necessary to provide short-term support in positions occupied by permanent employees who are absent from work because of illness, vacation, maternity, or training.

c. Reimbursable Details	$1,553,000	$1,448,000	$1,446,000

The military personnel detailed to the Manned Spacecraft Center on a reimbursable basis are personnel experienced in manned flight or related fields. Each individual performs an essential and critical function to the current and future programs.

From the inception of the Manned Spacecraft Center it was recognized that the experience and knowledge of individuals with a "flight" background would be essential to the manned space flight programs. The individuals most readily available within the Government ranks were in the military. The requirement for keeping the military current on the manned space flight technology is also essential, even though the participation would be limited to a relative few. This is the basis for utilizing reimbursable detailees in addition to the astronauts.

Some civilian employees are also detailed, on a reimbursable basis, to the Manned Spacecraft Center. These are individuals whose experience in a specific field is essential.

There are some individuals of other Government agencies both civilian and military, who are detailed to the Manned Spacecraft Center but not on a reimbursable basis. These individuals are to observe and keep abreast of the technical progress of manned space flights in their respective areas.

The reimbursable detailee costs in 1974 are estimated to be 14.3% less than 1972.

	1972	1973	1974
d. Overtime and Other Compensation.....	$1,021,000	$1,192,000	$1,181,000

The major portion (approximately 81%) of overtime and holiday pay is used in direct support of manned missions, long duration chamber tests and preparation and operation of astronaut training simulators. Specific examples are the Skylab Medical Experiment Altitude Tests (SMEAT), Skylab chamber tests, training preparation and transition of Skylab training. In addition, there is the direct support required for priority printing of training and missions operations manuals, hand tools, etc. There is also the lunar samples processing and analysis and other postflight related activities. The earth observation program in such areas as ecological studies and weather observations requires some continuous effort beyond the normal work period.

The remaining portion (approximately 19%) of overtime and holiday pay is used in peak work load periods. Some specific examples are preparation of the fiscal year-end close-out, a reduction in force, inquiry mail before and after a mission, large RFP preparations, statements of work and SEB criteria,

and unforseen "crash" type exercises.

	1972	1973	1974
2. Benefits.....	$6,432,000	$6,641,000	$6,330,000

In addition to the compensation paid employees MSC makes an employer's contribution to personnel benefits as authorized and required by law. The cost of benefits is $311,000 less in 1974 than in 1973 because of the personnel reductions.

Following are the amounts of contribution by category:

Category	1972	1973	1974
Civil Service Retirement.....	$5,124,000	$5,111,000	$5,052,000
Employees life insurance.....	257,000	254,000	250,000
Employees health insurance.....	733,000	743,000	735,000
FICA.....	29,000	33,000	33,000
Incentive awards.....	59,000	17,000	25,000
Other personnel benefits.....	1,000	9,000	10,000
Severance pay.....	229,000	474,000	225,000
Total.....	$6,432,000	$6,641,000	$6,330,000

B. Supporting Costs.....	$456,000	$578,000	$547,000

Supporting personnel costs provide for the expenses of moving reassigned personnel and for maintaining and expanding the skills of the employees.

1. Transfer of personnel.....	$144,000	$251,000	$220,000

This category includes the reimbursement to employees of movement of household goods to the employees' new duty station and other relocation expenses. The estimated costs are based on historical average costs and the planned number of moves.

2. Personnel training.....	$312,000	$327,000	$327,000

The Personnel training costs for 1974 are based on continuation of current training programs and the need to reorient skills of employees into areas compatible with the direction of the space program in the 1970's and MSC's role in the program. A prime objective is career development to permit employees to advance to more responsible positions and to provide the Center with highly motivated and experienced personnel not readily available in the labor market. The maintenance and expansion of the skills of personnel is essential in carrying out the Center's many complex technical and management responsibilities. The costs cover tuition, fees and related costs for training at colleges, universities, technical and management institutes; and for the cost of seminars and workshops related to MSC's role in the space

program. The personnel level will be less in 1974 but the need to retain or update skills has increased as well as the costs of training; therefore, the plan is to hold to the 1973 estimate.

	1972	1973	1974	Change in 1974
II. TRAVEL.....	$3,145,000	$3,360,000	$3,355,000	-$5,000

Basis of Fund Requirements

Summary of Travel by Major Category

	1972	1973	1974
A. Program Related Travel			
1. Direction, coordination, and management of Research and Development and Construction of Facilities program activities.....	$1,122,000	$1,340,000	$1,335,000
2. Flight mission support.....	969,000	893,000	893,000
3. Overseas travel to launch and tracking sites.....	355,000	350,000	350,000
Subtotal.....	$2,446,000	$2,583,000	$2,578,000
B. Meetings and Technical Seminars			
1. Government sponsored meetings	$159,000	$165,000	$165,000
2. Other than government sponsored meetings and technical seminars.....	96,000	75,000	75,000
Subtotal.....	$255,000	$240,000	$240,000
C. Administrative Travel.....	$444,000	$537,000	$537,000
Total, Travel.....	$3,145,000	$3,360,000	$3,355,000
A. Program Related Travel.....	$2,446,000	$2,583,000	$2,578,000

Program related travel is the travel most directly related to the mission of the Manned Spacecraft Center. It is the largest part of the travel function and accounts for approximately 77% of the Center's total travel requirements for FY 1974.

1. Direction, coordination, and management of programs.....	$1,122,000	$1,340,000	$1,335,000

The largest individual part of program related travel is for direction,

coordination and management of Research and Development and Construction of Facilities program activities. That amount required to support Construction of Facilities programs is, of course, negligible. However, because of the complexity of the Research and Development programs and the distribution of contractor effort throughout the entire United States, coordination and management of activities and contract monitoring require frequent examination by personnel responsible for the programs. In FY 1974 the Skylab program will be at its peak with two 56-day missions scheduled. In this same time frame the Shuttle program will be reaching the heights of its complexity, requiring hardware and other requirement reviews, close configuration monitoring between the three Manned Space Flight Centers, and many trips for the purposes of contract monitoring and cost controls.

	1972	1973	1974
2. Flight mission support.....	$969,000	$893,000	$893,000

Support is required for prelaunch and postlaunch activities and the amount of travel required for this purpose is directly related to the flight schedules for FY 1974. The Skylab program is scheduled for two 56-day flights in FY 1974.

3. Overseas travel to launch and tracking sites.....	$355,000	$350,000	$350,000

Overseas travel to launch and tracking sites is required for inspection, instrumentation and testing of the sites prior to launch and operation of sites during flight. The Skylab program will have two 56 day missions in FY 1974, therefore this type of travel will be of much longer duration than that previously encountered during previous program flights such as Apollo and Gemini.

B. Meetings and Technical Seminars....	$255,000	$240,000	$240,000

Travel to meetings and technical seminars permits employees engaged in Research and Development activities to participate at government sponsored and non-government sponsored meetings and technical seminars with other representatives of the scientific community. Activities centered around the lunar samples and the earth observations programs constitutes the majority of this cost area. Many of these meetings are made up of working panels convened to solve certain problems for the benefit of the people of the world and the United States government. Authorization to attend meetings of this nature is granted only after assurance that attendance will be in the best interests of NASA.

C. Administrative Travel.....	$444,000	$537,000	$537,000

Administrative travel includes travel for the direction and coordination of general management matters. It includes travel by managers in such areas as personnel, financial management and procurement. Travel by center officials to other centers and off-site locations is also provided for in this

category. The level in FY 1974 is expected to be the same as in FY 1973.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES..	$10,160,000	$9,483,000	$10,292,000	+$809,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Minor rehabilitation and modification, and construction.....	$168,000	$10,000	$10,000
B. Maintenance & Related Services			
1. Maintenance of buildings and grounds.....	$4,849,000	$4,105,000	$5,458,000
2. Maintenance of equipment...	242,000	302,000	287,000
3. Custodial services.....	2,525,000	2,828,000	2,252,000
Subtotal.....	$7,616,000	$7,235,000	$7,997,000
C. Operation of Facilities			
1. Utilities.....	$1,867,000	$1,714,000	$1,749,000
2. Supplies and equipment.....	509,000	524,000	536,000
Subtotal.....	$2,376,000	$2,238,000	$2,285,000
Total, Facilities Services.	$10,160,000	$9,483,000	$10,292,000
A. Acquisition of Facilities.....	$168,000	$10,000	$10,000
1. Minor rehabilitation and modification and construction.....	$168,000	$10,000	$10,000

Minor construction includes projects not in excess of $10,000 per project. All other projects are included in the CofF appropriation.

B. Maintenance and Related Services.....	$7,616,000	$7,235,000	$7,997,000
1. Maintenance of buildings and grounds.....	$4,849,000	$4,105,000	$5,458,000

This activity provides for maintenance of buildings, grounds, and utility systems at the Manned Spacecraft Center and the White Sands Test Facility. This service provides only cyclic maintenance and minor breakdown repair. Approximately 265 man-years of effort are required to maintain: 201 buildings that have an average age of 9 years, containing 2,931,000 square feet of space; 868 acres of improved ground and 216 acres of surfaced acreas; 117,490 LF of water line; 223,680 LF of sewage and drainage lines; 274,428 LF of electrical distribution lines and 18,673 LF of utility tunnels.

The increase in FY 1974 is due to a revision to the contracting plan, the full year effect of previously negotiated cost increases, and additional support at the White Sands Test Facility.

	1972	1973	1974
2. Maintenance of equipment.....	$242,000	$302,000	$287,000

Maintenance of equipment consists of work necessary to keep all equipment operational at MSC. This equipment includes office typewriters, adding machines, calculators, copiers, etc. The majority of these items were purchased in the 1962-1965 time period and require maintenance and repair far in excess of quarterly maintenance agreements. The Manned Spacecraft Center maintains approximately 4,500 items of equipment.

3. Custodial services.....	$2,525,000	$2,828,000	$2,252,000

Custodial services include security, janitorial and laundry activities. Security is provided by a support service contractor which provides two-shift service at five entrances, three-shift service at one entrance and patrolling of all buildings. The security service also includes badging of personnel and visitors, and policing of traffic involving approximately 13,000 vehicles daily. This support service contractor also provides 24-hour fire fighting and ambulance service to MSC.

The janitorial service is also provided by a support service contractor and includes building custodians as well as custodians required for clean rooms, environmental control facilities and specialized technical facilities. Approximately 3,155,000 square feet of surface area are maintained. The decrease in FY 1974 is due to current year negotiations.

C. Operation of Facilities.....	$2,376,000	$2,238,000	$2,285,000
1. Utilities.....	$1,867,000	$1,714,000	$1,749,000

This activity includes only purchased electricity and natural gas, plus a one time charge in 1972 for the Clear Lake City Sewage Disposal agreement.

491-316 O - 73 - 8

The rates for electricity and natural gas are the current approved rates for the areas concerned. Yearly consumption of electricity is 103,000,000 KWH and natural gas is 843,000 M cu. feet. Increase is due to rate changes.

	1972	1973	1974
2. Supplies and equipment.....	$509,000	$524,000	$536,000

The supplies, materials and equipment used in the operation of the MSC facilities are included in this category. The slight increase in 1974 of $12,000 is attributed to price escalation for supplies and materials.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES....	$8,006,000	$5,475,000	$5,486,000	+$11,000

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment.....	$1,900,000	$2,057,000	$2,057,000
2. Purchase of equipment.....	2,466,000	148,000	---
3. Maintenance of equipment.....	670,000	689,000	689,000
4. Programming and operations....	780,000	867,000	867,000
Subtotal.....	$5,816,000	$3,761,000	$3,613,000
B. Engineering Services.....	$236,000	$165,000	$165,000
C. Scientific and Technical Information and Educational Programs			
1. Technical library.....	$92,000	$98,000	$98,000
2. Educational programs.....	356,000	385,000	385,000
3. Scientific and technical information.....	1,506,000	1,066,000	1,225,000
Subtotal.....	$1,954,000	$1,549,000	$1,708,000
Total, Technical Services.....	$8,006,000	$5,475,000	$5,486,000
A. Automatic Data Processing.....	$5,816,000	$3,761,000	$3,613,000

This activity includes all ADP and EAM functions applicable to administration and logistics. This activity is accomplished by a support service contractor who performs programming, key punch, data storage and listings for managerial, financial, and other administrative requirements in addition to supporting

mission programs. Some of the requirements include data for reports on personnel, property inventory, financial status reports, budgetary history, contractor performance and costs, etc. The equipment utilized is both NASA-owned and leased with purchase options. Equipment includes 10 main frames owned, two main frames leased, 203 items of peripheral equipment owned, and 193 items of peripheral equipment leased.

	1972	1973	1974
B. Engineering Services.....	$236,000	$165,000	$165,000

This activity includes engineering services for all minor construction projects.

C. Scientific and Technical Information and Educational Programs.....	$1,954,000	$1,549,000	$1,708,000

Included in these programs are the costs of the technical library, photo processing services, technical documentation, graphics, exhibit preparation, and educational programs. The costs are summarized below:

1. Operation of technical library.....	$92,000	$98,000	$98,000

The technical library was established to serve the needs of employees and authorized contractor personnel for books, periodicals, technical reports, and other documentation. The technical library acquires approximately 13,000 units a year.

2. Educational/informational programs.....	$356,000	$385,000	$385,000

This activity includes the Public Affairs function. Included in this area are the unescorted tours of the Manned Spacecraft Center by the general public. In calendar year 1972, over one million visitors toured MSC. Also included in this activity are the maintenance of exhibits, press conferences, news coverage of flights, distribution of exhibits, distribution of film and press releases. These activities accounted for approximately 28,000 inquires from news media; 900 press interviews; 400 industrial releases; 140 news releases; 67,000 information requests; 800,000 publications furnished; 70,000 tours; 300 exhibits in the adjacent eight state area; 420 speeches; and 1,400 spacemobile presentations.

3. Scientific and technical information.....	$1,506,000	$1,066,000	$1,225,000

Scientific and technical information activities include documentation, publication, photographic, and translation services. General and scientific and technical graphic materials are prepared for presentations and publica-

tions in addition to operating a visual presentation system. Approximately 45,000 graphic units are prepared annually. Photography support is also included in this activity. This support includes operation of a still and motion picture processing laboratory; operation of a precision slide laboratory that supports mission control during flight for visual display of trajectories, times, etc.; operation of chemical mixing and quality control processes; and operation and maintenance of the film repository.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT..	$8,107,000	$8,418,000	$8,004,000	$-414,000

Basis of Fund Requirements

Summary of Administrative Support Services

	1972	1973	1974
A. Communications			
1. Leased lines and tolls.....	$1,037,000	$947,000	$966,000
2. Local telephone service.....	897,000	916,000	934,000
3. Other communications.....	117,000	122,000	124,000
Subtotal.....	$2,051,000	$1,985,000	$2,024,000
B. Administrative Printing.....	$843,000	$870,000	$887,000
C. Supplies, Materials and Equipment			
1. Supplies and materials.....	$1,736,000	$1,564,000	$1,595,000
2. Equipment.....	535,000	744,000	759,000
Subtotal.....	$2,271,000	$2,308,000	$2,354,000
D. Transportation			
1. Center operations.....	$410,000	$553,000	$421,000
2. Common carrier.....	290,000	278,000	285,000
Subtotal.....	$700,000	$831,000	$706,000
E. Administrative Support Services			
1. Installation support.....	$1,605,000	$1,812,000	$1,554,000
2. Medical services.....	637,000	612,000	479,000
Subtotal.....	$2,242,000	$2,424,000	$2,033,000
Total, Administrative Support	$8,107,000	$8,418,000	$8,004,000
A. Communications.....	$2,051,000	$1,985,000	$2,024,000

Included in this estimate are the costs of leased lines, long distance tolls, local telephone exchange services, and other communications, such as Western Union transmission charges and on-site two-way radio systems for mobile security, fire fighting and medical requirements. The Manned Spacecraft Center and White Sands Test Facility utilize 7,000 telephone instruments, and 3,900 on-site lines for approximately 840,000 calls and 228,000 teletype messages. Increase is due to rate increase.

	1972	1973	1974
B. Administrative Printing.....	$843,000	$870,000	$887,000

Estimates for administrative printing include funds for contractual printing and the related composition and binding operations, as well as on-site program related work. The MSC printing facility has been authorized as a Government Printing Plant to support priority mission requirements. The administrative type printing that does not have a mission related priority is the work that is contracted for with private firms as well as the overflow of mission related work. A decrease in support of the Apollo program is not expected until after 1973. Increase is for the cost of living escalation allowance in support contracts.

C. Supplies, Materials and Equipment.....	$2,271,000	$2,308,000	$2,354,000

Administrative supplies, materials, and equipment include those items of a general nature which service the entire installation, both civil service and contractor personnel. Approximately 130,000 items are issued a year from a stockage of 7,000 line items. Increase is due to increased cost of purchased material.

D. Transportation.....	$700,000	$831,000	$706,000

Transportation services include motor pool operations and associated services, administrative aircraft operations and services, as well as the movement of supplies, materials, equipment, and related items by common carrier. Vehicles utilized are 125 passenger carrying vehicles; 311 trucks; 47 fork lifts; eight mobile cranes; four specialized trucks; and 50 trailers. Vehicles are utilized at MSC, WSTF, Bothpage, N.Y.; Downey, California and MTF. The decrease in 1974 is the result of a one-time charge in 1973 for updating avionics on the administrative aircraft to meet new FAA standards. A similar charge is not anticipated in 1974.

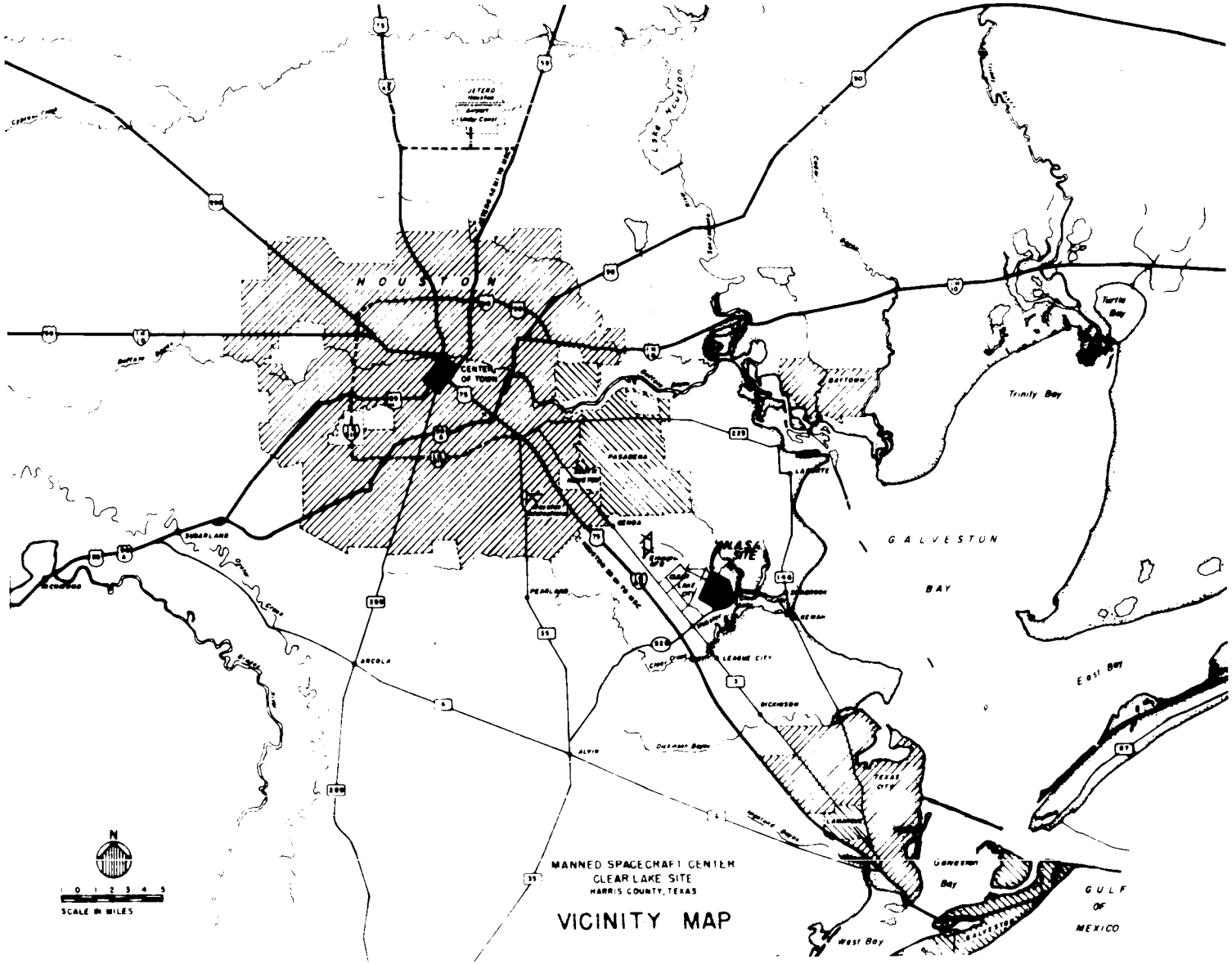
E. Installation Support Services.....	$2,242,000	$2,424,000	$2,033,000

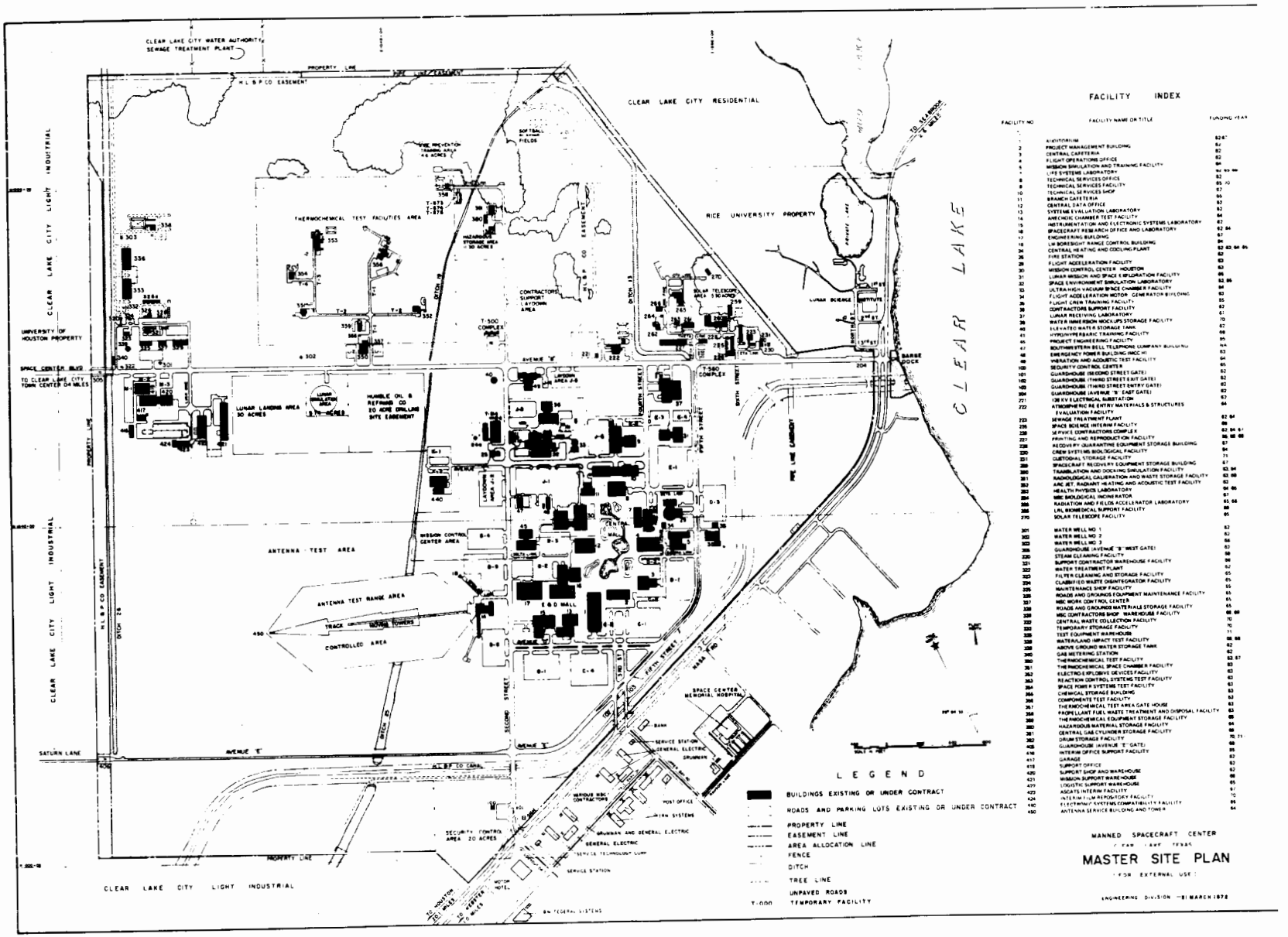
Installation support services include those services which support the installation generally. These services include equipment rental; storage and issue functions; forms and publications; moving and hauling; DOD support for MSC activities at Ellington Air Force Base; patent applications; and tort claims. Equipment rental provides for the lease of 18 Xerox copiers that produce an average of 20,000,000 units a year. Storage and issue functions handle

approximately 130,000 units a year. DOD support at Ellington Air Force Base is primarily related to aircraft and related support (i.e. hangars, security, utilities, fire fighting, etc.). Approximately 680,000 items are processed each year in the requisition, receipt and storage of forms and publications.

In addition, a contractor provides occupational medicine, industrial hygiene and environmental health services; operation of the dispensary for emergency medical treatment and employee physicals handling approximately 20,000 patients a year; and recognition, measurement and control of hazardous or potentially hazardous working and environmental conditions.

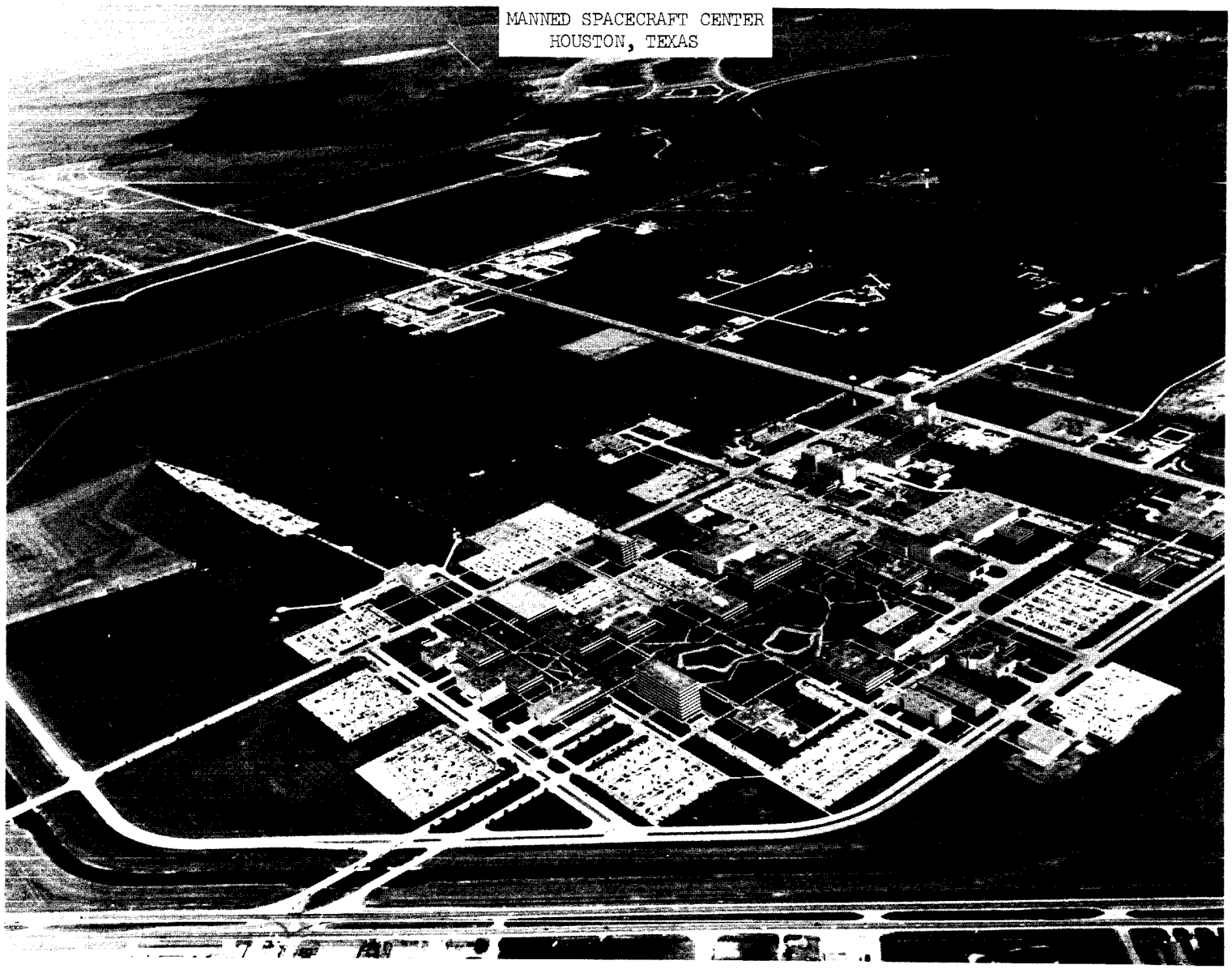
NASA
S-66-66721





FACILITY INDEX

FACILITY NO	FACILITY NAME OR TITLE	FUNDING YEAR
1	AUDITORIUM	62*
2	PROJECT MANAGEMENT BUILDING	62
3	CENTRAL CAFETERIA	62
4	FLIGHT OPERATIONS OFFICE	62
5	MISSION SIMULATION AND TRAINING FACILITY	64
6	LIFE SYSTEMS LABORATORY	62 65 66
7	TECHNICAL SERVICES OFFICE	62
8	TECHNICAL SERVICES FACILITY	65 70
9	TECHNICAL SERVICES SHOP	67
10	BRANCH CAFETERIA	66
11	CENTRAL DATA OFFICE	62
12	SYSTEMS EVALUATION LABORATORY	62
13	ANECHOIC CHAMBER TEST FACILITY	64
14	INSTRUMENTATION AND ELECTRONIC SYSTEMS LABORATORY	62
15	SPACECRAFT RESEARCH OFFICE AND LABORATORY	62 64
16	ENGINEERING BUILDING	67
17	LM BORESIGHT RANGE CONTROL BUILDING	64
18	CENTRAL HEATING AND COOLING PLANT	62 63 64 65
19	FIRE STATION	62
20	FLIGHT ACCELERATION FACILITY	63
21	MISSION CONTROL CENTER HOUSTON	63
22	LUNAR MISSION AND SPACE EXPLORATION FACILITY	65
23	SPACE ENVIRONMENT SIMULATION LABORATORY	62 66
24	ULTRA HIGH VACUUM SPACE CHAMBER FACILITY	64
25	FLIGHT ACCELERATION MOTOR GENERATOR BUILDING	63
26	FLIGHT CREW TRAINING FACILITY	65
27	CONTRACTORS SUPPORT FACILITY	63
28	LUNAR RECEIVING LABORATORY	67
29	WATER IMMERSION MOCKUPS STORAGE FACILITY	70
30	ELEVATED WATER STORAGE TANK	62
31	HYPOGYMPERBARIC TRAINING FACILITY	68
32	PROJECT ENGINEERING FACILITY	70
33	SOUTHWESTERN BELL TELEPHONE COMPANY BUILDING	N/A
34	EMERGENCY POWER BUILDING (MCC H)	63
35	VIBRATION AND ACOUSTIC TEST FACILITY	64
100	SECURITY CONTROL CENTER	65
101	GUARDHOUSE (SECOND STREET GATE)	62
102	GUARDHOUSE (THIRD STREET EXIT GATE)	62
103	GUARDHOUSE (THIRD STREET ENTRY GATE)	62
104	GUARDHOUSE (AVENUE "B" EAST GATE)	62
271	138 KV ELECTRICAL SUBSTATION	63
272	ATMOSPHERIC RE ENTRY MATERIALS & STRUCTURES EVALUATION FACILITY	64
273	SEWAGE TREATMENT PLANT	62 64
274	SPACE SCIENCE INTERIM FACILITY	66
275	SERVICE CONTRACTORS COMPLEX	63 64 67
276	PRINTING AND REPRODUCTION FACILITY	66 68 69
277	RECOVERY QUARANTINE EQUIPMENT STORAGE BUILDING	67
278	CREW SYSTEMS BIOLOGICAL FACILITY	64
279	CUSTODIAL STORAGE FACILITY	71
280	SPACECRAFT RECOVERY EQUIPMENT STORAGE BUILDING	67
281	TRANSLATION AND DOCKING SIMULATION FACILITY	63 64
282	RADIOLOGICAL CALIBRATION AND WASTE STORAGE FACILITY	63 69
283	ARC JET RADIANT HEATING AND ACOUSTIC TEST FACILITY	63
284	HEALTH PHYSICS LABORATORY	64 66
285	MSC BIOLOGICAL INCINERATOR	67
286	RADIATION AND FIELDS ACCELERATOR LABORATORY	65 66
287	LRL BIOMEDICAL SUPPORT FACILITY	69
288	SOLAR TELESCOPE FACILITY	65
301	WATER WELL NO 1	62
302	WATER WELL NO 2	62
303	WATER WELL NO 3	66
304	GUARDHOUSE (AVENUE "B" WEST GATE)	63
305	STEAM CLEANING FACILITY	69
306	SUPPORT CONTRACTOR WAREHOUSE FACILITY	66
307	WATER TREATMENT PLANT	62
308	FILTER CLEANING AND STORAGE FACILITY	65
309	CLASSIFIED WASTE DISINTEGRATOR FACILITY	65
310	MAINTENANCE SHOP FACILITY	65
311	ROADS AND GROUNDS EQUIPMENT MAINTENANCE FACILITY	65
312	MSC WORK CONTROL CENTER	65
313	ROADS AND GROUNDS MATERIALS STORAGE FACILITY	65
314	MSC CONTRACTORS SHOP WAREHOUSE FACILITY	66 69
315	CENTRAL WASTE COLLECTION FACILITY	70
316	TEMPORARY STORAGE FACILITY	70
317	TEST EQUIPMENT WAREHOUSE	71
318	WATERLAND IMPACT TEST FACILITY	66 68
319	ABOVE GROUND WATER STORAGE TANK	62
320	GAS METERING STATION	62
321	THERMOCHEMICAL TEST FACILITY	63 67
322	THERMOCHEMICAL SPACE CHAMBER FACILITY	63
323	ELECTRO EXPLOSIVE DEVICES FACILITY	63
324	REACTION CONTROL SYSTEMS TEST FACILITY	63
325	SPACE POWER SYSTEMS TEST FACILITY	63
326	CHEMICAL STORAGE BUILDING	63
327	COMPONENTS TEST FACILITY	63
328	THERMOCHEMICAL TEST AREA GATE HOUSE	63
329	PROPELLANT FUEL WASTE TREATMENT AND DISPOSAL FACILITY	63
330	THERMOCHEMICAL EQUIPMENT STORAGE FACILITY	66
331	HAZARDOUS MATERIAL STORAGE FACILITY	64
332	CENTRAL GAS CYLINDER STORAGE FACILITY	69
333	DRUM STORAGE FACILITY	70 71
334	GUARDHOUSE (AVENUE "E" GATE)	68
335	INTERIM OFFICE SUPPORT FACILITY	65
416	GARAGE	62
417	SUPPORT OFFICE	62
418	SUPPORT SHOP AND WAREHOUSE	62
420	MISSION SUPPORT WAREHOUSE	68
421	LOGISTIC SUPPORT WAREHOUSE	65
422	ASCATS INTERIM FACILITY	67
423	INTERIM FILM REPOSITORY FACILITY	70
424	ELECTRONIC SYSTEMS COMPATIBILITY FACILITY	66
450	ANTENNA SERVICE BUILDING AND TOWER	64



491-316 O - 73 - 9

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

MARSHALL SPACE FLIGHT CENTER

MISSION

The Marshall Space Flight Center (MSFC) at Huntsville, Alabama, became a part of NASA in July 1960. Marshall serves as one of NASA's primary Centers for the design, development and testing of space transportation systems, including large launch vehicles and engines for programs such as Apollo and the Space Shuttle. The Center also has a lead role in integration and management of the Skylab program and in space flight payload planning; and complete design, development and management responsibility for scientific projects such as the High Energy Astronomy Observatory and the Gravitational Redshift Space Probe. Recently assigned additional categories of roles and missions include lead Center responsibility for Sortie Lab., Space Tug, Concept Verification Testing and Large Space Telescope; significant responsibility in the Apollo Soyuz Test Project and environmental resources and applications programs. In addition, the Center conducts advanced development and research and technology activities in support of NASA programs.

In addition to on-site activities at Huntsville, MSFC manages the Michoud Assembly Facility (MAF) at New Orleans, Louisiana; the Slidell Computer Complex at Slidell, Louisiana; and the Mississippi Test Facility (MTF) at Bay St. Louis, Mississippi. Also, resident offices are maintained at or adjacent to industrial sites at various locations throughout the nation.

The Center is currently involved in the direction and management of the following on-going programs:

1. The Saturn program, which provides the nation's launch vehicle for manned lunar landing missions and very large payloads, such as the Skylab, and provides the launch vehicle for earth orbital manned missions.

2. The Skylab program, including development of ground support equipment and cluster modules such as the Orbital Workshop, Apollo Telescope Mount, Airlock Module, and Multiple Docking Adapter, management of selected experiments, and overall systems engineering and integration of the total Skylab cluster.

3. The Space Shuttle main engine, a high thrust, throttleable liquid hydrogen, liquid oxygen fueled rocket engine capable of many reuses.

4. The solid rocket booster and external tank, which together with the Shuttle Orbiter, are designed for transporting scientific and

applications payloads and technical and scientific personnel to and from space. The Shuttle will also have a retrieval and repair capability.

5. The High Energy Astronomy Observatory, including technical and program management of an orbital scientific program designed to obtain high quality, high resolution data on cosmic ray, gamma ray and x-ray sources.

6. The Gravitational Redshift Space Probe, which is designed for tests related to the equivalence principle of the Einstein Theory of Relativity.

7. The Apollo Soyuz Test Project, including responsibility for providing the Saturn IB launch vehicle and required engineering and management support.

8. Lead Center responsibility for orbital debris analysis with the objective of providing assessments of the potential hazard related to the random entry of orbital debris for all future NASA-launched space vehicles, for NASA spacecraft launched by other countries, and for all major NASA objects currently in orbit.

The Center has been assigned the lead role in the study and definition of several additional programs, primarily involving space payload planning and Space Shuttle utilization, to include:

1. The Space Tug, a vehicle for delivery and retrieval of automated payloads. This stage will augment the Shuttle capability, particularly for high energy missions.

2. The Sortie Lab, operating with the Space Shuttle as a pressurized and habitable module, providing a versatile and economical laboratory and observatory facility for manned research and applications investigations and experimentation in earth orbit.

3. The Concept Verification Testing Program, an in-house NASA effort to verify the concepts resulting from definition studies now underway, utilizing hardware which can be produced as the end product of "focused technology". Primary objectives are to demonstrate representative Shuttle payload concepts and develop interface requirements. The CVT Program will also support design and development of such potential hardware items as the Sortie Lab.

4. Large Space Telescope, a Shuttle-launched 3-meter-class optical telescope that provides for international scientific use, and which will significantly extend man's knowledge of the universe.

Marshall is also participating in the NASA Earth Resources Survey Program, to include environmental applications at Huntsville and environmental activities

at the Mississippi Test Facility. These activities are directed generally toward the application of space technology and associated managerial and technical disciplines to solve environmental problems. At both locations, interfaces and working relationships are being established with federal, state and local agencies to determine ways of utilizing NASA Earth Survey data and techniques for potential benefits at the user level. These efforts are of particular significance at MTF, where other government agencies are locating selected environmental research and earth resources activities. In addition to providing a support base for other agency operations, MTF has a primary role to provide for an active interchange of information and technology among the various activities located at the site. This interchange will offer opportunities for interdisciplinary spinoffs, as well as providing a feedback of payload and experiment ideas for future NASA programs.

In addition to environmental efforts, certain other federal agency activities are being located at the MTF and MAF facilities, in order to achieve full utilization of their capacity and for the benefit of better cost effectiveness to the government.

In addition to on-going assignments, the Center is deeply involved in a variety of activities related to studies and plans for future space missions. These activities range from overall mission analyses of initial Shuttle missions to specific studies in the scientific and applications disciplines, including programs related to laser experiments, plasma physics, life sciences, astronomy, solar observation, gravitational relativity, earth observation, solar power, earth physics, meteoroid studies, materials science, zero-G, cloud physics, solar electrical propulsion, and other scientific areas within the scope of NASA's mission.

DESCRIPTION

Operations at the Marshall Space Flight Center are conducted at three primary locations:

The main Marshall Space Flight Center site is near Huntsville, Alabama, on Army property at the Redstone Arsenal. The Center occupies 1,840 acres under a nonrevocable use permit from the Army. The capital investment as of June 30, 1972 was $412,924,000. Certain facilities such as the Redstone Arsenal Air Field and some utilities are used jointly by NASA and the Army. The Huntsville location has deepwater access via the Tennessee, Ohio, and Mississippi Rivers.

The Michoud Assembly Facility is located 15 miles east of New Orleans, Louisiana. The main facility occupies 891 acres. The Slidell Computer Complex, a facility 20 miles to the northeast, occupies 14 additional acres bringing the total acreage to 905. The capital investment as of June 30, 1972 was $183,880,000.

The Michoud Facility provides 3,557,935 square feet of space, including the main assembly plant, covering an area of 43 acres under one roof. The

Facility is located on the Gulf-Intra-Coastal Waterway and has deepwater access via the Mississippi River.

The Mississippi Test Facility is located in southwest Mississippi, approximately 50 miles northeast of New Orleans, Louisiana. Total land area is 138,000 acres of which 13,428 acres make up the actual test area owned by NASA. The remaining 125,372 acres are held as a buffer zone. In the buffer area, 7,488 acres are owned by NASA, and 117,884 acres are under restrictive easements. Capital investment for the Mississippi Test Facility as of June 30, 1972, was $322,530,000. Test stands include a dual position stand for testing the Saturn V first stage (S-IC), and two stands for testing the 1,000,000 pound thrust Saturn V second stage (S-II). The site has deepwater access via the Pearl River and the Intra-Coastal Waterway. The Mississippi Test Facility is also being utilized as a host site for space and environmental activities by other government agencies.

The total capital investment of the Marshall Space Flight Center and its installations at Mississippi and Louisiana, including fixed assets in progress and contractor-held facilities at various locations as of June 30, 1972 was $1,158,511,000.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

Functions	1972	1973	1974
Personnel.....	$113,067,000	$110,242,000	$107,662,000
Travel.....	2,720,000	2,791,000	2,658,000
Facilities services.....	16,876,000	8,940,000	9,175,000
Technical services.....	7,368,000	7,140,000	6,998,000
Administrative support.....	6,915,000	6,175,000	6,364,000
Total, fund requirements.....	$146,946,000	$135,288,000	$132,857,000

	1972	1973	1974	Change in 1974
I. PERSONNEL.....	$113,067,000	$110,242,000	$107,662,000	$-2,580,000

Basis of Fund Requirements

	1972	1973	1974
A. Compensation and Benefits:			

	1972	1973	1974
1. Compensation:			
a. Permanent positions...	$101,248,000	$98,276,000	$94,402,000
b. Nonpermanent positions	1,261,000	1,569,000	1,549,000
c. Reimbursable details..	142,000	298,000	298,000
d. Overtime and other compensation.....	1,015,000	975,000	975,000
Subtotal, Compensation.....	$103,666,000	$101,118,000	$97,224,000
2. Benefits.....	$9,041,000	$8,601,000	$9,960,000
Subtotal, Compensation and Benefits.....	$112,707,000	$109,719,000	$107,184,000
B. Supporting Costs:			
1. Transfer of personnel.....	$52,000	$127,000	$82,000
2. Personnel training.....	308,000	396,000	396,000
Subtotal, Supporting Costs.....	$360,000	$523,000	$478,000
Total, Personnel and Related Costs.....	$113,067,000	$110,242,000	$107,662,000
1. Compensation	$103,666,000	$101,118,000	$97,224,000
a. Permanent Positions.....	$101,248,000	$98,276,000	$94,402,000

The cost of compensation for permanent positions is the largest part of personnel and related costs. The funds shown above will support 5,214 permanent positions in 1973 and 4,564 positions in 1974, a reduction of 777 positions from 1972. The changes in 1974, a reduction of 650 from 1973, result from the phase-out of Skylab not being fully offset by the build-up from the Apollo Soyuz Test project and the Space Shuttle Program, the suspension of the HEAO project, the phase-out of the Communications Program, and the curtailment of other space research programs, along with a related reduction in support positions.

	1972	1973	1974
Permanent Positions by Program:			
Manned Space Flight			
Space flight operations.....	2,299	2,074	1,280
Space shuttle.....	530	905	1,450
Advanced missions.....	42	25	20
Apollo.....	330	80	---

	1972	1973	1974
Space Science			
Physics and astronomy.....	266	290	255
Lunar and planetary exploration	5	---	---
Launch vehicle procurement.....	19	---	---
Space Applications.....	37	109	84
Aeronautics and Space Technology			
Aeronautical research and technology.....	6	5	5
Space research and technology..	196	139	75
Nuclear power and propulsion...	12	---	---
Tracking and Data Acquisition....	3	2	---
Technology Utilization.....	---	---	---
Subtotal, Positions by program.	3,745	3,629	3,169
Indirect Positions:			
Director and staff.....	75	85	80
Administrative support.....	1,114	1,107	960
Research and development support.	407	393	355
Subtotal, Indirect positions...	1,596	1,585	1,395
Total, permanent positions.....	5,341	5,214	4,564
Other than permanent positions.....	452	452	427
Total Positions.....	5,793	5,666	4,991

The above table illustrates the manpower assigned to the programs conducted at the Center. The distribution by occupation of these positions illustrates a significant characteristic of the Marshall Space Flight Center workforce. Professional engineers and scientists comprise approximately 45% of the Center workforce. Technicians and technically oriented wage board employees, working in direct support of the professional technical staff make up another 23% of the complement. The following table summarizes by occupational group the Center's workforce.

Occupational Group	1972 Number	1972 Percent	1973 Number	1973 Percent	1974 Number	1974 Percent
Professional scientists and engineers.....	2,423	45.4	2,363	45.0	2,047	45.0
Technicians.....	1,190	22.3	1,150	22.0	985	22.0
Wage board.....	43	.8	42	1.0	40	1.0
Professional administrative.....	907	17.0	875	17.0	749	16.0
Clerical.....	778	14.5	784	15.0	743	16.0
Total.....	5,341	100.0	5,214	100.0	4,564	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the start of the year, as modified by abolishment of existing positions, within grade advances, career development, etc. After these modifications, the year-end position structure is established and the cost effect for the year is calculated based on the estimated period that these modifications are in effect.

In 1974 the cost of permanent positions will be $94,402,000, a reduction of $3,874,000 from 1973. This reduction is calculated as follows:

Cost of permanent positions in 1973.....		$98,276,000
Cost increases in 1974.....		+1,794,000
Within grade advances and career development:		
Full year effect of 1973 actions.....	$1,155,000	
Partial year effect of 1974 actions....	639,000	
Cost decreases in 1974.....		-5,668,000
Abolished positions:		
Full year effect of 1973 actions.....	-$3,736,000	
Partial year effect of 1974 actions...	-1,682,000	
Turnover savings.....	-250,000	
Cost of permanent positions in 1974.....		$94,402,000

	1972	1973	1974
b. Nonpermanent Positions.....	$1,261,000	$1,569,000	$1,549,000

The 1974 plan includes 427 positions. These positions will be used to support the following programs at approximately the levels indicated:

Program	Positions
College Cooperative Training	135
Vocational Cooperative Training	25
Summer Employment	110
Youth Opportunity	150
Temporary Clerical	7

The College Cooperative Training Program provides alternating work and study periods providing the student with practical experience and adacemic training. This program permits many students to attend college who could otherwise not afford to by providing them an income during their work period. This program has been a principal source of recruitment for young and experienced professional personnel.

The Summer Employment Program at MSFC employs high school and college students and faculty members, and in consonance with the Federal government policies and objectives provides them an insight into government operations. The Center benefits from the useful and productive work performed by these highly motivated individuals.

The Youth Opportunity Campaign Program is conducted within the National policy which enables disadvantaged youth to work and learn on the job and provide an income which assists them to continue their secondary education.

The Temporary Clerical Program is necessary to provide short-term support in positions occupied by permanent employees who are absent from work because of illness, vacation, maternity, or training.

	1972	1973	1974
c. Reimbursable Details.....	$142,000	$298,000	$298,000

A total of 20 reimbursable detailees are assigned to NASA from DOD for the purpose of training flight crews in the area of zero gravity and for support in other research and engineering projects. This effort provides mutual benefits to NASA and DOD by providing NASA with special talent and by keeping DOD personnel current on the Manned Space Flight management and technology.

d. Overtime and Other Compensation.....	$1,015,000	$975,000	$975,000

The 1974 level will decrease from the 1973 level. The 1974 level represents about 1% of the Personnel Compensation. This represents the minimum overtime that can be achieved and provide for the in-house effort necessary to solve unanticipated technical problems and meet the difficult program milestones. Other compensation provides for holiday, Sunday and night work differential pay to employees performing maintenance functions.

491-316 O - 73 - 10

	1972	1973	1974
2. Benefits.....	$9,041,000	$8,601,000	$9,960,000

In addition to compensation, MSFC makes an employer's contribution to personnel benefits as authorized and required by law, and pays severance pay for employees involuntarily separated. The cost of benefits is $1,359,000 higher in 1974 than in 1973 because of the estimated cost of severance pay in 1974 due to personnel reductions. The following table indicates the costs of personnel benefits by the major categories:

Category of Cost			
Contribution to the Civil Service Retirement Fund....	$7,235,000	$6,915,000	$6,794,000
Contribution for employee life insurance.....	381,000	340,000	270,000
Contribution for employee health insurance.....	1,059,000	950,000	930,000
Contribution to FICA.....	26,000	20,000	15,000
Incentive awards.....	63,000	60,000	36,000
Severance pay.....	277,000	316,000	1,915,000
Total.....	$9,041,000	$8,601,000	$9,960,000

B. Supporting Costs.....	$360,000	$523,000	$478,000

Supporting personnel costs provide for the expenses of moving employees to their initial duty station or reassignments, and for maintaining and expanding the skills of our employees. These costs are summarized as follows:

1. Transfer of Personnel.....	$52,000	$127,000	$82,000

The estimated cost in FY 1974 is based on the number and historical average cost of relocations, and provides for certain relocation costs such as the expenses of selling and buying a home, the cost of one trip to the new duty station to secure housing, and the cost of family relocation.

2. Personnel Training.....	$308,000	$396,000	$396,000

The Personnel Training cost for 1974 is based on the continuation of current training programs and the need to reorient skills of employees into areas compatible with the direction of the space program in the 1970's and MSFC's role in the program. A prime objective is career development to permit employees to advance to more responsible positions and to provide the Center with highly motivated and experienced personnel not readily available in the labor market. The maintenance and expansion of the skills of personnel is essential in carrying out the Center's many complex technical and management responsibilities. The costs cover tuition, fees and related costs for training at colleges, universities, technical and management institutes; and for the cost of seminars and workshops related to MSFC's role in the space

program. The personnel level will be less in 1974 but the need to retrain or update skills has increased as well as the costs of training; therefore, the plan is to hold to the 1973 level.

	1972	1973	1974	Change in 1974
II. TRAVEL.....	$2,720,000	$2,791,000	$2,658,000	$-133,000

Basis of Fund Requirements

Summary of Travel by Major Category

	1972	1973	1974
A. Program Related Travel			
1. Direction, coordination, and management of Research and Development and Construction of Facilities program activities.....	$2,354,000	$2,636,000	$2,509,000
2. Flight mission support....	34,000	38,000	38,000
3. Overseas travel to launch and tracking sites.....	22,000	20,000	18,000
Subtotal.....	$2,410,000	$2,694,000	$2,565,000
B. Meetings and Technical Seminars			
1. Government-sponsored meetings	$7,000	$6,000	$6,000
2. Other than government-sponsored meetings and technical seminars.....	19,000	16,000	15,000
Subtotal.....	$26,000	$22,000	$21,000
C. Administrative Travel.....	$284,000	$75,000	$72,000
Total, Travel.....	$2,720,000	$2,791,000	$2,658,000
A. Program Related Travel.....	$2,410,000	$2,694,000	$2,565,000

Program related travel represents about 96% of Marshall's travel requirements for 1974 and is incurred in connection with direction and management of on-going and future programs.

1. Direction, coordination, and management of programs..	$2,354,000	$2,636,000	$2,509,000

The largest individual part of program related travel is for the direction, coordination, and management of Research and Development programs involving

design, development and testing of large launch vehicles and space transportation systems. The complexity of the programs and distribution of contractors, subcontractors, experimenters, principal investigators and coordination of activities with other NASA Centers, require frequent trips by MSFC personnel responsible for the programs. Extended TDY requirements in 1974 are impacted significantly by second and third manned visits to Skylab, management and support system engineering, development production activities of Shuttle, Space Tug, MSF Advanced Missions, payloads and supporting technology and development.

The volume of separate items which must be accepted by Marshall and integrated into payload modules is also a significant influence which is different from prior programs. This acceptance requires direct civil service participation in the preparation of test plans and procedures, acceptance tests, test evaluation and final acceptance.

	1972	1973	1974
2. Flight mission support.....	$34,000	$38,000	$38,000

Flight mission support travel includes only that applicable to MSFC contractor fabricated stages and related hardware and is in consonance with the 1974 launch schedule.

3. Overseas travel to launch and tracking sites.....	$22,000	$20,000	$18,000

MSFC overseas travel to launch and tracking sites is rather limited and is normally accomplished at the request and in support of MSC.

B. Meetings and Technical Seminars.	$26,000	$22,000	$21,000

Travel to meetings and technical seminars permits employees engaged in program activities to participate at both government sponsored and non-government sponsored meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to advances in the field which arise outside NASA, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the government sponsored meetings are made up of working panels convened to solve certain problems for the benefit of the government. Authorization to attend meetings of the type described is granted only after assurance that attendance will be in the best interest of NASA.

C. Administrative Travel.....	$284,000	$75,000	$72,000

Administrative travel includes travel for the direction and coordination of general management matters. It includes travel by managers in such areas as personnel, financial management, and procurement to assure that policies and procedures are being implemented properly. The travel of Center officials

to NASA Headquarters, other NASA Centers, and to off-site locations is provided for in this category.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES...	$16,876,000	$8,940,000	$9,175,000	$+235,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Minor rehabilitation and modification, and construction.....	$20,000	---	---
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds.....	$958,000	$1,534,000	$1,498,000
2. Maintenance of equipment..	892,000	731,000	731,000
3. Custodial services.....	2,829,000	2,645,000	2,645,000
Subtotal.....	$4,679,000	$4,910,000	$4,874,000
C. Operation of Facilities			
1. Utilities.....	$3,240,000	$3,253,000	$3,590,000
2. Supplies and equipment....	891,000	777,000	711,000
Subtotal.....	$4,131,000	$4,030,000	$4,301,000
D. MTF Support.....	$8,046,000	---	---
Total, Facilities Services....	$16,876,000	$8,940,000	$9,175,000
A. Acquisition of Facilities.....	$20,000	---	---
1. Minor rehabilitation and modification, and construction.....	$20,000	---	---

This activity provides for minor construction activity of projects which do not exceed $10,000 per project. Beginning in 1973, all other projects which were previously budgeted for in this category are included in the C of F or R&D appropriations. There are no minor construction projects of $10,000 or less for which funds are required in 1973 or 1974.

	1972	1973	1974
B. Maintenance and Related Services	$4,679,000	$4,910,000	$4,874,000
1. Maintenance of buildings and grounds.....	$958,000	$1,534,000	$1,498,000

The amount required for maintenance of buildings and grounds is $36,000 less than FY 1973. This decrease is the result of decreased reroofing and repainting cycles in FY 1974 compared to FY 1973 in accordance with a phased maintenance cycle.

These services are performed by the U.S. Army Missile Command (AMC) on a reimbursable basis and by the MSFC support services contractor (Management Services Inc.) personnel. The buildings range in age from the World War II vintage to those completed in recent years. Over four million square feet of space are involved, of which approximately 15% are Army buildings (of considerable age) used and maintained by MSFC. The grounds cover 1,840 acres of which 1,242 acres are improved and 598 acres are unimproved. AMC maintenance billing to MSFC is based on $10.50 per thousand square feet of floor space occupied. Maintenance performed under the MSI contract is accomplished by miscellaneous crafts, a mix of some forty skilled trades. This sub-category also includes supplies, tools, G&A and overhead and labor cost which approximates 77% of the maintenance cost.

2. Maintenance of equipment...	$892,000	$731,000	$731,000

Maintenance and repair of equipment consists of preventative maintenance and repair of all equipment used in the administration of the Center. This includes office and laboratory equipment which is maintained by vendors under service agreements. Although normal cost escalation is anticipated in FY 1974 over FY 1973, austere measures to be taken are expected to hold the FY 1974 cost at the FY 1973 level.

3. Custodial services.....	$2,829,000	$2,645,000	$2,645,000

Custodial services are for the most part performed by the Hayes support service contract personnel and include janitorial services for some 3,376,000 square feet of area in 100 different buildings; security services that provide for badging of employees and visitors, maintaining security patrol and policing traffic (the U. S. Army provides perimeter patrol and entrance gate services for which MSFC is charged a pro rata share); laundry services comprising the cleaning and laundry of 416,000 pieces of material annually; movement and disposal of approximately 90,000 cubic yeards of refuse annually at 132 different pickup points; and fire protection service furnished by the U. S. Army for 2,617,000 square feet of area. Reduced personnel levels in FY 1974, improved management techniques and reduced services are expected to hold FY 1974 cost at the FY 1973 level.

C. Operation of Facilities.....	$4,131,000	$4,030,000	$4,301,000
1. Utilities.....	$3,240,000	$3,253,000	$3,590,000

This item includes the cost of utility services furnished by the U.S. Army Missile Command on a reimbursable basis. Charges for electricity, water and steam are based on metered consumption and the rates are dependent upon load demand and the cost to the Army for furnishing the services. Sewerage charges are based on population levels. An abnormally mild winter was experienced in FY 1972. Should normal temperatures prevail in 1973, austere heating and cooling and lighting policies will have to be implemented in order to live within current funding levels. However, 1974 estimates provide for normal consumption requirements experienced in prior years plus a slight increase for cost escalation in 1974 due to electrical rate increases.

	1972	1973	1974
2. Supplies and equipment....	$891,000	$777,000	$711,000

The supplies, materials and equipment budgeted for in this subcategory are those items associated with the modification of facilities projects such as relocation of partitions and updating the physical plant facilities. The estimate is based on the number of personnel supported, the number of facilities operated, and the need for equipment replacement in 1974. The decrease in 1974 is due to a large equipment replacement at the end of 1972 and a decrease in manpower levels in FY 1974.

D. Mississippi Test Facility Support.....	$8,046,000	---	---

The $10,000,000 in the 1971 Appropriation Act provided for basic institutional and technical services for federal and state agencies resident at the Mississippi Test Facility/Slidell Computer Complex and other NASA installations in pursuit of space and environmental activities. The funds were utilized for equipment procurements, alteration and modification of existing facilities and construction of facilities required by the various tenants in performance of their missions. The above was furnished on a nonreimbursable basis. Because of the time required to implement the Congressional intent and because R&PM is an annual appropriation, Congress continued the availability of these funds until September 30, 1971. The 1973 and 1974 budget is based on the assumption that support to other federal and state agencies will be provided completely on a reimbursable basis. Some of the tenants at MTF are: Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S. Geological Survey, Department of Army, Department of Transportation, Department of Air Force, Gulf Universities Research Corporation, Louisiana State University, and Mississippi State University.

Currently, in addition to maintaining NASA launch vehicle and rocket engine static test certification capability, and modification and operation of Space Shuttle Main Engine Test facilities, MTF is involved in developing interfaces and working relationships with appropriate federal and state agencies in determining ways of utilizing NASA technology, management skills and earth survey data to solve environmental problems and providing support to tenants

in accordance with approved agreements.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES..	$7,368,000	$7,140,000	$6,998,000	$-142,000

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment.....	$96,000	$96,000	$96,000
2. Maintenance of equipment..	338,000	338,000	338,000
Subtotal, equipment.....	$434,000	$434,000	$434,000
3. Programming and operations	4,623,000	4,403,000	4,368,000
Subtotal.....	$5,057,000	$4,837,000	$4,802,000
B. Engineering Services.....	$23,000	$59,000	$59,000
C. Scientific and Technical Information and Educational Programs			
1. Operation of NASA technical library.....	$69,000	$69,000	$69,000
2. Educational/informational programs.....	1,823,000	1,764,000	1,671,000
3. Scientific and technical information.....	396,000	411,000	397,000
Subtotal.....	$2,288,000	$2,244,000	$2,137,000
Total, Technical Services.....	$7,368,000	$7,140,000	$6,998,000
A. Automatic Data Processing.....	$5,057,000	$4,837,000	$4,802,000

The R&PM appropriation provides for the lease, purchase, maintenance, and programming and operations services of ADP equipment which is not dedicated to specific research or operational systems and funded from the Research and Development appropriation. Business-type applications utilize 21 remote input terminals to support an on-line inventory system to provide complete electronic processing of all supply transactions from the charting of the Program Operating Plan, contracts and change orders, control and engineering support. Additional applications consist of payroll, labor distribution and costing, personnel records, and data management.

	1972	1973	1974
B. Engineering Services.....	$23,000	$59,000	$59,000

This subcategory provides for engineering design services for the design of minor repair and alterations and other related engineering services such as facilities studies covering pollution control, utilities conservation, and core boring for soil sampling. The FY 1974 level is expected to remain at the FY 1973 level.

C. Scientific and Technical Information and Educational Programs.....	$2,288,000	$2,244,000	$2,137,000

Included in these programs are the costs of the technical libraries, educational/informational programs, and the scientific and technical information services. The costs are summarized as follows:

1. Operation of technical libraries.....	$69,000	$69,000	$69,000

This subcategory provides for the costs of books, periodicals, technical reports, and other documentation items strategically located in small libraries throughout the Center for ready reference needs by civil service and contractor employees. The level of activity in FY 1974 is expected to remain at the FY 1973 level.

2. Educational/informational programs.....	$1,823,000	$1,764,000	$1,671,000

The educational/informational programs provide for the gathering and dissemination of information about the agency's programs to the mass communications media, the general public, and to the educational community at the elementary and secondary levels. Assistance to the mass communications media includes the gathering and exposition of news-worthy material in support of their requests, and takes such forms as press kits, news releases, television and radio information tapes and clips, and feature material. It also includes the cost for the services received from Redstone Scientific and Information Center which maintains a complete library of periodicals, text and reference books of a scientific and technical nature. The decrease in FY 1974 is related to reduced personnel levels and a more selective screening technique of educational and information data.

3. Scientific and technical information.....	$396,000	$411,000	$397,000

The scientific and technical information activity includes the cost of docu-

491-316 O - 73 - 11

mentation and publication services, systems development, and translation services. These costs are for the documentation of worldwide aerospace journal and report literature; monographs and technical reviews; analyzing, evaluating, and testing new methods and systems in the field of scientific communications to increase the effectiveness of the technical information program; and translating foreign language technical books, reports and journal articles required to meet the needs of MSFC and its contractor scientific personnel to keep abreast of world developments in the space sciences and related fields. The decreases in FY 1974 result from reduced personnel levels.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT...	$6,915,000	$6,175,000	$6,364,000	$+189,000

Basis of Fund Requirements

Summary of Administrative Support

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$562,000	$556,000	$556,000
2. Local telephone service...	943,000	811,000	846,000
3. Other communications.....	146,000	116,000	117,000
Subtotal.....	$1,651,000	$1,483,000	$1,519,000
B. Administrative Printing.....	$524,000	$513,000	$540,000
C. Supplies, Materials, and Equipment			
1. Supplies and materials....	$948,000	$900,000	$862,000
2. Equipment.....	418,000	39,000	230,000
Subtotal.....	$1,366,000	$939,000	$1,092,000
D. Transportation			
1. Center operations.....	$1,558,000	$1,566,000	$1,537,000
2. Common carrier.....	18,000	15,000	15,000
Subtotal.....	$1,576,000	$1,581,000	$1,552,000
E. Administrative Support Services			
1. Installation support services.....	$1,412,000	$1,264,000	$1,266,000
2. Medical services.....	386,000	395,000	395,000
Subtotal.....	$1,798,000	$1,659,000	$1,661,000
Total, Administrative Support.	$6,915,000	$6,175,000	$6,364,000

	1972	1973	1974
A. Communications.....	$1,651,000	$1,483,000	$1,519,000

Included in this estimate are the costs of leased lines which include all circuits and associated equipment; long distance tolls; local telephone exchange services which includes services provided by other government agencies on a reimbursable basis or contractually by commercial concerns; and switchboard, installation, and service charges. Other communications include message transmission, land telegraph service, marine cable service, wireless telegraph service, rental of post office boxes, postage meter machines, mailing machines, and teletype equipment and TWX services. MSFC business is conducted with companies and institutions in all states. Consequently, the cost of communications is large. The increased cost in FY 1974 is due to cost escalation of 3%.

B. Administrative Printing.....	$524,000	$513,000	$540,000

Estimates for administrative printing include funds for contractual printing and the related composition and binding operations. This includes services performed by other agencies, including the Government Printing Office, or by commercial printing firms. All common processes of duplicating, including photostating, blueprinting, microfilming, and other photographic reproductions, are included. The increase in FY 1974 provides for cost escalation of 5.5% over FY 1973.

C. Supplies and Materials and Equipment.....	$1,366,000	$939,000	$1,092,000

This activity includes those items of a general nature which service the entire installation but excludes supplies and materials associated with facilities services and supplies in support of ADP processing. Included are fuels and lubricants; general operating materials; general service materials; missile, aircraft, and vehicle parts; equipment and accessories; office supplies; laboratory, photographic, electrical and electronic equipment; furniture and office equipment; and non-capitalized equipment. The increase in FY 1974 over FY 1973 provides for price escalation plus an increase in motor vehicle requirements to implement an equipment replacement program.

D. Transportaton	$1,576,000	$1,581,000	$1,552,000

This subfunction includes motor pool operation and the cost of automotive repairs. It also includes the maintenance of mobile, mechanical and shop equipment consisting of some 1,200 items which is made up of forklifts, protable generators, bulldozers, cranes and electrical power equipment. The operation of the motor pool, including the automotive repair, and most of the maintenance of all mobile equipment is performed by support contractor personnel. G&A costs, fees, cost of materials, parts and supplies are also included. This subcategory also includes the rental of commercial and govern-

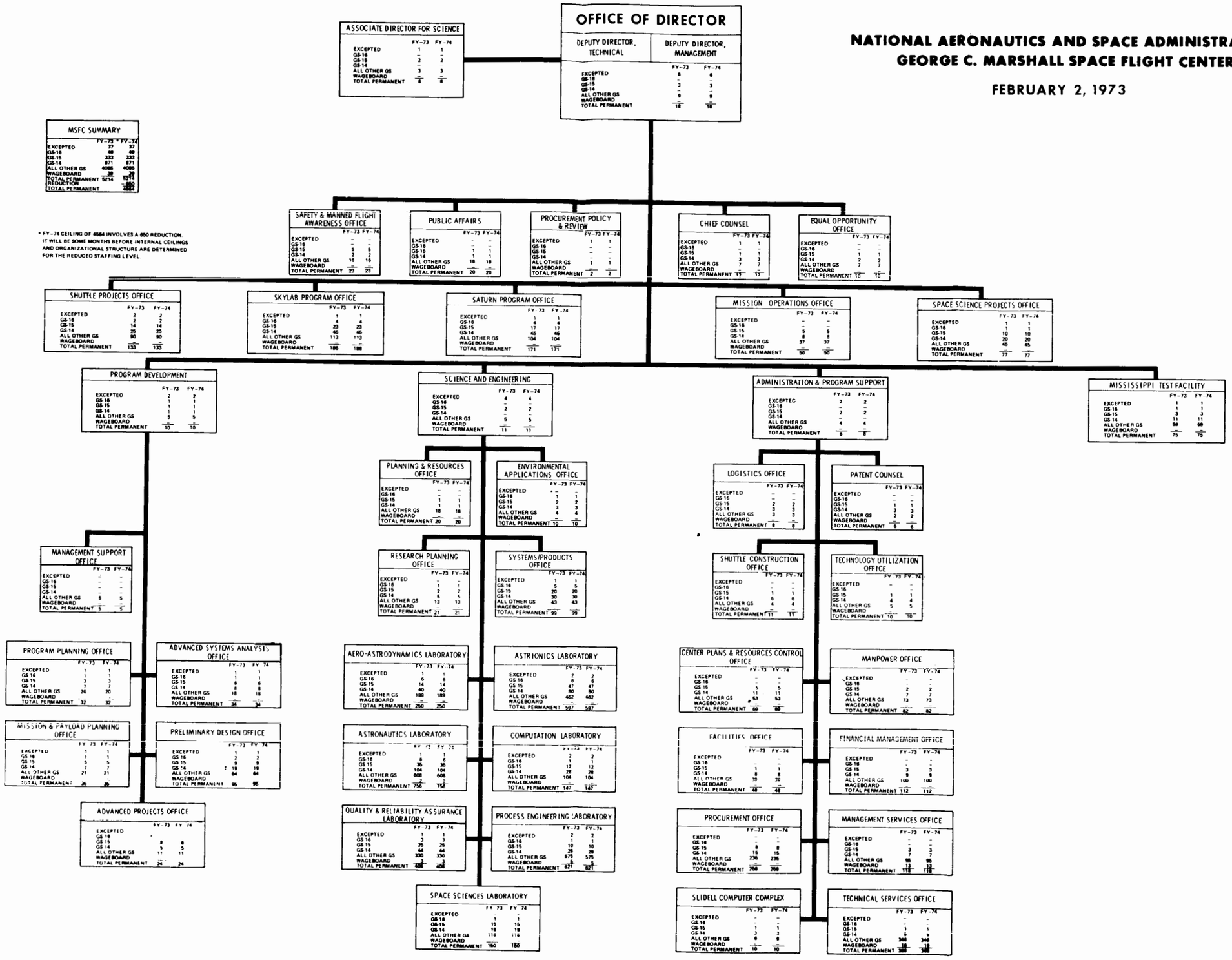
ment passenger vehicles, local transportation, the operational cost and maintenance of the Center's aircraft, and the transportation cost of supplies, materials, equipment, and related items moved by surface and air carriers. The decrease in FY 1974 is attributable to lower personnel levels and reduced operational levels.

	1972	1973	1974
E. Administrative Support Services.....	$1,798,000	$1,659,000	$1,661,000

Administrative support services include those services which support the total installation generally. This includes telecommunication services and technical publication services performed by the Hayes support service contract; miscellaneous Army services, packing, crating, and handling issues and turn-ins, and disposal of hazardous and contaminated materials; vent cleaning; repair; logistics (management of furniture and warehousing); medical services; maintenance of office furniture and equipment; stenographers, court reporting, and advertising services and tort claims. It also includes gauge calibration, patent counsel contractor support services, and other miscellaneous charges of minor amounts. The increase in FY 1974 over FY 1973 provides for price escalation.

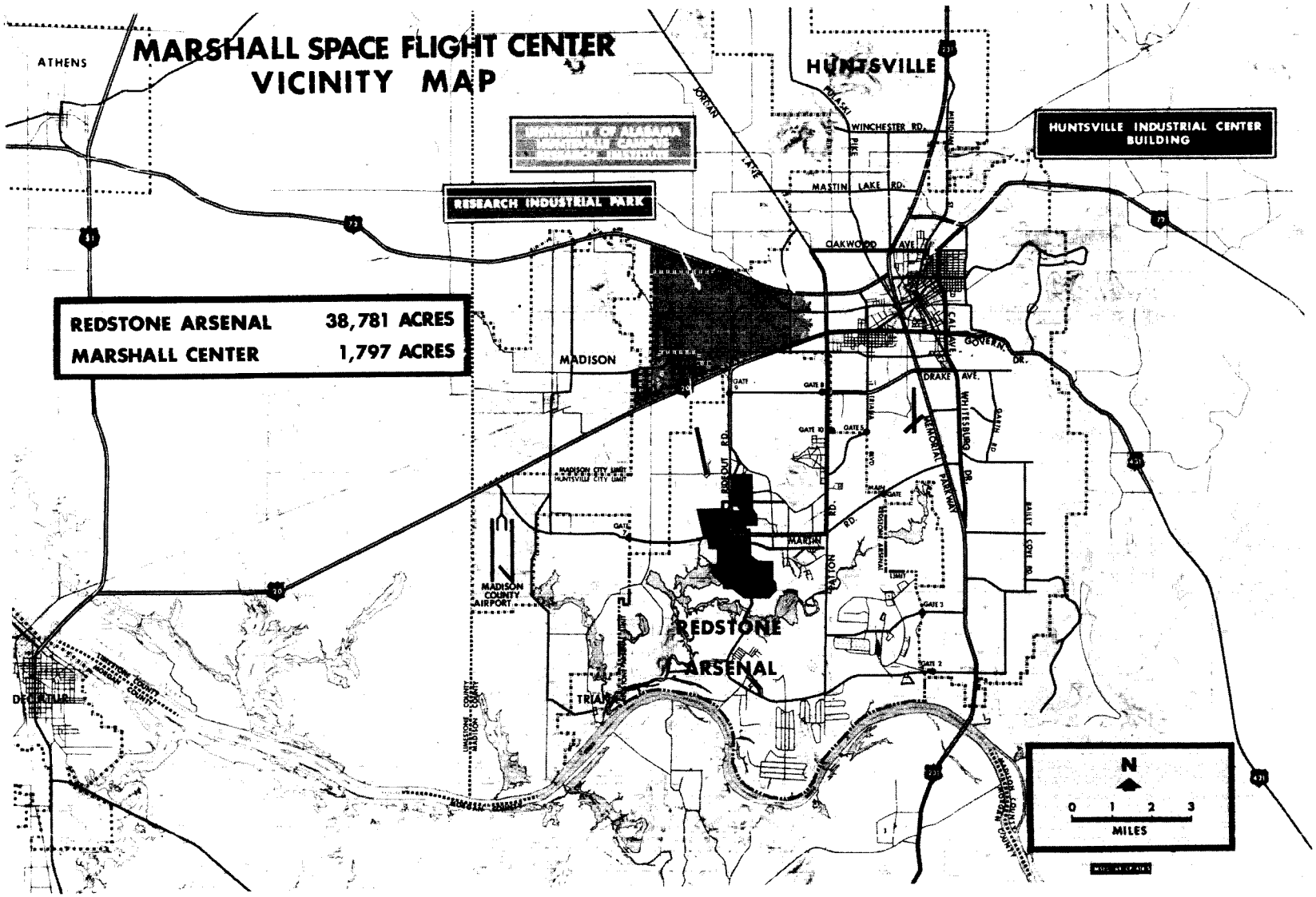
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GEORGE C. MARSHALL SPACE FLIGHT CENTER

FEBRUARY 2, 1973

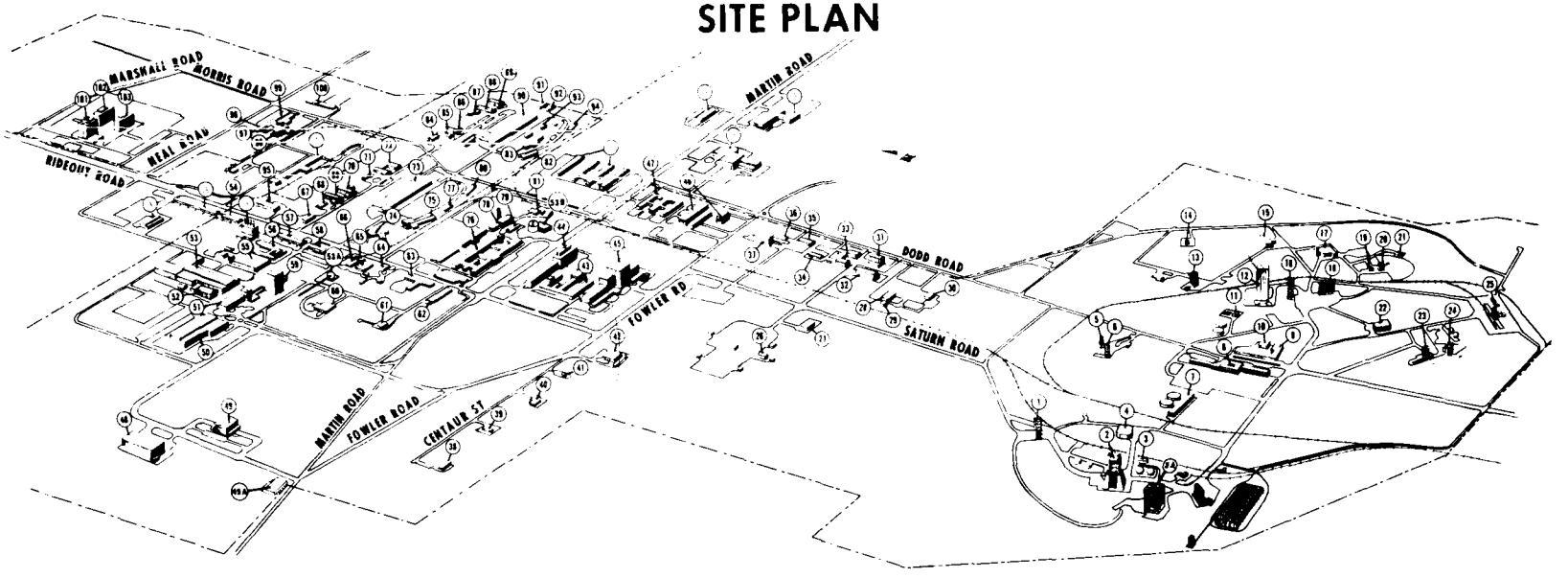


* FY-74 CEILING OF 4664 INVOLVES A 650 REDUCTION. IT WILL BE SOME MONTHS BEFORE INTERNAL CEILINGS AND ORGANIZATIONAL STRUCTURE ARE DETERMINED FOR THE REDUCED STAFFING LEVEL.

491-316 O - 73 (Follows p. RPM 66) No. 4


MARSHALL SPACE FLIGHT CENTER
VICINITY MAP
ATHENS
HUNTSVILLE
HUNTSVILLE INDUSTRIAL CENTER BUILDING
RESEARCH INDUSTRIAL PARK
REDSTONE ARSENAL 38,781 ACRES
MARSHALL CENTER 1,797 ACRES
MADISON
MADISON COUNTY AIRPORT
REDSTONE ARSENAL
DECATUR
TRIANA
WINCHESTER RD.
MASTIN LAKE RD.
OAKWOOD AVE.
GOVERN DR.
DRAKE AVE.
WHITESBURG DR.
MEMORIAL PARKWAY
RIDEOUT RD.
BATON RD.
JORDAN LAKE
PULASKI PIKE
GATE 1
GATE 2
GATE 3
GATE 5
GATE 8
GATE 10
N
0 1 2 3
MILES

MARSHALL SPACE FLIGHT CENTER
SITE PLAN



HEADQUARTERS AREA

95	4207	CENTRAL COMMUNICATIONS FACILITY
96	4241	STORAGE BUILDING
97	S-4244	BUTLER BUILDING (STORAGE AND SHOPS)
98	S-4251	SUPPORT SERVICES EQUIPMENT SHED
99	4250	TECHNICAL SERVICES OPERATIONS BUILDING
100	4249	SUPPORT SERVICES OPERATIONS AND MEDICAL CENTER
101	4200	CENTRAL LABORATORY AND OFFICE BUILDING
102	4202	PROJECT ENGINEERING BUILDING
103	4201	ENGINEERING AND ADMINISTRATION BUILDING

LAB AND SUPPORT AREA

38	4628	LOW TEMPERATURE TEST FACILITY
39	4622	LIQUID HYDROGEN TEST PAD
40	4623	ACCELERATOR AND TEST CELL FACILITY
41	4624	HYDROGEN PEROXIDE STATION
42	4605	NON-DESTRUCTIVE TEST LABORATORY
43	4617	MATERIALS LABORATORY
44	4610	ASTRONAUTICS LAB
45	4619	STRUCTURES AND MECHANICS LABORATORY
46	4650	TEST SHOP & INSTRUMENT LAB
47	4663	COMPUTATION LABORATORY
48	S-4755	VEHICLE COMPONENTS HANGER
49	S-4752	COMPONENTS AND SUBASSEMBLY ACCEPTANCE BLDG.
49A		INDUSTRIAL WASTE TREATMENT FACILITY
50	4708	ASSEMBLY AND INSPECTION HANGER
51	4760	SURFACE TREATMENT FACILITY
52	S-4706	NEUTRAL BUOYANCY SIMULATOR
53	4705	ASSEMBLY SHOP AND HANGER
53A	4775	EXPERIMENTAL TEST FACILITY
53B	4467	CELESTIAL SENSOR FACILITY
54	4723	MATERIAL TEST LABORATORY
55	4711	PRECISION MACHINE SHOP
56	4712	FIELD OFFICE BUILDING (MFG. ENG. LAB)
57	4727	MACHINE SHOP AND OFFICE BUILDING
58	4728	EQUIPMENT TEST SHOP
59	4707	COMPONENT HANGER & HYDROSTATIC TEST
60	4750	HIGH ALTITUDE TEST FACILITY
61	4748	LIQUID PROPELLANT TEST SUPPORT BUILDING
62	S-4747	AIR COMPPESSOR STATION
63	4746	OFFICE, TEST DIVISION
64	4741	BERYLLIUM FACILITY
65	4732	WIND TUNNEL FACILITY
66	4733	VACUUM TANK FACILITY
67	4306	SUPPORT OFFICES
68	4312	OFFICE BUILDING
69	4311	SHOCK TUNNEL FACILITY
70	4315	STRUCTURAL TESTING LABORATORY STORAGE
71	4332	ENVIRONMENTAL TEST LABORATORY
72	4331	TESTING AND DEVELOPMENT SHOP
73	4471	STORAGE AND OFFICE BUILDING
74	4485	FINANCIAL MANAGEMENT OFFICE BUILDING
75	4491	COMPUTATION/ADP LABORATORY
76	4487	GUIDANCE AND CONTROL BUILDING ASTRIONICS LAB
77	S-4479	STORAGE SHED
78	4476	ACCELERATION AND ENVIRONMENTAL TEST FACILITY
79	S-4436	AUTOMATION CHECKOUT BUILDING
80	4492	ELECTRICAL SYSTEM LABORATORY
81	4475	HAZARDOUS OPERATIONS LABORATORY
82	4493	MACHINE AND SHEET METAL SHOP
83	4483	VEHICLE MAINTENANCE SHOP
84	4352	NITROGEN STORAGE BUILDING
85	4351	ADMINISTRATIVE BUILDING
86	4353	PHOTOGRAPHIC LABORATORY
87	4372	EQUIPMENT STORAGE
88	4371	STORAGE AND OFFICES
89	4373	GSE LABORATORY
90	4481	ENGINEERING AND MACHINE SHOP/OFFICE
91	S-4436	STORAGE BUILDING (QUONSET)
92	S-4499	STORAGE BUILDING (QUONSET)
93	4482	OPERATIONS SUPPORT BUILDING
94	4494	MARS ACTIVITIES

TEST AREA

WEST AREA

1	4696	F-1 ENGINE TEST STAND
2	4670	SATURN STATIC TEST STAND (S-IC)
3	4664	HELIUM COMPRESSOR BUILDING
4	4676	CONTROL CENTER BUILDING
5		INTERIM TEST STAND
6		JUPITER "HOP" TEST STAND
7	4667	PUMP HOUSE
8	4668	TEST DIVISION ENGINEERING BUILDING
8A	4699	S-II STRUCTURAL TEST STAND

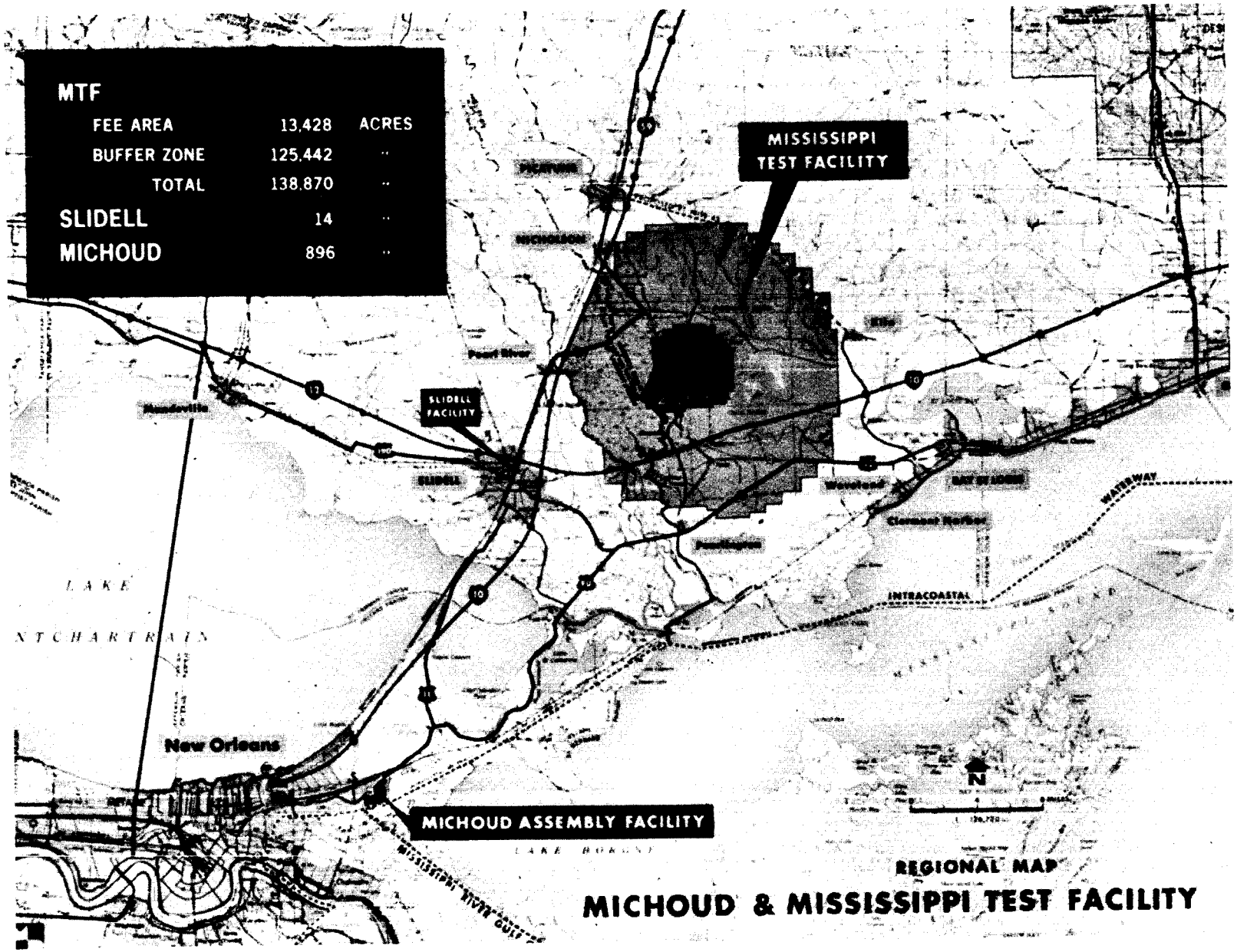
EAST AREA

9	4665	TECHNICAL DOCUMENTATION CENTER
10	4662	BOILER HOUSE AND PUMP STATION
11	S-4649	DEIONIZED WATER TREATMENT PLANT
12	4550	ADVANCED SATURN DYNAMIC TEST STAND
13	4522	TEST STAND (LOX-LH_2 COMPONENTS)
14	4530	TEST STAND (LOX-RP COMPONENTS)
15	4561	CONTROL AND SERVICE CENTER
16	4557	DYNAMIC TEST STAND (SATURN I/IB)
17	4503	COMPONENTS TEST LABORATOPY
18	4548	F-1 TUPBO TEST FACILITY
19	S-4539	TEST PREPARATION BUILDING
20	4540	ACOUSTIC MODEL TEST FACILITY
21	4541	CONTROL BUILDING
22	4570	BLOCKHOUSE
23	4564	POWER PLANT TEST STAND (H-1 ENGINE)
24	4514	LIQUID HYDROGEN FACILITY (S-IVB)
25	4572	STATIC TEST TOWER (S-IIB)

TEST SUPPORT AREA

26	4646	GSE TEST CONTROL CENTER
27	4648	HIGH PRESSURE FLUID TEST FACILITY
28	S-4659	SUPPORT BUILDING (N2 VAPORIZATION FAC)
29	S-4666	BOILER HOUSE
30	S-4647	GAS STORAGE & COMPRESSOR BLDG
31	S-4655	ENGINE PREPARATION BUILDING
32	S-4656	SATURN V GSE ASSEMBLY BUILDING
33	S-4653	COMPONENTS SUPPORT BUILDING
34	4675	SUB-STORES BUILDING
35	S-4654	TECHNICAL SYSTEMS WAREHOUSE
36	S-4651	SHOP BUILDING (QUONSET)
37	4649	TRANSPORTATION HANGER
		A - - ARMY BUILDINGS

MSFC-71-IND 435D

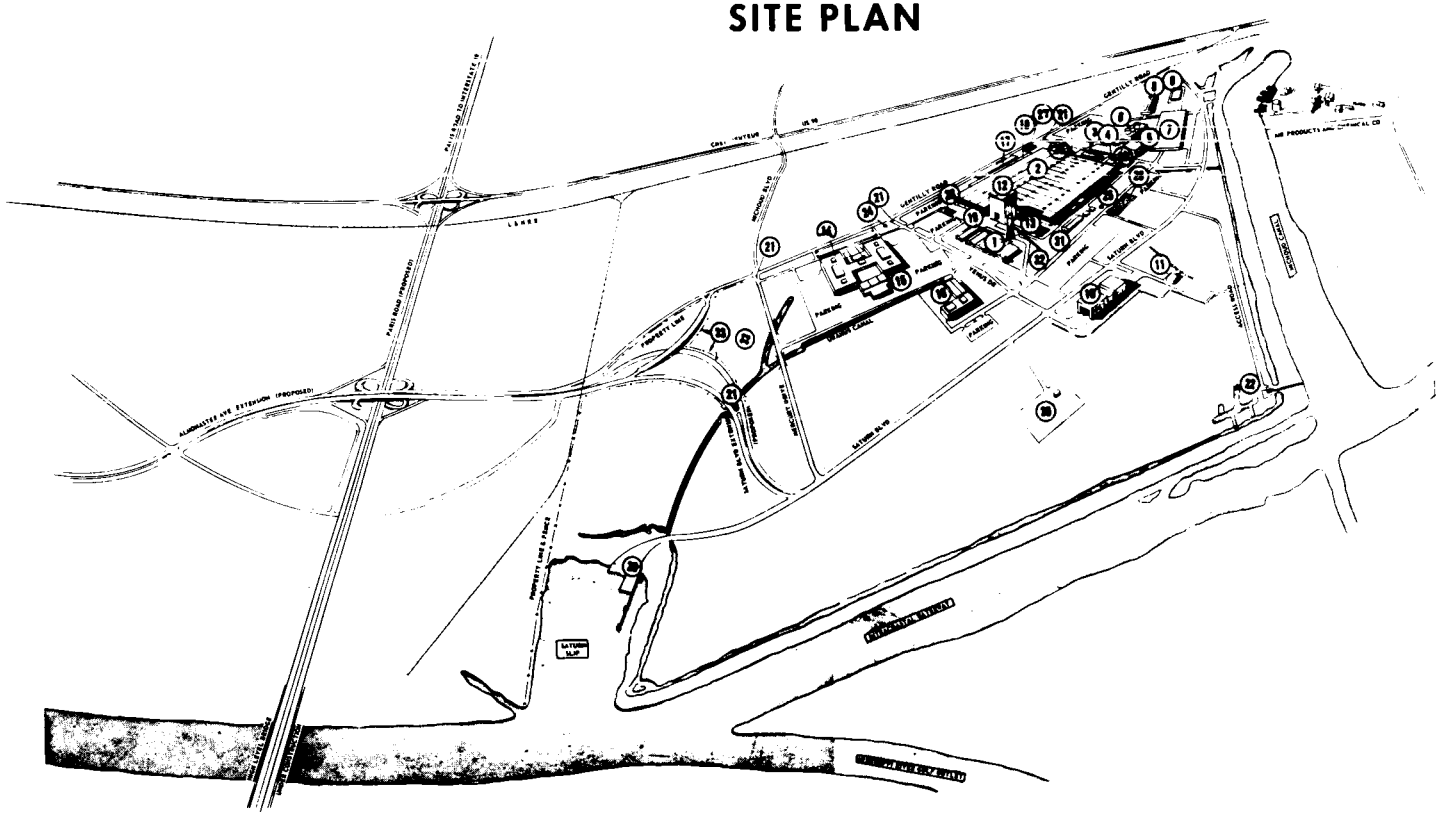


REGIONAL MAP

MICHOUD & MISSISSIPPI TEST FACILITY

MICHOUD ASSEMBLY FACILITY

SITE PLAN



MANUFACTURING AND ASSEMBLY

1	303	BOOSTER HANGAR
2	103	MANUFACTURING
3	111	LABORATORY
4	104	BATTERY CHARGING & STORAGE
5	207	BOILER HOUSE
6	202	COOLING TOWER
7	220	VEHICLE COMPONENT SUPPLY
8	203	MAINTENANCE SUPPLY
9	221	HAZARDOUS MATERIAL STORAGE

TEST FACILITIES

10	420	S-IC STAGE TEST & CHECKOUT FACILITY
11	404	HIGH PRESSURE TEST FACILITY
12	110	VERTICAL ASSEMBLY & HYDROSTATIC TEST
13	130	SYSTEMS ENGINEERING

ENGINEERING & ADMINISTRATION

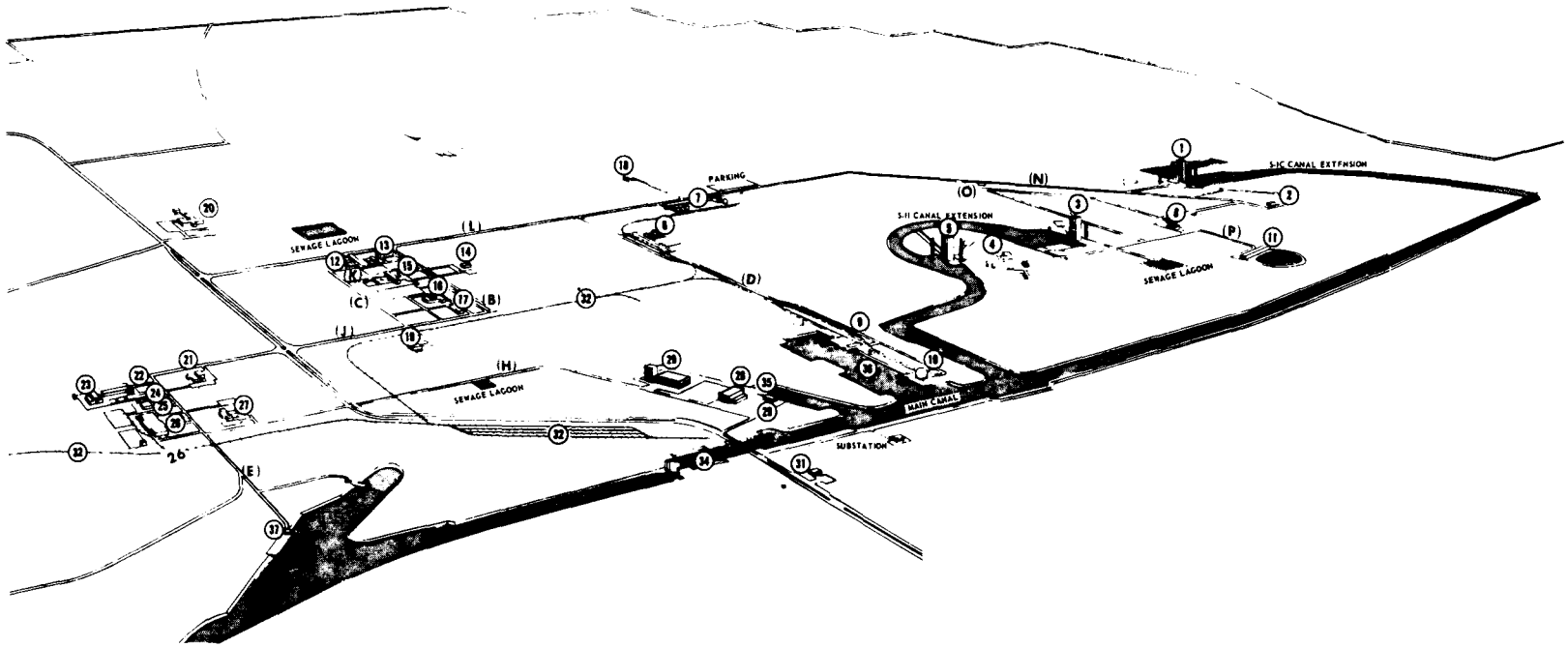
14	350	OFFICE AND ENGINEERING BUILDING
15	351	CAFETERIA
16	320	CONTRACTOR SERVICES BUILDING
17	101	ADMINISTRATION
18	102	ENGINEERING
19	301	MAINTENANCE SHOP

TRANSPORTATION, UTILITIES & MISC

20	480	SATURN BARGE DOCK
21		GUARD HOUSE
22	450	MAIN PUMP STATION
23	201	PUMP STATION NO 1
24	304	PUMP STATION NO 3
25	143	PUMP STATION NO 4
26	308	WEST MASTER SUBSTATION
27	121	MAIN SUBSTATION
28		CHEMICAL WASTE LAGOON
29	119	PAINT SHOP
30	403	SALVAGE YARD
31	105	TRANSPORTATION
32		ELEVATED WATER TOWER
33		SATURN BOULEVARD EXTENSION

MSFC-67-IND 8943B

MISSISSIPPI TEST FACILITY
SITE PLAN



SATURN V TEST COMPLEX

1	4220	SATURN S-IC STATIC TEST FAC. (DUAL POSITION)
2	4210	S-IC TEST CONTROL CENTER
3	4122	S-II POSITION A-2
4	4110	S-II TEST CONTROL CENTER
5	4120	S-II POSITION A-1
6	4995	DATA ACQUISITION CENTER
7	3305	HIGH PRESSURE GAS COMPRESSOR FACILITY
8		RP-1 STORAGE AND TRANSFER AREA
9		LH_2 TRANSFER AREA
10		LOX STORAGE AND TRANSFER AREA
11	4400	HI PR WATER STORAGE, PUMP, & DISTR SYSTEM

ENGINEERING AND ADMINISTRATION COMPLEX

12	1201	COMMUNICATIONS & TELEPHONE BUILDING
13	1200	TEST AREA CONTROL CENTER
14	1000	DATA HANDLING CENTER
15	1100	ENGINEERING AND ADMINISTRATION BUILDING
16	1105	ELECTRONICS INSTR & MATERIALS LAB
17	1110	SONIC MEASURING FACIL - ACOUSTIC LAB
18	8201	SONIC MEASURING FACIL - METEOROLOGY LAB
19	3204	CENTRAL HEATING PLANT

INDUSTRIAL COMPLEX

20	8100	COMPONENTS SERVICE FACILITY
21	2101	EMERGENCY SERVICES BLDG.
22	2201	SITE MAINTENANCE BLDG.
23	2205	TEST MAINTENANCE BLDG
24	2202	COMPRESSED GAS CYLINDER STORAGE
25	2203	INFLAMMABLE MATERIAL STORAGE
26	2204	WAREHOUSE
27	2105	MOBILE EQUIPMENT OPERATION BLDG.
28	3202	S-IC STAGE STORAGE BUILDING
29	3203	S-II STAGE STORAGE & C/O FAC.
30	3201	CRYOGENIC BARGE SERVICE BUILDING
31	3102	SECURITY CONTROL FACILITY

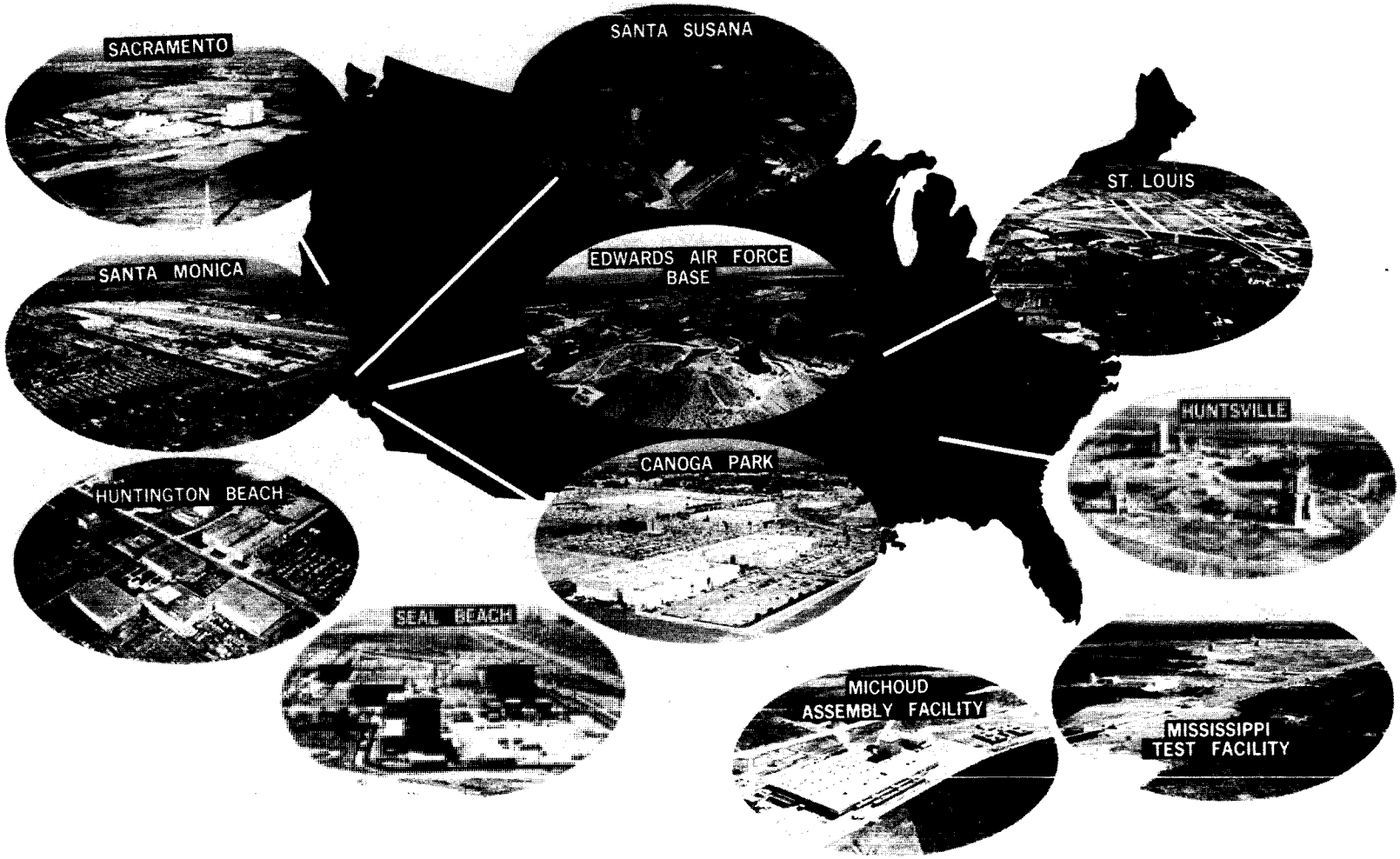
TRANSPORTATION & MISC.

32		RAILROAD & SWITCHING YARD
33	2402	RP-1 TRANSFER DOCK
34	2315	NAVIGATION LOCK & BRIDGE
35		BOOSTER TRANSFER DOCK
36		CRYOGENIC DOCK & CANAL EXTEN
37	2401	CONSTRUCTION DOCK

MSFC-67-IND 7816K

491-316 O - 73 - 12

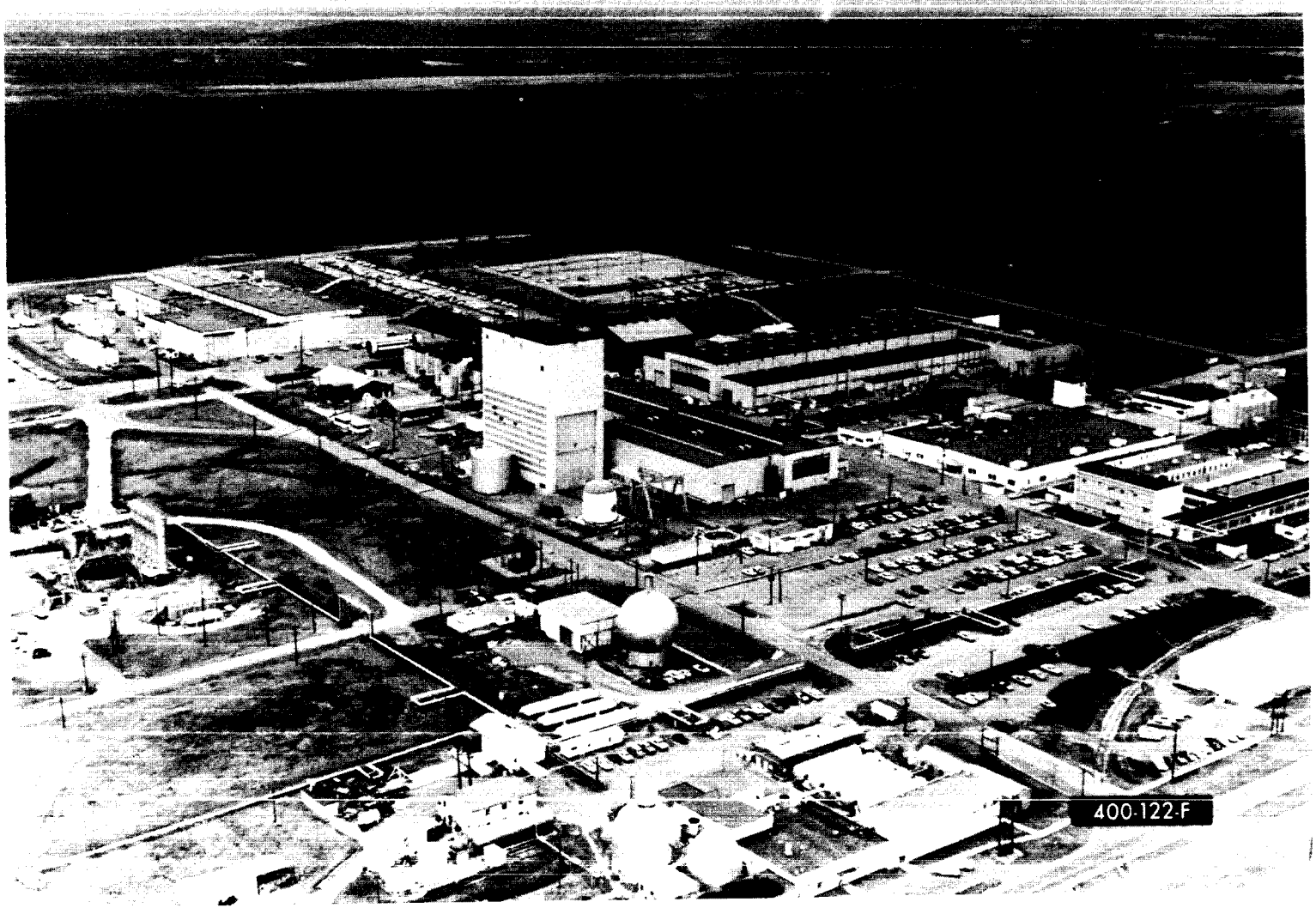
MARSHALL SPACE FLIGHT CENTER
PROGRAM FACILITIES



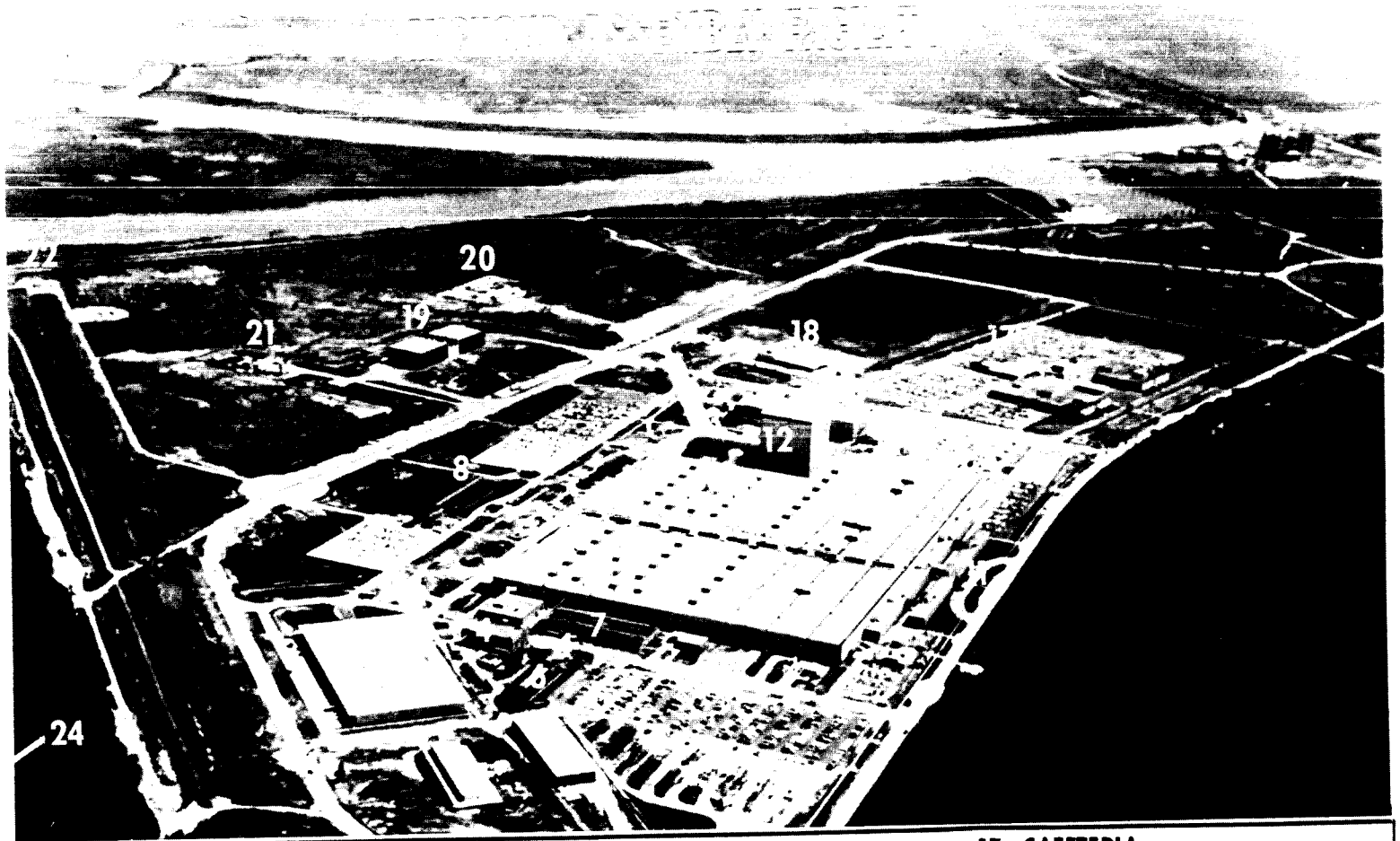
MSFC-71-CP 400-218C

AERIAL VIEW OF LOAD TEST ANNEX
HUNTSVILLE
ASTRO. LAB.
P&VE LAB.
LOAD TEST ANNEX
RDO B400-135E

PROD. ENGR. & PROC. TECH. LAB.
HUNTSVILLE



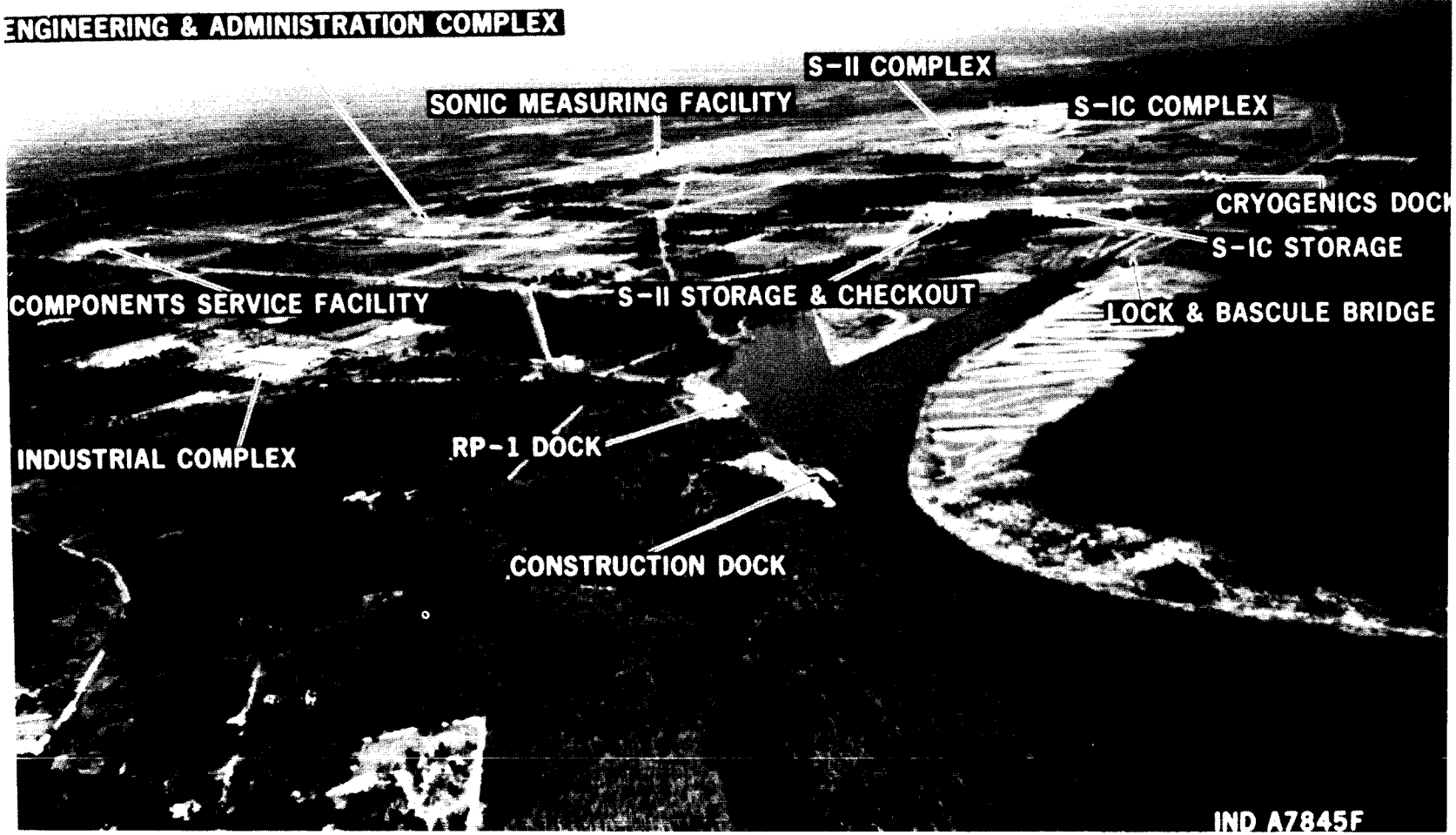
EAST TEST AREA–HUNTSVILLE
SAT. V DYNAMIC TEST STAND
SAT. IB DYNAMIC TEST STAND
F-1 TURBOPUMP
H-1 TEST STAND
S-IVB TEST STAND
SAT. IB/F-1 STATIC
TEST STAND
MSFC-69-S&E-400-215A



1. MAINTENANCE SUPPLY
2. HAZARDOUS MATLS STORAGE
3. VEHICLE COMPONENT SUPPLY
4. BOILER PLANT & FUEL TANKS
5. BATTERY CHARGING
6. COOLING TOWER
7. LABORATORY
8. CHEMICAL WASTE RESERVOIR
9. CHRYSLER FAB AREA (S-IB)
10. BOEING FAB AREA (S-IC)
11. ENGINEERING BUILDINGS
12. VERT ASSY & HYDROSTATIC TEST
13. SYSTEMS ENGINEERING BLDG
14. BOOSTER HANGAR
15. MAINTENANCE
16. ENGINEERING & OFFICE BLDG
17. CAFETERIA
18. CONTRACTOR SERVICES BLDG
19. STAGE TEST & CHECK OUT
20. SALVAGE YARD
21. HIGH PRESSURE TEST FACILITY
22. MAIN PUMPING STATION
23. BARGE DOCK
24. LOX & LH_2 PLANT

IND 8904F

MISSISSIPPI TEST FACILITY—AERIAL VIEW



STAGE AND ENGINE TESTING
SANTA SUSANA
BRAVO
CANYON
DELTA
CTL-3
BOWL
CTL-5
COCA
MSFC-67-IND 433

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

GODDARD SPACE FLIGHT CENTER

MISSION

The Goddard Space Flight Center, established in 1959 as the first major United States installation devoted to the investigation and exploration of space, conducts a wide-ranging program of experimentation in space science and applications. The Goddard Center has developed many diverse capabilities: the management of complex satellite projects; the development of wholly integrated spacecraft, ranging from systems engineering to development, integration, and testing; the development and operation of satellite tracking networks; data acquisition and analysis; and scientific research to include both theoretical studies and the development of many significant scientific experiments flown in satellites.

The majority of the Goddard Center's personnel are located at Greenbelt, Md.; other personnel are located at the Goddard Institute for Space Studies in New York City, and throughout the world, managing the operation of satellite tracking and communications network stations.

Goddard is responsible for the management of communications and earth observation satellite projects, such as the Applications Technology (ATS), Nimbus and Earth Resources Technology Satellites (ERTS); management of scientific satellite projects which include the Orbiting Solar Observatory (OSO), the Orbiting Astronomical Observatory (OAO), and the Explorer series; project management of the Delta launch vehicle; management and operation of the world-wide Spaceflight Tracking and Data Network (STDN) and NASA Communications Network (NASCOM); and the Center carries out an extensive sounding rocket program.

Major Goddard activities during the year were in the following areas:

Applications Satellites - Goddard is presently involved with several key applications satellite projects. They are the Synchronous Meteorological Satellite (SMS), the Earth Resources Technology Satellite (ERTS) and the Applications Technology Satellite (ATS). The SMS will provide continuous weather coverage from a geostationary orbit on an operational basis. The Earth Resources Technology Satellite is presently providing high quality images of the earth and aiding in a wide variety of earth resource disciplines. The ATS-F will be a highly flexible spacecraft carrying advanced meteorological, communications, air traffic control and scientific experiments. Nimbus-5, now in orbit, provides additional data on instruments designed to help in weather analysis and prediction.

491-316 O - 73 - 13

Scientific Satellites - During the past year Goddard-managed scientific satellites have continued to probe the complex nature of our solar system and the universe. OAO-Copernicus, carrying a 32-inch telescope, was launched in August 1972. Explorer 47 (IMP-H), launched in September 1972, continues the investigation of the interplanetary magnetic field and the magnetosphere that surrounds the earth. A Small Astronomy Satellite was launched from a launch platform near the equator to continue gamma radiation studies.

International Programs - Goddard continues in its responsibility to carry out international cooperative efforts in space exploration. During the past year technical assistance and launch support were provided for two European Space Research Organization satellites, HEOS-2, and TD-1. The Canadian communications satellite ANIK-1 was launched aboard a NASA Delta rocket. The German aeronomy satellite AEROS was launched by a NASA Scout rocket. Several other cooperative programs with the Netherlands, Germany, Canada and Great Britain will result in spacecraft launchings within the next several years.

Tracking and Data Acquisition - The Goddard-managed Spaceflight Tracking and Data Network (STDN) provided tracking and communications coverage for all of NASA's satellites. The Apollo Subnet of the STDN provided the tracking support for all Apollo lunar missions and will provide the tracking for the earth-orbiting Skylab missions.

Sounding Rockets - During 1972 more than 80 sounding rocket launchings, primarily from Wallops Station, Virginia, were conducted by Goddard bringing to just under 1600 the number of sounding rocket launchings in the program since 1959.

DESCRIPTION

The Goddard Space Flight Center, located 15 miles northeast of Washington, D. C., at Greenbelt, Maryland, is situated on a 554-acre main site. Three additional nearby plots of 639 acres comprise the remote site area and contain the Goddard Antenna Test Range, the Goddard Optical Facility, the Propulsion Research Facility, the Magnetic Fields Component Test Facility, the Attitude Control Test Facility, and the Network Training and Test Facility.

The total capital investment for the Goddard Space Flight Center, including fixed assets in progress and contractor-held facilities at various locations as of June 30, 1972 was $690,601,000 (including capital type facilities of the network and other supporting activities including equipment aboard ships and aircraft).

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

Functions	1972	1973	1974
Personnel	$80,593,000	$80,447,000	$79,384,000
Travel	2,231,000	2,255,000	2,216,000
Facilities Services	5,463,000	5,003,000	5,169,000
Technical Services	3,984,000	2,584,000	2,540,000
Administrative Support	4,185,000	4,180,000	4,348,000
Total, fund requirements	$96,456,000	$94,469,000	$93,657,000

	1972	1973	1974	Change in 1974
I. PERSONNEL	$80,593,000	$80,447,000	$79,384,000	$-1,063,000

Basis of Fund Requirements:

	1972	1973	1974
A. Compensation and Benefits			
1. Compensation			
a. Permanent positions	$72,918,000	$71,822,000	$70,901,000
b. Nonpermanent positions	405,000	506,000	481,000
c. Reimbursable details	69,000	47,000	47,000
d. Overtime and other compensation	513,000	551,000	542,000
Subtotal, Compensation	$73,905,000	$72,926,000	$71,971,000
2. Benefits	$ 6,245,000	$ 6,850,000	$ 6,648,000
Subtotal, Compensation and Benefits	$80,150,000	$79,776,000	$78,619,000
B. Supporting Costs			
1. Transfer of personnel	$ 59,000	$ 178,000	$ 171,000
2. Personnel training	384,000	493,000	594,000
Subtotal, Supporting Costs	$ 443,000	$ 671,000	$ 765,000

	1972	1973	1974
Total Personnel and Related Costs.....	$80,593,000	$80,447,000	$79,384,000
1. Compensation.....	$73,905,000	$72,926,000	$71,971,000
a. Permanent positions....	$72,918,000	$71,822,000	$70,901,000

The cost of compensation for permanent positions is the largest part of Personnel and Related Costs. The funds shown above will support 3,966 permanent positions in 1973 and 3,808 in 1974, a total reduction from 1972 of 253. The reduction of 158 in 1974 is related to the suspension of HEAO, and the phase-out of the communications program, including the cancellation of ATS-G.

Over two-thirds of Goddard's permanent positions are used in direct support of the various R&D programs. The following table summarizes the actual and planned utilization of positions for direct program activity and for indirect support.

Permanent Positions by Programs:	1972	1973	1974
Direct Positions			
Manned Space Flight	27	45	34
Space flight operations.....	14	29	20
Space shuttle.....	4	10	11
Apollo.....	9	6	3
Space Science	1,360	1,225	1,190
Physics and astronomy.....	1,169	1,041	1,000
Lunar and planetary exploration..	137	128	136
Launch vehicle procurement.....	54	56	54
Applications	668	750	636
Space applications.....	668	750	636
Aeronautics and Space Technology	76	55	52
Space research and technology....	76	55	52
Tracking and Data Acquisition	805	723	709
Technology Utilization	1	5	4
Subtotal, direct positions....	2,937	2,803	2,625

	1972	1973	1974
Indirect Positions			
Director and staff.....	19	23	23
Administrative support.....	811	843	860
Research and development support...	294	297	300
Subtotal, indirect positions.....	1,124	1,163	1,183
Total, permanent positions.....	4,061	3,966	3,808
Other than Permanent Positions.....	330	325	310
Total positions.....	4,391	4,291	4,118

The above table illustrates the use of civil service positions. The distribution by occupation of our positions illustrates a significant characteristic of the Goddard work force professional engineers and scientists comprise approximately 46% of the Center work force. Technicians and technically oriented wage board employees, working in direct support of the professional technical staff, make up another 23% of the complement.

The following table summarizes by occupational group the Center's work force:

	1972		1973		1974	
Occupational Group	Number	Percent	Number	Percent	Number	Percent
Professional scientists and engineers.	1,891	46.6	1,786	45.0	1,750	46.0
Technicians.....	796	19.6	768	19.4	739	19.4
Wage Board.....	167	4.1	165	4.2	165	4.3
Professional administrative.....	602	14.8	609	15.3	587	15.4
Clerical.....	605	14.9	638	16.1	567	14.9
Total	4,061	100.0	3,966	100.0	3,808	100.0

Basis Of Cost For Permanent Positions

The estimate for permanent compensation is based upon the position structure at the start of the year, as modified by the addition of new positions and abolishment of existing positions, within grade advances, career development, etc. After these modifications, the year-end position structure is established and the cost effect for the year is calculated based on the estimated period that these modifications are in effect.

In 1974 the cost of permanent positions will be $70,901,000, a reduction of $921,000 from 1973. This reduction results as follows:

Cost of permanent positions in 1973.....		$71,822,000
Cost of increases in 1974:		
Within grade advances and career development:		1,730,000
Full Year effect of 1973 actions.....	$830,000	
Partial year effect of 1974 actions.....	900,000	
Cost decreases in 1974		-2,651,000
Full year effect of 1973 actions.....	-1,145,000	
Partial year effect of 1974 actions.....	-703,000	
Turnover savings.....	-803,000	
Cost of permanent positions in 1974.....		$70,901,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent positions	$405,000	$506,000	$481,000

These positions will be used to support the following programs at approximately the levels indicated:

Program	Positions
College Cooperative Training	56
Summer Employment	85
Youth Opportunity	160
Temporary Clerical	9

The College Cooperative Training Program provides alternating work and study periods providing the student with practical experience and academic training. The program is an excellent source for recruiting individuals where requirements exist for highly specialized training.

The Summer Employment Program employs high school and college students and faculty members. The summer program provides them with an insight into NASA programs and governmental operations.

The Youth Opportunity Program is conducted within the national policy which enables disadvantaged youths to work at unskilled jobs both during the summer and throughout the regular school year.

The Temporary Clerical Program is necessary to provide short-term support in positions occupied by permanent employees who are absent from work because of illness, vacation, maternity, or training.

c. Reimbursable details.....	$69,000	$47,000	$47,000

The services of a small group of military officers is utilized in Goddard's programs where such assignments are of mutual benefit. In accordance with existing agreements, Goddard reimburses the Department of Defense for the salaries and related costs of the detailees.

d. Overtime and other compensation	$513,000	$551,000	$542,000

Overtime at Goddard is required to meet peak operational requirements where additional man-hours of work are essential, generally culminating in the launch of a manned or automated spacecraft. Some of the areas involved are fabrication, experimentation, testing, launching, and tracking of the spacecraft.

2. Benefits.....	$6,245,000	$6,850,000	$6,648,000

In addition to compensation, Goddard makes an employer's contribution to personnel benefits as authorized and required by law. The following table indicates the costs of personnel benefits by the major categories:

Category of Cost			
Contribution to the Civil Service Retirement Fund.....	$5,090,000	$5,034,000	$4,983,000
Contribution for employee life insurance.....	262,000	260,000	252,000
Contribution for employee health insurance.....	739,000	785,000	760,000
Contribution to FICA.....	9,000	12,000	12,000
Incentive awards.....	42,000	42,000	42,000
Other personnel benefits.....	10,000	10,000	10,000
Severance pay.....	93,000	707,000	589,000
Total.....	$6,245,000	$6,850,000	$6,648,000

The largest part of personnel benefits is the Center's contribution to the Civil Service Retirement Fund.

The Center's contribution toward the cost of employee life and health insurance is based upon employee participation. FICA or social

security contributions are for nonpermanent employees who are not covered by the Civil Service Retirement Fund.

The incentive awards program provides for cash awards for outstanding contributions to Goddard, employees' superior performance and for improvement of the Center's operations. The cost of the program remains relatively stable. Other personnel benefits provide for such items as uniform allowances.

The severance pay estimate is related to the legal requirement of severance pay for employees who are involuntarily separated from the rolls through no fault of their own. The amounts shown are related to the reductions-in-force necessary to attain the end year employment ceilings.

	1972	1973	1974
B. Supporting Costs.....	$443,000	$671,000	$765,000

Supporting personnel costs provide for the expenses of moving employees to their initial duty station or reassignment and for maintaining and expanding the skills of our employees. These costs are summarized as follows:

1. Transfer of personnel.....	$59,000	$178,000	$171,000

This category includes the reimbursement to employees of movement of household goods to the employees new duty station and other relocation expenses. The estimated costs are based on historical average cost and the planned number of moves.

2. Personnel training.....	$384,000	$493,000	$594,000

The personnel training costs for 1974 are based on continuation of current training programs and the need to reorient skills of employees into areas compatible with the direction of the space program in the 1970's and Goddard's role in the program. A prime objective is career development to permit employees to advance to more responsible positions and to provide the Center with highly motivated and experienced personnel not readily available in the labor market. Part of the training consists of courses offered by other government agencies, usually for a fee. The remainder of the training is provided by local colleges, universities, technical and management institutes, and seminars and workshops in which groups of NASA employees receive training in subjects of agency-wide interest.

The increase in FY 1974 is due to a $50,000 increase in the cost for the Goddard Research Engineering Management Exercise instruction course, and in addition, a rise in costs of tuition for local academic courses.

	1972	1973	1974	Change in 1974
II. TRAVEL.....	$2,231,000	$2,255,000	$2,216,000	$ -39,000

Basis of Fund Requirements

Summary of Travel by Major Category

	1971	1972	1973
A. Program Related Travel			
1. Direction, coordination and management of Research and Development and Construction of Facilities program activities.....	$1,341,000	$1,412,000	$1,412,000
2. Flight mission support.....	251,000	260,000	260,000
3. Overseas travel to launch and tracking sites.....	343,000	296,000	257,000
Subtotal.....	$1,935,000	$1,968,000	$1,929,000
B. Meetings and Technical Seminars			
1. Government-sponsored meetings.....	$ 38,000	$ 48,000	$ 48,000
2. Other than government-sponsored meetings and technical seminars.....	180,000	151,000	151,000
Subtotal.....	$ 218,000	$ 199,000	$ 199,000
C. Administrative Travel.....	$ 78,000	$ 88,000	$ 88,000
TOTAL TRAVEL.....	$2,231,000	$2,255,000	$2,216,000
A. Program Related Travel.....	$1,935,000	$1,968,000	$1,929,000

Program related travel is the travel most directly related to the mission of Goddard Space Flight Center. It is the largest part of the travel function and accounts for approximately 87% of the travel requirements for 1974.

1. Direction, coordination, and management of programs.....	$1,341,000	$1,412,000	$1,412,000

491-316.O - 73 - 14

The largest individual part of program related travel is for direction, coordination, and management of Research and Development and Construction of Facilities program activities. Goddard has approximately 200 active R&D contracts in excess of $100,000. Technical officers are required to review contractors' performance at design reviews, fabrication, and during integration and test of the spacecraft. A substantial amount of travel is required to coordinate the interface of experiments with the spacecraft. Due to the numerous technical problems associated with R&D effort it is imperative that government monitoring of the contractor performance is accomplished to maintain schedule and cost controls.

	1972	1973	1974
2. Flight mission support.....	$ 251,000	$ 260,000	$ 260,000

As projects reach the flight stage, support is required for prelaunch and postlaunch activities. The amount of travel required for this purpose is directly related to both the number and complexity of the launches. The estimate for 1974 is in consonance with the planned launch schedule in 1974, including such major launches as OSO-I, IMP-J, AE-C, and ATS-F.

3. Overseas travel to launch and tracking sites.....	$ 343,000	$ 296,000	$ 257,000

Overseas travel to launch and tracking sites includes travel required for instrumentation of the tracking sites, and inspection of the sites prior to launch. The San Marco platform off the east coast of Africa is used as a launch site for several launches per year. In addition, sounding rockets are launched in various parts of the world such as Alaska, Canada, and South America.

B. Meetings and Technical Seminars	$ 218,000	$ 199,000	$ 199,000

Travel to meetings and technical seminars permits employees engaged in Research and Development activities to participate at both government sponsored and non-government sponsored meetings and technical seminars with other representatives of the aerospace community. The participation allows personnel to benefit from exposure to advances in the field which arise outside NASA, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the government sponsored meetings are made up of working panels covened to solve certain problems for the benefit of the government. Authorization to attend meetings of the types described is granted only after assurance that attendance will be in the best interest of NASA. Included among the non-government sponsored meetings are the American Astronautical Society, the American Geophysical Union, the American Association for the Advancement of Science, the Institutes of Electrical and Electronic Engineers and the Committee on Space Research.

	1972	1973	1974
C. Administrative Travel.....	$ 78,000	$ 88,000	$ 88,000

Administrative travel includes travel for the direction and coordination of general management matters. It includes travel by functional managers in such areas as personnel, financial management, and procurement. This category also includes the cost of travel in and around the centers, including bus and taxi services and rental of motor vehicles, and travel of unpaid members of research advisory committees.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES	$5,463,000	$5,003,000	$5,169,000	+$166,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Rental of real property....	$ 197,000	$ 89,000	$ 90,000
2. Minor rehabilitation and modification, and construction.....	207,000	92,000	34,000
Subtotal.....	$ 404,000	$ 181,000	$ 124,000
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds.....	$ 790,000	$ 599,000	$ 592,000
2. Maintenance of equipment...	214,000	249,000	249,000
3. Custodial services.....	1,454,000	1,282,000	1,305,000
Subtotal.....	$2,458,000	$2,130,000	$2,146,000
C. Operation of Facilities			
1. Utilities.....	$1,840,000	$2,085,000	$2,276,000
2. Supplies and equipment.....	761,000	607,000	623,000
Subtotal.....	$2,601,000	$2,692,000	$2,899,000
Total, Facilities Services.....	$5,463,000	$5,003,000	$5,169,000

	1972	1973	1974
A. Acquisition of Facilities.....	$ 404,000	$ 181,000	$ 124,000
1. Rental of real property....	197,000	89,000	90,000

Rental of land and property is required to house personnel and provide storage and warehouse space for equipment, supplies and materials where space is not available in government-owned facilities.

2. Minor rehabilitation and modification and construction	207,000	92,000	34,000

This activity provides for additions, modifications and minor construction of facilities within statutory limitations.

B. Maintenance and Related Services.....	$2,458,000	$2,130,000	$2,146,000
1. Maintenance of buildings and grounds.....	790,000	599,000	592,000

This activity provides for maintenance of buildings, grounds, and utility systems. This service provides only cyclic maintenance and minor breakdown repair. This includes items such as 25 buildings comprising 2,191,000 square feet, 1,092 acres of ground, 489 acres of surfaced areas and utility systems with a value of $8,833,000.

2. Maintenance of equipment...	214,000	249,000	249,000

Maintenance of equipment consists of work necessary to keep all equipment operational. This equipment includes such items as office typewriters, calculators, copiers and miscellaneous mechanical and shop equipment.

3. Custodial services.....	1,454,000	1,282,000	1,305,000

Custodial services include security, janitorial, laundry activities and refuse handling. Security is provided by a support service contractor utilizing 48 manyears of effort. The janitorial services are also provided by a support service contractor requiring 110 manyears of effort. Higher wage rates are anticipated in the janitorial contract in FY 1974.

C. Operation of Facilities.....	$2,601,000	$2,692,000	$2,899,000
1. Utilities.....	1,840,000	2,085,000	2,276,000

The cost of utilities, electricity, gas, water, etc., is paid for from R&PM funds. The increased cost in 1974 is due primarily to anticipated increased electric power rates.

	1972	1973	1974
2. Supplies and equipment.....	761,000	607,000	623,000

The supplies, materials, and equipment used in the operation of the GSFC facilities is budgeted for in this subcategory. The amount required is based on the number of personnel supported, the number of facilities operated and the level of equipment replaced.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES.....	$3,984,000	$2,584,000	$2,540,000	$-44,000

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment.....	$2,001,000	$1,225,000	$1,223,000
2. Purchase of equipment.....	405,000	---	15,000
3. Maintenance of equipment...	54,000	65,000	30,000
Subtotal, equipment....	$2,460,000	$1,290,000	$1,268,000
4. Programming and operations.	598,000	606,000	577,000
Subtotal.....	$3,058,000	$1,896,000	$1,845,000
B. Engineering Services.....	$ 81,000	$ 56,000	$ 56,000
C. Scientific and Technical Information and Educational Programs			
1. Operation of NASA technical libraries.....	$ 595,000	$ 355,000	$ 355,000
2. Educational/informational programs.....	139,000	145,000	145,000
3. Scientific and technical information.....	111,000	132,000	139,000
Subtotal.....	$ 845,000	$ 632,000	$ 639,000
Total, Technical Services	$3,984,000	$2,584,000	$2,540,000

	1972	1973	1974
A. Automatic Data Processing.....	$3,058,000	$1,896,000	$1,845,000

The R&PM appropriation provides for the lease, purchase, maintenance, and programming and operations services of ADP equipment which is not dedicated to specific research or operational systems and is not funded from the Research and Development appropriation. The reduction in costs in 1974 results primarily from conversion of business data operations from IBM 1410 to IBM 360, which reduces both maintenance and operation costs.

B. Engineering Services.....	$ 81,000	$ 56,000	$ 56,000

Engineering services provide for engineering design and drafting services for the design of minor construction, repair and alteration projects, and other related engineering services.

C. Scientific and Technical Information and Educational Programs.....	$ 845,000	$ 632,000	$ 639,000

Included in these programs are the operating costs of GSFC's technical library, the educational/informational programs, and the scientific and technical information services. The costs are summarized as follows:

1. Operation of technical libraries.....	$ 595,000	$ 355,000	$ 355,000

The technical library provides reference, acquisition, cataloging, translating and dissemination services to all employees. The library collection includes over 60,000 books, 35,000 volumes of bound journals and 1,800 current journals.

2. Educational/Informational Programs.....	$ 139,000	$ 145,000	$ 145,000

The educational/informational programs provide for the gathering and dissemination of information about the agency's programs to the mass communications media, the general public, and to the educational community at the elementary and secondary levels. Assistance to the communications media includes the gathering and exposition of newsworthy material in support of their requests, and takes such forms as press kits, news releases, television and radio information tapes and clips, and feature material.

Research, development and operational missions in aeronautics and space provide substantive knowledge and serve as an educational stimulus to students and teachers. GSFC responds to expressed needs of students and teachers by developing curriculum supplements in space-related areas such as physics, biology, chemistry, and math; assisting teacher workshops

and professional education meetings; sponsorship of the Youth Science Congresses; and participation in science fairs.

	1972	1973	1974
3. Scientific and technical information.....	$ 111,000	$ 132,000	$ 139,000

This category includes the cost of programs designed to collect, identify and disseminate scientific and technical information. Included are technical writing, patent applications, drafting and preparation, editorial services, scientific editing, publication, and chart and art work.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT SERVICES.....	$4,185,000	$4,180,000	$4,348,000	+$168,000

Basis of Fund Requirements

Summary of Administrative Support Services

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$ 566,000	$ 750,000	$ 780,000
2. Local telephone service...	851,000	905,000	950,000
3. Other communications.....	13,000	12,000	13,000
Subtotal.....	$1,430,000	$1,667,000	$1,743,000
B. Administrative Printing and Reproduction.....	$ 116,000	$ 114,000	$ 120,000
C. Supplies, Materials, and Equipment			
1. Supplies and Materials....	$ 378,000	$ 394,000	$ 414,000
2. Equipment.....	415,000	279,000	229,000
Subtotal.....	$ 793,000	$ 673,000	$ 643,000
D. Transportation			
1. Center operations.....	$ 5,000	$ 5,000	$ 7,000
2. Common carrier.....	1,238,000	1,207,000	1,319,000
Subtotal.....	$1,243,000	$1,212,000	$1,326,000

	1972	1973	1974
E. Administrative Support Services			
1. Installation support services	$ 367,000	$ 242,000	$ 242,000
2. Medical and Safety services	236,000	272,000	274,000
Subtotal	$ 603,000	$ 514,000	$ 516,000
Total, Administrative Support Services	$4,185,000	$4,180,000	$4,348,000
A. Communications	$1,430,000	$1,667,000	$1,743,000

Included in this estimate are the costs of leased lines, long distance tolls, local telephone exchange services, and other communications. Costs for certain operational communications related to flight activities and dedicated leased lines are excluded from the Research and Program Management appropriation, but are included in the relevant program in the Research and Development appropriation. Increases for FY 1973 and FY 1974 are attributable to rate increases in FTS service.

B. Administrative Printing and Reproduction	$ 116,000	$ 114,000	$ 120,000

Estimates for administrative printing include funds for contractual printing and reproduction and the related composition and binding operations. This includes services performed by other agencies, chiefly the Government Printing Office, or by commercial printing firms. All common processes of duplicating, including photostating, blueprinting, microfilming, and other photographic reproductions, are included.

C. Supplies, Materials and Equipment	$ 793,000	$ 673,000	$ 643,000
1. Supplies and Materials	$ 378,000	$ 394,000	$ 414,000

The requirements in this category include general maintenance materials, office supplies, computer supplies, print shop supplies and materials for the motor pool and mailroom.

2. Equipment	$ 415,000	$ 279,000	$ 229,000

This includes motor vehicles and transportation equipment, typewriters, calculators, copiers, furniture, microfilm readers and printers and mail handling equipment.

	1972	1973	1974
D. Transportation.....	$1,243,000	$1,212,000	$1,326,000

Transportation services include local motor pool operations and associated services, as well as the movement of supplies, materials, equipment, and related items by common carrier.

The increase for FY 1974 is primarily to cover wage raises already awarded the on-site contractor's Teamsters' Union employees.

E. Administrative Support Service.	$ 603,000	$ 514,000	$ 516,000

Administrative support services include those services which support the installation generally, such as logistics support, supply operations, mail and messenger services, center medical services, and the on-site support contractor for Xerox operations.

491-316 O - 73 - 15

	73	74
WAGE BOARD	165	165
TOTAL	3966	3808

	73	74
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	7	7

	73	74
WAGE BOARD	-	-
TOTAL	16	16

METEOROLOGY PROGRAM OFFICE

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	6	6
GS 14	3	3
ALL OTHER GS	11	13
WAGE BOARD	-	-
TOTAL	20	22

DIRECTOR SYSTEMS RELIABILITY

	73	74
EXCEPTED	2	2
GS 16	-	-
GS 15	3	3
GS 14	4	4
ALL OTHER GS	4	3
WAGE BOARD	-	-
TOTAL	13	12

TEST AND EVALUATION DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	11	11
GS 14	30	30
ALL OTHER GS	140	140
WAGE BOARD	-	-
TOTAL	182	182

QUALITY ASSURANCE DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	12	12
ALL OTHER GS	52	54
WAGE BOARD	-	-
TOTAL	69	71

DIRECTOR ADMINISTRATION AND MANAGEMENT

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	8	8
GS 14	8	8
ALL OTHER GS	48	48
WAGE BOARD	1	1
TOTAL	66	66

PROCUREMENT DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	6	6
GS 14	19	19
ALL OTHER GS	209	205
WAGE BOARD	-	-
TOTAL	235	231

PROGRAM SUPPORT DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	-	-
GS 14	16	16
ALL OTHER GS	121	120
WAGE BOARD	-	-
TOTAL	137	136

MANPOWER UTILIZATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	1	1
GS 14	1	1
ALL OTHER GS	68	67
WAGE BOARD	-	-
TOTAL	70	69

FACILITIES ENGINEERING DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	2	2
GS 14	7	7
ALL OTHER GS	58	58
WAGE BOARD	-	-
TOTAL	67	67

EXPERIMENTAL FABRICATION AND ENGINEERING DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	2	2
GS 14	3	3
ALL OTHER GS	108	90
WAGE BOARD	1	1
TOTAL	114	96

FINANCIAL MANAGEMENT DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	1	1
GS 14	4	4
ALL OTHER GS	87	88
WAGE BOARD	-	-
TOTAL	92	93

MANAGEMENT SERVICES AND SUPPLY DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	1	1
GS 14	2	2
ALL OTHER GS	96	95
WAGE BOARD	23	23
TOTAL	122	121

PLANT OPERATIONS AND MAINTENANCE DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	1	1
GS 14	1	1
ALL OTHER GS	24	23
WAGE BOARD	122	122
TOTAL	148	147

TECHNICAL INFORMATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	-	-
GS 14	1	1
ALL OTHER GS	55	54
WAGE BOARD	18	18
TOTAL	74	73

DIRECTOR NETWORKS

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	6	6
ALL OTHER GS	24	26
WAGE BOARD	-	-
TOTAL	35	37

NETWORK ENGINEERING DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	12	12
GS 14	23	22
ALL OTHER GS	108	102
WAGE BOARD	-	-
TOTAL	144	137

NASA COMMUNICATIONS DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	2	2
GS 14	11	10
ALL OTHER GS	56	57
WAGE BOARD	-	-
TOTAL	70	70

NETWORK FACILITIES & SERVICES DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	3	3
GS 14	7	7
ALL OTHER GS	66	66
WAGE BOARD	-	-
TOTAL	77	77

NETWORK OPERATIONS

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	18	18
GS 14	21	20
ALL OTHER GS	72	73
WAGE BOARD	-	-
TOTAL	112	112

NETWORK COMPUTING AND ANALYSIS DIVISION

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	7	7
GS 14	10	10
ALL OTHER GS	63	62
WAGE BOARD	-	-
TOTAL	82	81

NETWORK PROCEDURES & EVALUATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	4	4
GS 14	9	9
ALL OTHER GS	66	65
WAGE BOARD	-	-
TOTAL	80	79

DIRECTOR MISSION & DATA OPERATIONS

	73	74
EXCEPTED	2	2
GS 16	1	1
GS 15	6	6
GS 14	2	2
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	17	17

MISSION OPERATIONS DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	17	16
ALL OTHER GS	49	46
WAGE BOARD	-	-
TOTAL	71	67

INFORMATION PROCESSING DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	8	8
GS 14	11	11
ALL OTHER GS	91	85
WAGE BOARD	-	-
TOTAL	110	104

TRAJECTORY ANALYSIS & GEODYNAMICS DIVISION

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	12	12
GS 14	9	9
ALL OTHER GS	53	53
WAGE BOARD	-	-
TOTAL	76	76

ADVANCED DATA SYSTEMS DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	9	9
ALL OTHER GS	49	45
WAGE BOARD	-	-
TOTAL	63	59

COMPUTATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	3	3
GS 14	9	9
ALL OTHER GS	55	55
WAGE BOARD	-	-
TOTAL	69	69

DIRECTOR PROJECTS

	73	74
EXCEPTED	2	2
GS 16	2	2
GS 15	3	3
GS 14	1	1
ALL OTHER GS	2	2
WAGE BOARD	-	-
TOTAL	10	10

OAO PROJECT

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	4	4
GS 14	3	3
ALL OTHER GS	2	2
WAGE BOARD	-	-
TOTAL	11	11

AE PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	3	3
GS 14	4	4
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	13	13

ERTS/NIMBUS PROJECT

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	10	10
GS 14	12	12
ALL OTHER GS	22	26
WAGE BOARD	-	-
TOTAL	46	50

OSO PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	4	4
GS 14	6	6
ALL OTHER GS	7	7
WAGE BOARD	-	-
TOTAL	17	17

ATS PROJECT

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	5	5
GS 14	11	11
ALL OTHER GS	13	3
WAGE BOARD	-	-
TOTAL	30	20

DELTA PROJECT

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	15	15
ALL OTHER GS	22	22
WAGE BOARD	-	-
TOTAL	42	42

ITOS PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	2	2
GS 14	5	5
ALL OTHER GS	9	9
WAGE BOARD	-	-
TOTAL	16	16

SMS PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	4	4
ALL OTHER GS	7	7
WAGE BOARD	-	-
TOTAL	16	16

TIROS-N- PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	3	3
ALL OTHER GS	9	4
WAGE BOARD	-	-
TOTAL	17	12

DIRECTOR SPACE APPLICATIONS AND TECHNOLOGY

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	1	1
GS 14	1	-
ALL OTHER GS	3	4
WAGE BOARD	-	-
TOTAL	6	6

EXPLORER PROJECTS OFFICE

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	7	7
GS 14	4	4
ALL OTHER GS	23	23
WAGE BOARD	-	-
TOTAL	36	36

INTERNATIONAL PROJECTS OFFICE

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	2	2
ALL OTHER GS	3	5
WAGE BOARD	-	-
TOTAL	10	12

ELECTRONICS DIVISION

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	10	10
GS 14	17	17
ALL OTHER GS	127	115
WAGE BOARD	-	-
TOTAL	156	144

MECHANICAL DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	6	7
GS 14	12	12
ALL OTHER GS	82	60
WAGE BOARD	-	-
TOTAL	101	80

EARTH OBSERVATIONS SYSTEMS AND SYSTEMS ENGINEERING DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	23	23
GS 14	30	29
ALL OTHER GS	70	59
WAGE BOARD	-	-
TOTAL	124	112

SOUNDING ROCKET DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	10	10
GS 14	12	12
ALL OTHER GS	105	105
WAGE BOARD	-	-
TOTAL	128	128

COMMUNICATIONS AND NAVIGATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	6	6
GS 14	18	18
ALL OTHER GS	33	14
WAGE BOARD	-	-
TOTAL	58	39

ENGINEERING PHYSICS DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	14	14
GS 14	11	11
ALL OTHER GS	97	69
WAGE BOARD	-	-
TOTAL	122	94

SPAC

	73	74
EXCEPTED		
GS 16		
GS 15		
GS 14		
ALL OTHE		
WAGE BO		
TOTA		

LABORATORY FOR PLANETARY ATMOSPHERES

	73	74
EXCEPTED	1	1
GS 16	3	3
GS 15	3	3
GS 14	11	11
ALL OTHER GS	72	70
WAGE BOARD	-	-
TOTAL	90	89

LABORATORY FOR SPACE PHYSICS

	73	74
EXCEPTED	1	1
GS 16	3	3
GS 15	10	10
GS 14	11	10
ALL OTHER GS	67	64
WAGE BOARD	-	-
TOTAL	92	88

LABORATORY FOR HIGH ENERGY ASTROPHYSICS

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	8	8
ALL OTHER GS	59	47
WAGE BOARD	-	-
TOTAL	72	60

LABORATORY FOR SOLAR PHYSICS

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	2	2
GS 14	7	7
ALL OTHER GS	40	39
WAGE BOARD	-	-
TOTAL	51	50

NATIONAL DAT

	73	74
EXCEPTED		
GS 16		
GS 15		
GS 14		
ALL OTHER		
WAGE BOA		
TOTAL		

491-316 O - 73 (Follows p. RPM 16) No. 1

GODDARD SPACE FLIGHT CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING SUMMARY

STAFFING SUMMARY

	73	74
EXCEPTED	33	33
GS 16	32	32
GS 15	308	311
GS 14	495	487
ALL OTHER GS	2933	2780
WAGE BOARD	165	165
TOTAL	3966	3808

CHIEF ADVANCED PLANS STAFF

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	-	-
GS 14	-	-
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	7	7

OFFICE OF THE DIRECTOR

	73	74
EXCEPTED	5	5
GS 16	-	-
GS 15	-	-
GS 14	-	-
ALL OTHER GS	11	11
WAGE BOARD	-	-
TOTAL	16	16

METEOROLOGY PROGRAM OFFICE

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	6	6
GS 14	3	3
ALL OTHER GS	11	13
WAGE BOARD	-	-
TOTAL	20	22

DIRECTOR SYSTEMS RELIABILITY

	73	74
EXCEPTED	2	2
GS 16	-	-
GS 15	3	3
GS 14	4	4
ALL OTHER GS	4	3
WAGE BOARD	-	-
TOTAL	13	12

TEST AND EVALUATION DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	11	11
GS 14	30	30
ALL OTHER GS	140	140
WAGE BOARD	-	-
TOTAL	182	182

QUALITY ASSURANCE DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	12	12
ALL OTHER GS	52	54
WAGE BOARD	-	-
TOTAL	69	71

DIRECTOR ADMINISTRATION AND MANAGEMENT

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	8	8
GS 14	8	8
ALL OTHER GS	48	48
WAGE BOARD	1	1
TOTAL	66	66

PROCUREMENT DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	6	6
GS 14	19	19
ALL OTHER GS	209	205
WAGE BOARD	-	-
TOTAL	235	231

PROGRAM SUPPORT DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	-	-
GS 14	16	16
ALL OTHER GS	121	120
WAGE BOARD	-	-
TOTAL	137	136

MANPOWER UTILIZATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	1	1
GS 14	1	1
ALL OTHER GS	68	67
WAGE BOARD	-	-
TOTAL	70	69

FACILITIES ENGINEERING DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	2	2
GS 14	7	7
ALL OTHER GS	58	58
WAGE BOARD	-	-
TOTAL	67	67

EXPERIMENTAL FABRICATION AND ENGINEERING DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	2	2
GS 14	3	3
ALL OTHER GS	108	90
WAGE BOARD	1	1
TOTAL	114	96

FINANCIAL MANAGEMENT DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	1	1
GS 14	4	4
ALL OTHER GS	87	88
WAGE BOARD	-	-
TOTAL	92	93

MANAGEMENT SERVICES AND SUPPLY DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	1	1
GS 14	2	2
ALL OTHER GS	96	95
WAGE BOARD	23	23
TOTAL	122	121

PLANT OPERATIONS AND MAINTENANCE DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	1	1
GS 14	1	1
ALL OTHER GS	24	23
WAGE BOARD	122	122
TOTAL	148	147

TECHNICAL INFORMATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	-	-
GS 14	1	1
ALL OTHER GS	55	54
WAGE BOARD	18	18

DIRECTOR NETWORKS

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	6	6
ALL OTHER GS	24	26
WAGE BOARD	-	-
TOTAL	35	37

NETWORK ENGINEERING DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	12	12
GS 14	23	22
ALL OTHER GS	108	102
WAGE BOARD	-	-
TOTAL	144	137

NASA COMMUNICATIONS DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	2	2
GS 14	11	10
ALL OTHER GS	56	57
WAGE BOARD	-	-
TOTAL	70	70

NETWORK FACILITIES & SERVICES DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	3	3
GS 14	7	7
ALL OTHER GS	66	66
WAGE BOARD	-	-
TOTAL	77	77

NETWORK OPERATIONS

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	18	18
GS 14	21	20
ALL OTHER GS	72	73
WAGE BOARD	-	-
TOTAL	112	112

NETWORK COMPUTING AND ANALYSIS DIVISION

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	7	7
GS 14	10	10
ALL OTHER GS	63	62
WAGE BOARD	-	-
TOTAL	82	81

NETWORK PROCEDURES & EVALUATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	4	4
GS 14	9	9
ALL OTHER GS	66	65
WAGE BOARD	-	-
TOTAL	80	79

DIRECTOR MISSION & DATA OPERATIONS

	73	74
EXCEPTED	2	2
GS 16	1	1
GS 15	6	6
GS 14	2	2
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	17	17

MISSION OPERATIONS DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	17	16
ALL OTHER GS	49	46
WAGE BOARD	-	-
TOTAL	71	67

INFORMATION PROCESSING DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	8	8
GS 14	11	11
ALL OTHER GS	91	85
WAGE BOARD	-	-
TOTAL	110	104

TRAJECTORY ANALYSIS & GEODYNAMICS DIVISION

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	12	12
GS 14	9	9
ALL OTHER GS	53	53
WAGE BOARD	-	-
TOTAL	76	76

ADVANCED DATA SYSTEMS DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	9	9
ALL OTHER GS	49	45
WAGE BOARD	-	-
TOTAL	63	59

COMPUTATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	3	3
GS 14	9	9
ALL OTHER GS	55	55
WAGE BOARD	-	-
TOTAL	69	69

DIRECTOR PROJECTS

	73	74
EXCEPTED	2	2
GS 16	2	2
GS 15	3	3
GS 14	1	1
ALL OTHER GS	2	2
WAGE BOARD	-	-
TOTAL	10	10

OAO PROJECT

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	4	4
GS 14	3	3
ALL OTHER GS	2	2
WAGE BOARD	-	-
TOTAL	11	11

AE PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	3	3
GS 14	4	4
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	13	13

ERTS/NIMBUS PROJECT

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	10	10
GS 14	12	12
ALL OTHER GS	22	26
WAGE BOARD	-	-
TOTAL	46	50

OSO PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	4	4
GS 14	6	6
ALL OTHER GS	7	7
WAGE BOARD	-	-
TOTAL	17	17

ATS PROJECT

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	5	5
GS 14	11	11
ALL OTHER GS	13	3
WAGE BOARD	-	-
TOTAL	30	20

DELTA PROJECT

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	15	15
ALL OTHER GS	22	22
WAGE BOARD	-	-
TOTAL	42	42

ITOS PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	2	2
GS 14	5	5
ALL OTHER GS	9	9
WAGE BOARD	-	-
TOTAL	16	16

SMS PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	4	4
ALL OTHER GS	7	7
WAGE BOARD	-	-
TOTAL	16	16

TIROS-N- PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	3	3
ALL OTHER GS	9	4
WAGE BOARD	-	-
TOTAL	17	12

DIRECTOR SPACE APPLICATIONS AND TECHNOLOGY

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	1	1
GS 14	1	-
ALL OTHER GS	3	4
WAGE BOARD	-	-
TOTAL	6	6

EXPLORER PROJECTS OFFICE

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	7	7
GS 14	4	4
ALL OTHER GS	23	23
WAGE BOARD	-	-
TOTAL	36	36

INTERNATIONAL PROJECTS OFFICE

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	2	2
ALL OTHER GS	3	5
WAGE BOARD	-	-
TOTAL	10	12

ELECTRONICS DIVISION

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	10	10
GS 14	17	17
ALL OTHER GS	127	115
WAGE BOARD	-	-
TOTAL	156	144

MECHANICAL DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	6	7
GS 14	12	12
ALL OTHER GS	82	60
WAGE BOARD	-	-
TOTAL	101	80

EARTH OBSERVATIONS SYSTEMS AND SYSTEMS ENGINEERING DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	23	23
GS 14	30	29
ALL OTHER GS	70	59
WAGE BOARD	-	-
TOTAL	124	112

SOUNDING ROCKET DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	10	10
GS 14	12	12
ALL OTHER GS	105	105
WAGE BOARD	-	-
TOTAL	128	128

COMMUNICATIONS AND NAVIGATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	6	6
GS 14	18	18
ALL OTHER GS	33	14
WAGE BOARD	-	-
TOTAL	58	39

ENGINEERING PHYSICS DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	14	14
GS 14	11	11
ALL OTHER GS	97	69
WAGE BOARD	-	-
TOTAL	122	94

DIREC SPACE ANI SCIEN

EXCEPTED		
GS 16		
GS 15		
GS 14		
ALL OTHER GS		
WAGE BOARD		
TOTAL		

LABORATORY FOR PLANETARY ATMOSPHERES

	73	74
EXCEPTED	1	1
GS 16	3	3
GS 15	3	4
GS 14	11	11
ALL OTHER GS	72	70
WAGE BOARD	-	-
TOTAL	90	89

LABORATORY FOR SPACE PHYSICS

	73	74
EXCEPTED	1	1
GS 16	3	3
GS 15	10	10
GS 14	11	10
ALL OTHER GS	67	64
WAGE BOARD	-	-
TOTAL	92	88

LABORATORY FOR HIGH ENERGY ASTROPHYSICS

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	8	8
ALL OTHER GS	59	47
WAGE BOARD	-	-
TOTAL	72	60

LABORATORY FOR SOLAR PHYSICS

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	2	2
GS 14	7	7
ALL OTHER GS	40	39
WAGE BOARD	-	-
TOTAL	51	50

NATIONAL SP DATA C

EXCEPTED	
GS 16	
GS 15	
GS 14	
ALL OTHER GS	
WAGE BOARD	
TOTAL	

491-316 O - 73 (Follows p. RPM 96) No. 5

GODDARD SPACE FLIGHT CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING SUMMARY

CHIEF ADVANCED PLANS STAFF

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	-	-
GS 14	-	-
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	7	7

OFFICE OF THE DIRECTOR

	73	74
EXCEPTED	5	5
GS 16	-	-
GS 15	-	-
GS 14	-	-
ALL OTHER GS	11	11
WAGE BOARD	-	-
TOTAL	16	16

METEOROLOGY PROGRAM OFFICE

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	6	6
GS 14	3	3
ALL OTHER GS	11	13
WAGE BOARD	-	-
TOTAL	20	22

DIRECTOR SYSTEMS RELIABILITY

	73	74
EXCEPTED	2	2
GS 16	-	-
GS 15	3	3
GS 14	4	4
ALL OTHER GS	4	3
WAGE BOARD	-	-
TOTAL	13	12

TEST AND EVALUATION DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	11	11
GS 14	30	30
ALL OTHER GS	140	140
WAGE BOARD	-	-
TOTAL	182	182

QUALITY ASSURANCE DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	12	12
ALL OTHER GS	52	54
WAGE BOARD	-	-
TOTAL	69	71

DIRECTOR MISSION & DATA OPERATIONS

	73	74
EXCEPTED	2	2
GS 16	1	1
GS 15	6	6
GS 14	2	2
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	17	17

DIRECTOR PROJECTS

	73	74
EXCEPTED	2	2
GS 16	2	2
GS 15	3	3
GS 14	1	1
ALL OTHER GS	2	2
WAGE BOARD	-	-
TOTAL	10	10

DIRECTOR SPACE APPLICATIONS AND TECHNOLOGY

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	1	1
GS 14	1	-
ALL OTHER GS	3	4
WAGE BOARD	-	-
TOTAL	6	6

DIRECTOR SPACE AND EARTH SCIENCES

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	2	2
GS 14	3	3
ALL OTHER GS	35	39
WAGE BOARD	-	-
TOTAL	42	46

ATIONS N

	73	74
	-	-
	-	-
	5	5
	17	16
	49	46
	-	-
	71	67

INFORMATION PROCESSING DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	8	8
GS 14	11	11
ALL OTHER GS	91	85
WAGE BOARD	-	-
TOTAL	110	104

ALYSIS & DIVISION

	73	74
	1	1
	1	1
	12	12
	9	9
	53	53
	-	-
	76	76

ADVANCED DATA SYSTEMS DIVISION

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	9	9
ALL OTHER GS	49	45
WAGE BOARD	-	-
TOTAL	63	59

DIVISION

	73	74
	-	-
	2	2
	3	3
	9	9
	55	55
	-	-
	69	69

OAO PROJECT

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	4	4
GS 14	3	3
ALL OTHER GS	2	2
WAGE BOARD	-	-
TOTAL	11	11

AE PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	3	3
GS 14	4	4
ALL OTHER GS	6	6
WAGE BOARD	-	-
TOTAL	13	13

ERTS/NIMBUS PROJECT

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	10	10
GS 14	12	12
ALL OTHER GS	22	26
WAGE BOARD	-	-
TOTAL	46	50

OSO PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	4	4
GS 14	6	6
ALL OTHER GS	7	7
WAGE BOARD	-	-
TOTAL	17	17

ATS PROJECT

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	5	5
GS 14	11	11
ALL OTHER GS	13	3
WAGE BOARD	-	-
TOTAL	30	20

DELTA PROJECT

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	15	15
ALL OTHER GS	22	22
WAGE BOARD	-	-
TOTAL	42	42

ITOS PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	2	2
GS 14	5	5
ALL OTHER GS	9	9
WAGE BOARD	-	-
TOTAL	16	16

SMS PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	4	4
ALL OTHER GS	7	7
WAGE BOARD	-	-
TOTAL	16	16

TIROS-N- PROJECT

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	5	5
GS 14	3	3
ALL OTHER GS	9	4
WAGE BOARD	-	-
TOTAL	17	12

EXPLORER PROJECTS OFFICE

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	7	7
GS 14	4	4
ALL OTHER GS	23	23
WAGE BOARD	-	-
TOTAL	36	36

INTERNATIONAL PROJECTS OFFICE

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	2	2
ALL OTHER GS	3	5
WAGE BOARD	-	-
TOTAL	10	12

ELECTRONICS DIVISION

	73	74
EXCEPTED	-	-
GS 16	2	2
GS 15	10	10
GS 14	17	17
ALL OTHER GS	127	115
WAGE BOARD	-	-
TOTAL	156	144

MECHANICAL DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	6	7
GS 14	12	12
ALL OTHER GS	82	60
WAGE BOARD	-	-
TOTAL	101	80

EARTH OBSERVATIONS SYSTEMS AND SYSTEMS ENGINEERING DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	23	23
GS 14	30	29
ALL OTHER GS	70	59
WAGE BOARD	-	-
TOTAL	124	112

SOUNDING ROCKET DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	10	10
GS 14	12	12
ALL OTHER GS	105	105
WAGE BOARD	-	-
TOTAL	128	128

COMMUNICATIONS AND NAVIGATION DIVISION

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	6	6
GS 14	18	18
ALL OTHER GS	33	14
WAGE BOARD	-	-
TOTAL	58	39

ENGINEERING PHYSICS DIVISION

	73	74
EXCEPTED	-	-
GS 16	-	-
GS 15	14	14
GS 14	11	11
ALL OTHER GS	97	69
WAGE BOARD	-	-
TOTAL	122	94

LABORATORY FOR PLANETARY ATMOSPHERES

	73	74
EXCEPTED	1	1
GS 16	3	3
GS 15	3	4
GS 14	11	11
ALL OTHER GS	72	70
WAGE BOARD	-	-
TOTAL	90	89

GODDARD INSTITUTE FOR SPACE STUDIES

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	7	8
GS 14	2	2
ALL OTHER GS	13	12
WAGE BOARD	-	-
TOTAL	23	23

LABORATORY FOR SPACE PHYSICS

	73	74
EXCEPTED	1	1
GS 16	3	3
GS 15	10	10
GS 14	11	10
ALL OTHER GS	67	64
WAGE BOARD	-	-
TOTAL	92	88

LABORATORY FOR METEOROLOGY AND EARTH SCIENCES

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	10	10
GS 14	9	9
ALL OTHER GS	61	54
WAGE BOARD	-	-
TOTAL	81	74

LABORATORY FOR HIGH ENERGY ASTROPHYSICS

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	8	8
ALL OTHER GS	59	47
WAGE BOARD	-	-
TOTAL	72	60

LABORATORY FOR OPTICAL ASTRONOMY

	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	4	4
GS 14	7	7
ALL OTHER GS	35	35
WAGE BOARD	-	-
TOTAL	47	47

LABORATORY FOR SOLAR PHYSICS

	73	74
EXCEPTED	1	1
GS 16	1	1
GS 15	2	2
GS 14	7	7
ALL OTHER GS	40	39
WAGE BOARD	-	-
TOTAL	51	50

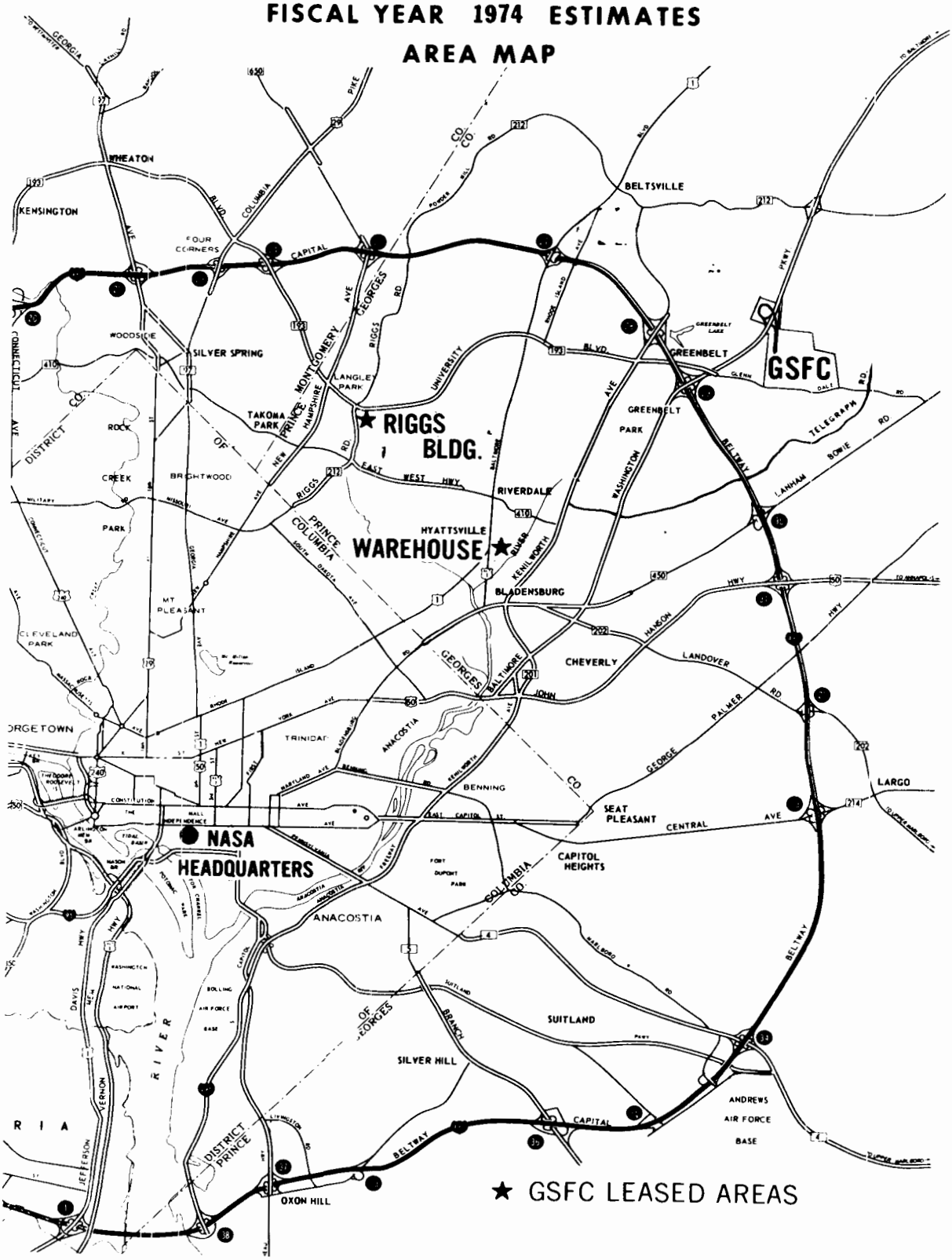
LABORATORY FOR EXTRATERRESTRIAL PHYSICS

	73	74
EXCEPTED	-	-
GS 16	1	1
GS 15	3	3
GS 14	9	8
ALL OTHER GS	42	51
WAGE BOARD	-	-
TOTAL	55	63

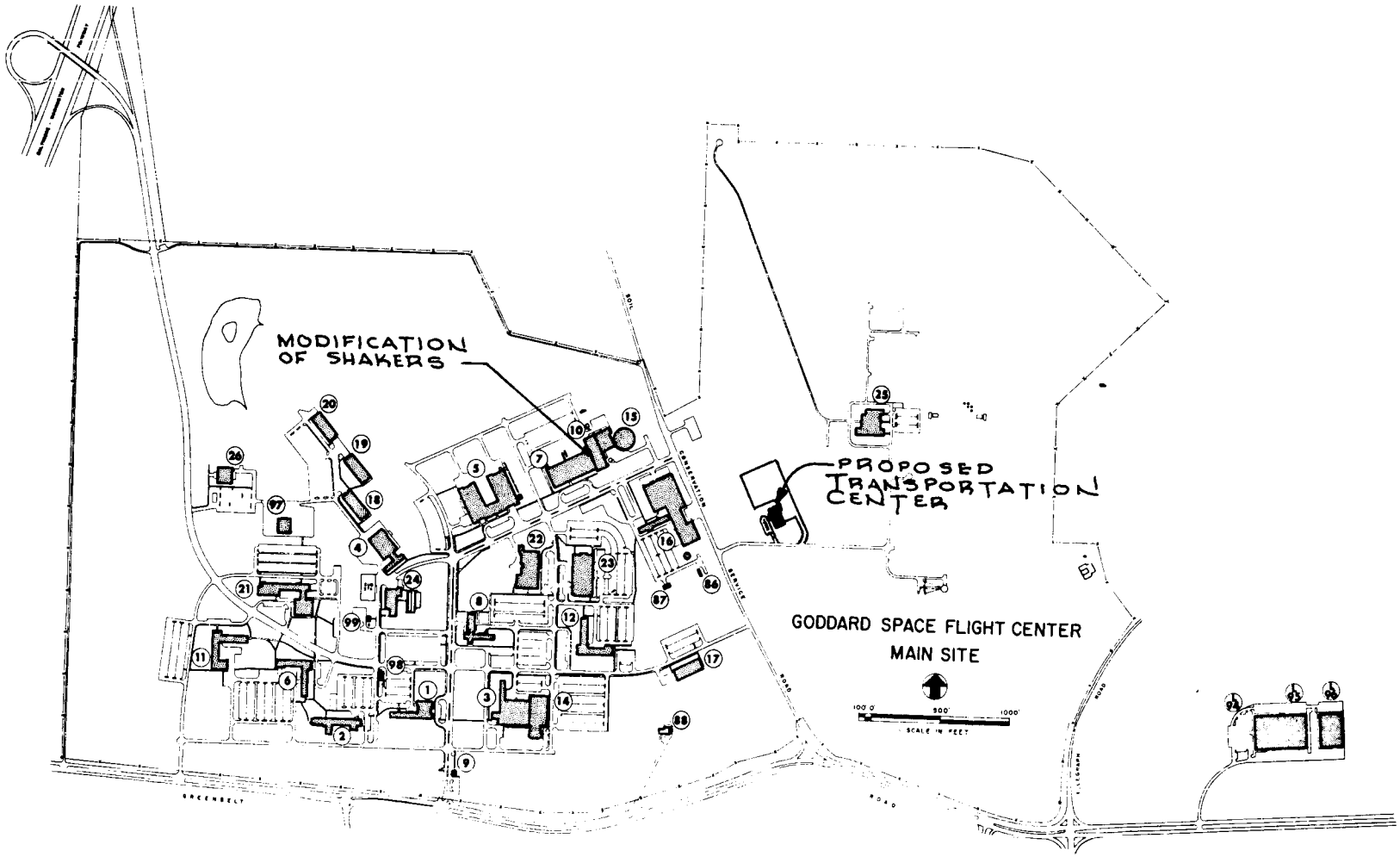
NATIONAL SPACE SCIENCE DATA CENTER

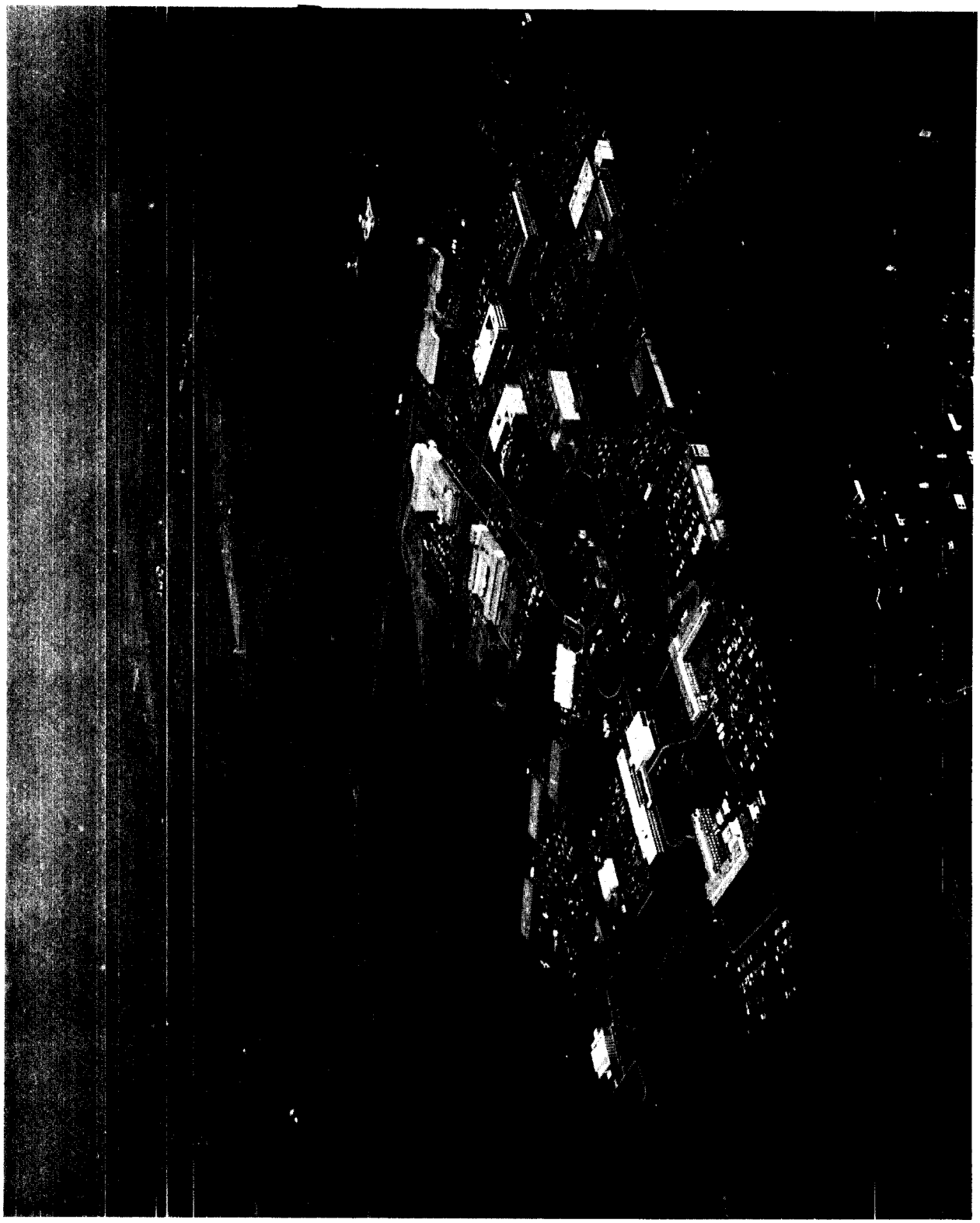
	73	74
EXCEPTED	1	1
GS 16	-	-
GS 15	2	2
GS 14	2	2
ALL OTHER GS	11	11
WAGE BOARD	-	-
TOTAL	16	16

GODDARD SPACE FLIGHT CENTER
FISCAL YEAR 1974 ESTIMATES
AREA MAP



RPM 98


MODIFICATION OF SHAKERS
PROPOSED TRANSPORTATION CENTER
GODDARD SPACE FLIGHT CENTER
MAIN SITE
100' 0'
500'
1000'
SCALE IN FEET
GREENBELT
ROAD
SERVICE
CONSTRUCTION



RPM 100

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

WALLOPS STATION

MISSION

Wallops Station is responsible for planning and conducting applied research and development with emphasis on scientific payload development, instrumentation, facilities and techniques utilized in rocket borne experiments, aeronautical and terminal area research projects and ecological studies.

Wallops Station prepares, assembles, launches, tracks and acquires scientific information from space vehicles. Its facilities are utilized by the scientists and engineers from the laboratories and research centers of NASA, other governmental agencies, colleges and universities, and the worldwide scientific community. Wallops Station personnel assist these scientific research teams with their projects; develop, as necessary, special types of instrumentation and equipment to complete the mission; and manage NASA research projects.

Research at Wallops Station is directed toward gathering information about the earth's atmosphere and its near space environment. The Station utilized launch vehicles ranging in size from the small Arcas and Hasp meteorological rockets to the 72-foot Scout rocket with orbital capability in obtaining scientific data about the atmosphere and the near space environment. Wallops Station has successfully launched sixteen satellites and approximately 8,000 research vehicles consisting of from one to seven stages in the quest for scientific knowledge.

Wallops facilities are utilized for many other research projects, such as space component tests, helicopter and aircraft drop tests, helicopter and aircraft noise abatement projects, anti-skid tests on grooved runways, V/STOL terminal air research, collision avoidance programs, laser and radar tracking of aircraft and satellites.

Wallops Station exercises project management responsibility for several NASA sponsored projects such as GEOS-C project, the Experimental Inter-American Meteorological Rocket Network (EXAMETNET), the German-American barium project, operation of remote site launching and tracking facilities and operation of NASA's portable range facilities for sounding rockets.

The Station is also responsible for a portion of the National Sounding Rocket Program. This requires program interface with the scientific, university and international community; engineering support including

analytical, feasibility, and design studies, payload, vehicles and recovery system engineering, test and evaluation; and data analysis and reporting.

A portion of the Station's effort is devoted to NASA's program of international cooperation in space research. Foreign countries are provided with training programs for their personnel, assistance in activation of launch sites, and with technical assistance and advice in launching experiments and in operation of their ranges. Representatives of foreign countries visit Wallops Station to observe operations or seek assistance in establishing sounding rocket facilities of their own.

Wallops Station is involved in establishing the Chesapeake Bay area as a multidisciplinary ecological test site for developing the applications of remote sensing from aircraft and space platforms. As part of the program the Station is working closely with user groups to develop remote sensing analysis and monitoring techniques for studying the ecology of the area.

DESCRIPTION

The Station includes three separate areas on the Atlantic Coast of Virginia's eastern shore: the main base, the Wallops Island launching site, and the Wallops mainland tracking site. The administrative offices, range control center, support shops, and main telemetry buildings are located on the main base. Wallops Island is about seven miles southeast of the main base and is connected to the mainland by a causeway and bridge. The island is about five miles long and only one-half mile wide at its widest point. Located on the island are rocket storage buildings, blockhouses, assembly shops and the launch sites. The Wallops mainland site is a one-half mile strip west of the island which houses the radar and optical tracking sites.

Wallops Station, totaling 6,561 acres, consists of 2,313 acres on the main base; 3,000 acres on Wallops Island, 108 acres on the mainland tracking site; and 1,140 acres of unusable marsh land. The total capital investment, including fixed assets in progress and contractor-held facilities at various locations, as of June 30, 1972, was $119,236,000.

SUMMARY OF RESOURCES REQUIREMENTS

	FUNDS		
Functions	1972	1973	1974
Personnel	$7,406,000	$7,384,000	$7,374,000
Travel	158,000	184,000	184,000
Facilities services	2,348,000	2,065,000	2,329,000
Technical services	127,000	184,000	197,000
Administrative support	870,000	817,000	853,000
Total, fund requirements	$10,909,000	$10,634,000	$10,937,000

	1972	1973	1974	Change in 1974
I. PERSONNEL.....	$7,406,000	$7,384,000	$7,374,000	-$10,000

Basis of Fund Requirements

	1972	1973	1974
A. Compensation and Benefits:			
1. Compensation:			
a. Permanent positions.....	$6,571,000	$6,483,000	$6,478,000
b. Nonpermanent positions...	95,000	128,000	138,000
c. Reimbursable details.....	8,000	---	---
d. Overtime and other compensations.....	96,000	118,000	118,000
Subtotal, Compensation...	$6,770,000	$6,729,000	$6,734,000
2. Benefits.....	589,000	600,000	583,000
Subtotal, Compensation and Benefits.....	$7,359,000	$7,329,000	$7,317,000
B. Supporting Costs:			
1. Transfer of personnel.....	---	---	---
2. Personnel training.....	$47,000	$55,000	$57,000
Subtotal, Supporting Costs.....	$47,000	$55,000	$57,000
Total, Personnel and Related Costs.....	$7,406,000	$7,384,000	$7,374,000
1. Compensation.....	$6,770,000	$6,729,000	$6,734,000
a. Permanent Positions.....	$6,571,000	$6,483,000	$6,478,000

The cost of permanent positions is the largest part of personnel and related costs. The funds shown above will support 437 permanent positions in 1973, and 420 in 1974. The change in 1974 is related to the reduction in support provided to the Communications and other supporting space research programs.

Over 50% of Wallops permanent positions are used in direct support of the various R&D programs. The following table summarizes the actual and planned utilization of positions for direct program activity and for indirect support.

	1972	1973	1974
Permanent Positions by Program			
Manned Space Flight			
Space flight operations.....	5	6	5
Space Science			
Physics and astronomy.....	92	90	90
Lunar and planetary exploration.....	4	3	2
Launch vehicle procurement.....	3	3	3
Space Applications.....	56	61	57
Aeronautics and Space Technology			
Aeronautical research and technology	28	29	30
Space research and technology.....	18	11	6
Tracking and Data Acquisition	59	59	55
Subtotal, positions by program.....	265	262	248
Indirect Positions			
Director and staff.....	5	5	4
Administrative support.....	73	70	69
Research and development support....	105	100	99
Subtotal, indirect positions.....	183	175	172
Total, permanent positions.....	448	437	420
Other than Permanent Positions.....	20	25	25
Total Positions.....	468	462	445

The following table summarizes by occupational group the Wallop's work force:

	1972		1973		1974	
Occupational Group	Number	Percent	Number	Percent	Number	Percent
Professional scientists and engineers.....	103	23.0	102	23.3	93	22.2
Technicians.....	177	39.6	177	40.5	169	40.2
Wage Board.....	62	13.9	51	11.7	51	12.1
Professional administrative.....	42	9.3	40	9.2	40	9.5
Clerical.....	64	14.2	67	15.3	67	16.0
Total.....	448	100.0	437	100.0	420	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the beginning of the year, as modified by within grade advances, promotions etc. After these modifications, the year-end position structure is established and the cost effect for the year is calculated based on the estimated time that these modifications are in effect.

In 1974 the cost of permanent positions will be $6,478,000, a decrease of $5,000 from 1973. This decrease is calculated as follows:

Cost of permanent positions in 1973.....		$6,483,000
Cost of increases in 1974.....		181,000
Within grade advances and promotions:		
Full year effect of 1973 actions.....	$68,000	
Partial year effect of 1974 actions.....	113,000	
Cost of decreases in 1974.....		-186,000
Abolished positions and turnover savings:		
Full year effect of 1973 actions.....	-124,000	
Partial year effect of 1974 actions.....	-62,000	
Cost of permanent positions in 1974.....		$6,478,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent Positions.....	$95,000	$128,000	$138,000

The 1973 and 1974 plans include 25 nonpermanent positions for each year. The 25 nonpermanent positions include five positions to be used for Wallops participation in the President's Youth Opportunity Campaign, five positions to be filled by cooperative engineering students who alternate between working at Wallops and attending college (co-ops), five Public Service Career and 10 other temporary positions.

c. Reimbursable Details.....	$8,000	---	---

The amount provided for the service of one military officer utilized on programs of mutual interest to NASA and DOD. There will be no reimbursable detailees assigned to Wallops in 1973 and 1974.

491-316 O - 73 - 16

	1972	1973	1974
d. Overtime and Other Compensation	$96,000	$118,000	$118,000

Wallops provides launching facilities, instrumentation, and tracking and data acquisition facilities, recovery operations, as well as administrative and management support of NASA programs. Many factors beyond the Station's control such as schedules, weather, holds, range clearance, etc., require the personnel operating and supporting the above facilities to work long hours which exceed a 40 hour week and the eight hour day.

2. Benefits.....	$589,000	$600,000	$583,000

Wallops contributes to personnel benefits as authorized and required by law. The following table indicates the cost of personnel benefits by the major categories:

Category of Cost			
Contribution to the Civil Service Retirement Fund.....	$461,000	$449,000	$450,000
Contribution for employee life insurance.....	26,000	27,000	28,000
Contribution to employee health insurance.....	95,000	96,000	96,000
FICA.....	3,000	4,000	5,000
Incentive awards.....	1,000	2,000	2,000
Other personnel benefits.....	2,000	2,000	2,000
Severance pay.....	1,000	20,000	---
Total.....	$589,000	$600,000	$583,000

B. Supporting Costs.....	$47,000	$55,000	$57,000

Supporting personnel costs provide for the expense of moving employees to initial duty station or reassignment, and for maintaining and expanding the skills of employees. The costs are summarized as follows:

1. Transfer of personnel.....	---	---	---

It is estimated that no funds will be required in 1974.

2. Personnel Training.....	$47,000	$55,000	$57,000

The maintenance and expansion of the skills of personnel is essential in carrying out Wallops' technical programs. Training is authorized under the Government Employees Training Act of 1958. The estimated cost for 1974 is for tuition of graduate study and off-the-job training of Wallops personnel. The increase is due to higher tuition costs.

	1972	1973	1974	Change in 1974
II. TRAVEL	$158,000	$184,000	$184,000	---

Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Related Travel			
1. Direction, coordination, and management of Research and Development and Construction of Facilities program activities	$33,000	$34,000	$34,000
2. Flight mission support	34,000	50,000	50,000
3. Overseas travel to launch and tracking sites	25,000	40,000	40,000
Subtotal	$92,000	$124,000	$124,000
B. Meetings and Technical Seminars			
1. Government-sponsored meetings	$28,000	$21,000	$21,000
2. Other than government-sponsored meetings and technical seminars.	13,000	13,000	13,000
Subtotal	$41,000	$34,000	$34,000
C. Administrative Travel	$25,000	$26,000	$26,000
Total, Travel	$158,000	$184,000	$184,000
A. Program Related Travel	$92,000	$124,000	$124,000

These costs include travel to industrial contractors and educational institutions, NASA installations, other government installations, and launch sites in support of Wallop's mission. It is the largest part of the travel function and accounts for 67% of the 1974 requirement.

1. Direction, coordination, and management of programs	$33,000	$34,000	$34,000

These costs include travel to industrial contractors and industrial institutions, NASA installations and other government installations. Approximately 198 trips are scheduled in 1973 to such locations as Goddard; Langley; Boulder, Colorado; Los Angeles; and White Sands, New Mexico. A comparable level of travel is anticipated for 1974.

	1972	1973	1974
2. Flight mission support.....	$34,000	$50,000	$50,000

These costs include travel to launch sites for prelaunch, and postlaunch activities in support of assigned R&D activities, such as 1973 Solar Eclipse, GEOS-C, and sounding rockets. Approximately 165 trips are scheduled for 1973 to such locations as Poker Flats, Alaska; White Sands, New Mexico; Canada; and California.

3. Overseas travel to launch and tracking sites.....	$25,000	$40,000	$40,000

This travel is necessary to conduct launchings of sounding rockets, meteorological rockets, and spacecraft at overseas sites. In addition, technical assistance is provided to other countries in the design, layout, and construction of launching ranges and tracking stations. Approximately 20 trips per year are planned to such locations as Norway, Sweden, India, Spain, Canada, French Guiana, Brazil, and Japan.

B. Meetings and Technical Seminars.....	$41,000	$34,000	$34,000

This travel is for attendance at NASA sponsored meetings, other government sponsored meetings, and meetings sponsored by non-government organizations. The schedule involves approximately 156 trips to such locations as Washington, D.C.; Langley Research Center; Goddard; Houston; and Colorado.

C. Administrative Travel.....	$25,000	$26,000	$26,000

Administrative travel includes travel required for the direction and coordination of administrative management programs, such as financial management and budget, procurement, personnel and manpower, and facilities. It also includes reimbursements to employees for local transportation, tolls, parking fees, and mileage for use of privately owned vehicle.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES..	$2,348,000	$2,065,000	$2,329,000	+$264,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Minor rehabilitation and modification, and construction..	$16,000	$25,000	$33,000

	1972	1973	1974
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds.....	$545,000	$348,000	$427,000
2. Maintenance of equipment.....	186,000	164,000	175,000
3. Custodial services.....	542,000	529,000	578,000
Subtotal.....	$1,273,000	$1,041,000	$1,180,000
C. Operation of Facilities			
1. Utilities.....	$323,000	$329,000	$331,000
2. Supplies and equipment.....	736,000	670,000	785,000
Subtotal.....	$1,059,000	$999,000	$1,116,000
Total, Facilities Services.....	$2,348,000	$2,065,000	$2,329,000
A. Acquisition of Facilities.....	$16,000	$25,000	$33,000

Beginning in 1973, funding in the R&PM appropriation for new facilities and additions to existing facilities is limited to $10,000 or less per project, and $25,000 or less per project for rehabilitation and modification of facilities. All projects over these amounts will be funded from the CoF appropriation. Minor construction projects planned for 1974 are as follows: Relocate liquid oxygen storage facility, enclose passageway for Building M-15, and various small projects under $5,000, such as relocate or renovate instrumentation systems and vehicle launching and checkout facilities, preparation of concrete pads or foundations for mobile instrumentation systems, additional storage areas, and small modifications to existing buildings to suit project requirements.

B. Maintenance and Related Services...	$1,273,000	$1,041,000	$1,180,000
1. Maintenance of buildings and grounds.....	$545,000	$348,000	$427,000

This category supports the maintenance and repair of office buildings, laboratories, launch facilities, aircraft hangars, shops and utility facilities in addition to the maintenance and repair of roads, improved and unimproved grounds. This includes over 330 buildings, approximately one million square feet of building space on 6,561 acres. In 1974 additional funds are needed for roof repairs to two large hangar buildings. The roofs are presently leaking in places and reroofing is needed to preclude water damage to interior surfaces, electrical wiring and equipment. In addition, flashing-glazing in these buildings has deteriorated allowing penetration of wind-blown rain into the work areas of the hangar. Also, portions of the Station work area need improvement of lighting and ventilation systems to meet occupational safety and health act requirements.

The corrosive environment at Wallops Station, caused by its proximity to the ocean requires frequent maintenance and repair of exterior surfaces, roofing, utility distribution systems, mechanical doors, hardware, and building equipment.

	1972	1973	1974
2. Maintenance of equipment.....	$186,000	$164,000	$175,000

These costs consists of work necessary to keep mechanical, electrical, laboratory and shop equipment operational. The increase in 1974 of $11,000 reflects a cost-of-living increase for the Heating Plant Operations service contract and higher prices of repair work.

3. Custodial services.....	$542,000	$529,000	$578,000

The estimate for custodial services includes the cost of janitorial, exterminating and refuse handling, security, fire protection, and laundry services. The increase in 1974 is to meet the increased prices on service contracts.

C. Operation of Facilities.....	$1,059,000	$999,000	$1,116,000
1. Utilities.....	$323,000	$329,000	$331,000

Electricity is the only utility purchased by Wallops Station. The estimate is based on maintaining approximately the present level of consumption.

2. Supplies and equipment.....	$736,000	$670,000	$785,000

This category includes all supplies, materials, and equipment required to support the operation of the physical plant at Wallops. The increase in 1974 is due to: Higher costs of replacement of supplies and materials, higher costs of the supply management service contract at the same level of effort and the cost of replacing shop equipment.

The increase is primarily in equipment and is due to the critical need to replace items that have been deferred due to budget constraints. Because of this, much of the equipment has become inefficient, beyond repair, and outdated.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES.....	$127,000	$184,000	$197,000	+$13,000

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment.....	---	$9,000	$18,000
2. Purchase of equipment.....	---	7,000	---
3. Maintenance of equipment.....	$9,000	7,000	8,000
Subtotal, equipment.....	$9,000	$23,000	$26,000
4. Programming and operation services.....	49,000	73,000	80,000
Subtotal, ADP.....	$58,000	$96,000	$106,000
B. Engineering Services.....	$1,000	$11,000	$11,000
C. Scientific and Technical Information and Educational Programs			
1. Operation of NASA technical libraries.....	$67,000	$69,000	$72,000
2. Educational/information programs	1,000	8,000	8,000
3. Scientific and technical information.....	---	---	---
Subtotal.....	$68,000	$77,000	$80,000
Total, Technical Services.....	$127,000	$184,000	$197,000
A. Automatic Data Processing.....	$58,000	$96,000	$106,000

The R&PM appropriation provides lease, purchase, maintenance, programming and operations services of ADP equipment utilized in business data processing. The increase in 1974 is to meet the higher costs of service contracts for programming, operations, and maintenance, and a full years rental of the business data remote unit.

	1972	1973	1974
B. Engineering Services.....	$1,000	$11,000	$11,000

This includes architectural and engineering design services such as the preparation of working drawings of special equipment, and plans and specifications in support of minor construction projects and alterations of buildings and facilities. It also includes chemical analyses services. It provides chemical analysis of rocket fuels, quality control of photoprocessing chemicals, and contamination analysis of hydraulic fluids.

C. Scientific and Technical Information and Educational Programs.....	$68,000	$77,000	$80,000

This includes support for the operation of the technical library, provides scientific information, documentary functions and motion picture services, and supplies and materials. The increase in 1974 is required to meet the higher cost of the contract for library services.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT.....	$870,000	$817,000	$853,000	+$36,000

Basis of Fund Requirements

Summary of Administrative Support

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$3,000	$3,000	$3,000
2. Local telephone service.....	78,000	83,000	91,000
3. Other communications.....	1,000	1,000	2,000
Subtotal.....	$82,000	$87,000	$96,000
B. Administrative Printing.....	$150,000	$165,000	$185,000
C. Supplies, Materials, and Equipment			
1. Supplies and materials.....	$308,000	$294,000	$236,000
2. Equipment.....	13,000	3,000	42,000
Subtotal.....	$321,000	$297,000	$278,000

	1972	1973	1974
D. Transportation			
1. Center support.....	$258,000	$204,000	$225,000
2. Common carrier.....	21,000	22,000	23,000
Subtotal.....	$279,000	$226,000	$248,000
E. Administrative Support Services			
1. Medical services.....	$38,000	$42,000	$46,000
Subtotal.....	$38,000	$42,000	$46,000
Total, Administrative Support.....	$870,000	$817,000	$853,000
A. Communications.....	$82,000	$87,000	$96,000

This includes charges for telegraph, telephone and teletype services, switchboard and service charges, and telephone installation charges. The increase in the 1974 estimate is primarily to meet the 1974 contractual option price.

B. Administrative Printing.....	$150,000	$165,000	$185,000

This category provides for printing, duplicating, photostating, blueprinting, photographic reproduction and binding services in support of Wallops Station. The printing and reproduction services are provided by the Station printing plant which is operated by contract personnel. The small increase is due to higher rental costs of reproduction equipment and purchase of replacement printing equipment.

C. Supplies, Materials, and Equipment..	$321,000	$297,000	$278,000

This category provides for the purchase of office and photographic supplies and materials, training material, electronics materials and equipment, general operating and general service materials and equipment, and missiles, aircraft, and vehicle equipment. The decrease in 1974 reflects fewer purchases of replacement supplies and materials.

D. Transportation.....	$279,000	$226,000	$248,000

This category provides for the transportation of people and goods within Wallops Station and the movement of goods by common carrier. It includes the contract operation of Wallops Shuttle Service, administrative aircraft services, and operation of motor vehicles. The increase in the 1974 estimate is to meet the 1974 option price of the shuttle bus contract and an increase in fuels and lubricants.

491-316 O - 73 - 17

	1972	1973	1974
E. Administrative Support Services.....	$38,000	$42,000	$46,000

Services under this category include the operation of the medical dispensary and Station health program. The increase in FY 1974 is to meet the option price for the medical services contract.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING CHART
WALLOPS STATION

STAFFING SUMMARY

	CY 73	BY 74
Excepted	2	2
GS-16	1	2
GS-15	10	11
GS-14	22	25
All Other GS	351	329
Wage Grade	51	51
Total Permanent	437	420

DIRECTOR

	CY	BY
Excepted	2	2
GS-16	-	-
GS-15	2	1
GS-14	-	-
All Other GS	1	1
Wage Grade	-	-
Total Permanent	5	4

OPERATIONS DIRECTORATE

	CY	BY
Excepted	-	-
GS-16	-	1
GS-15	2	2
GS-14	6	6
All Other GS	123	114
Wage Grade	0	0
Total Permanent	131	123

ENGINEERING DIRECTORATE

	CY	BY
Excepted	-	-
GS-16	1	1
GS-15	4	5
GS-14	11	14
All Other GS	82	71
Wage Grade	0	0
Total Permanent	98	91

ADMINISTRATION DIRECTORATE

	CY	BY
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	1	1
All Other GS	70	70
Wage Grade	1	1
Total Permanent	73	73

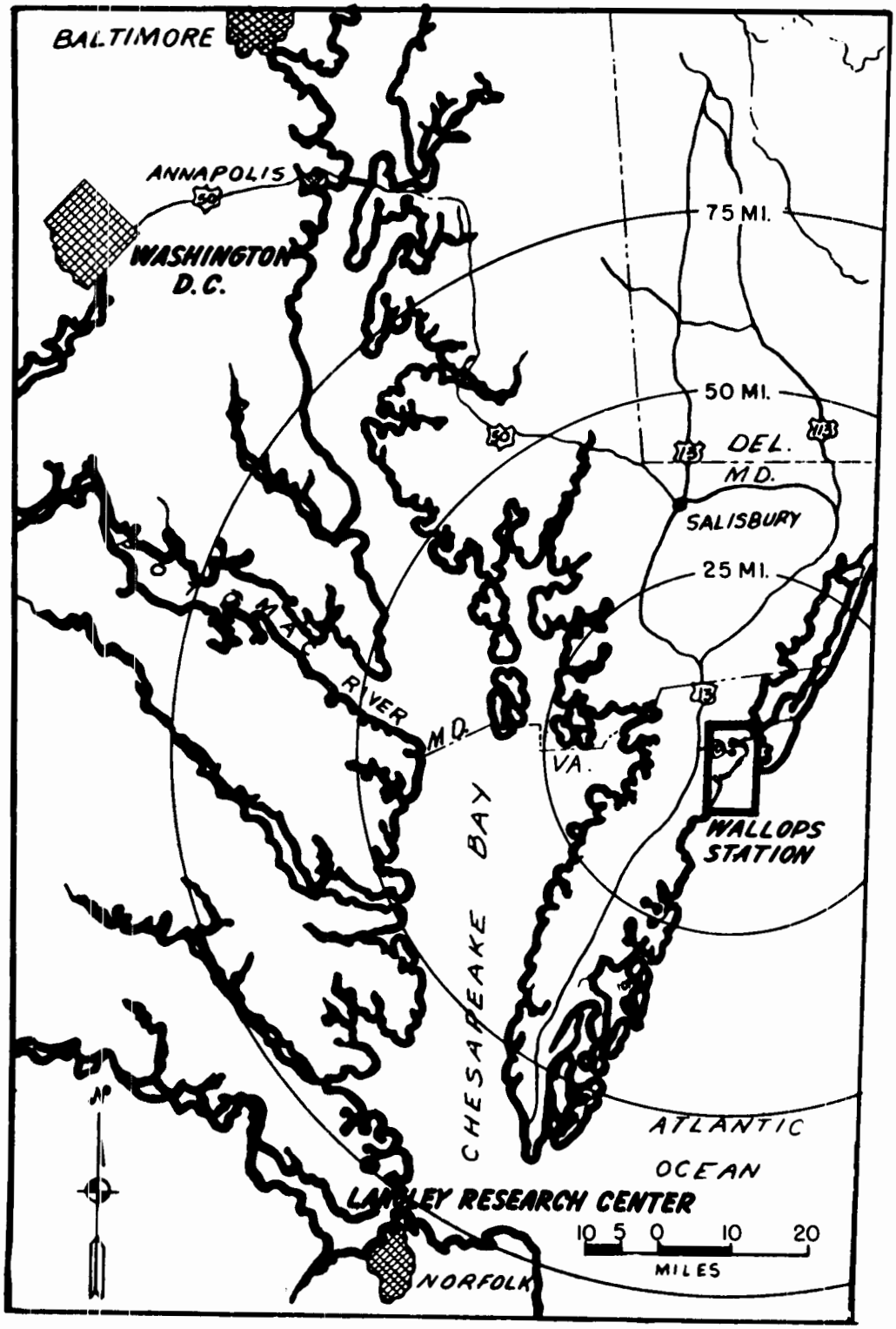
TECHNICAL SUPPORT DIRECTORATE

	CY	BY
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	0	0
All Other GS	63	63
Wage Grade	50	50
Total Permanent	114	114

APPLIED SCIENCE DIRECTORATE

	CY	BY
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	3	4
All Other GS	12	10
Wage Grade	0	0
Total Permanent	16	15

WALLOPS STATION LOCATION

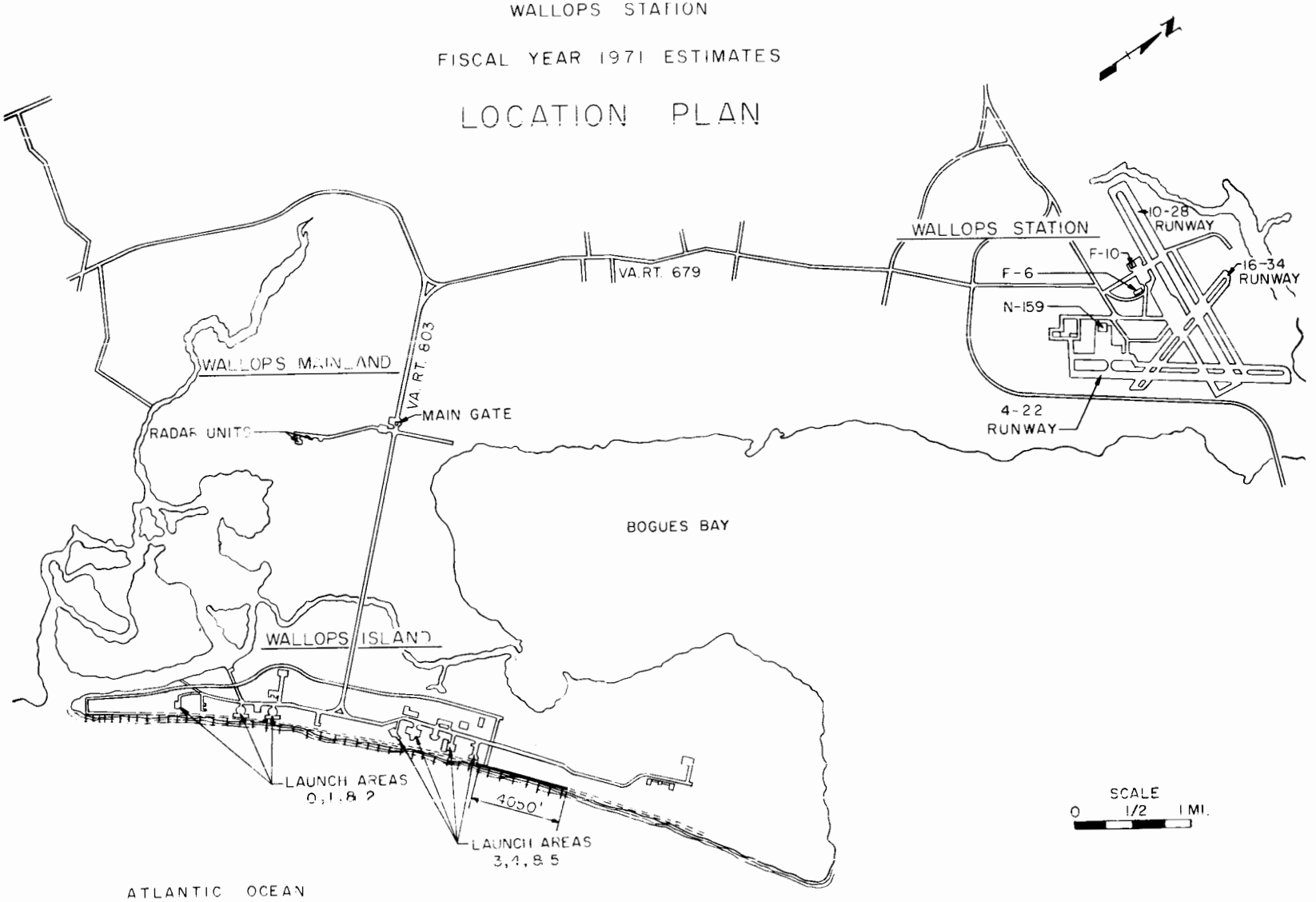


RPM 116

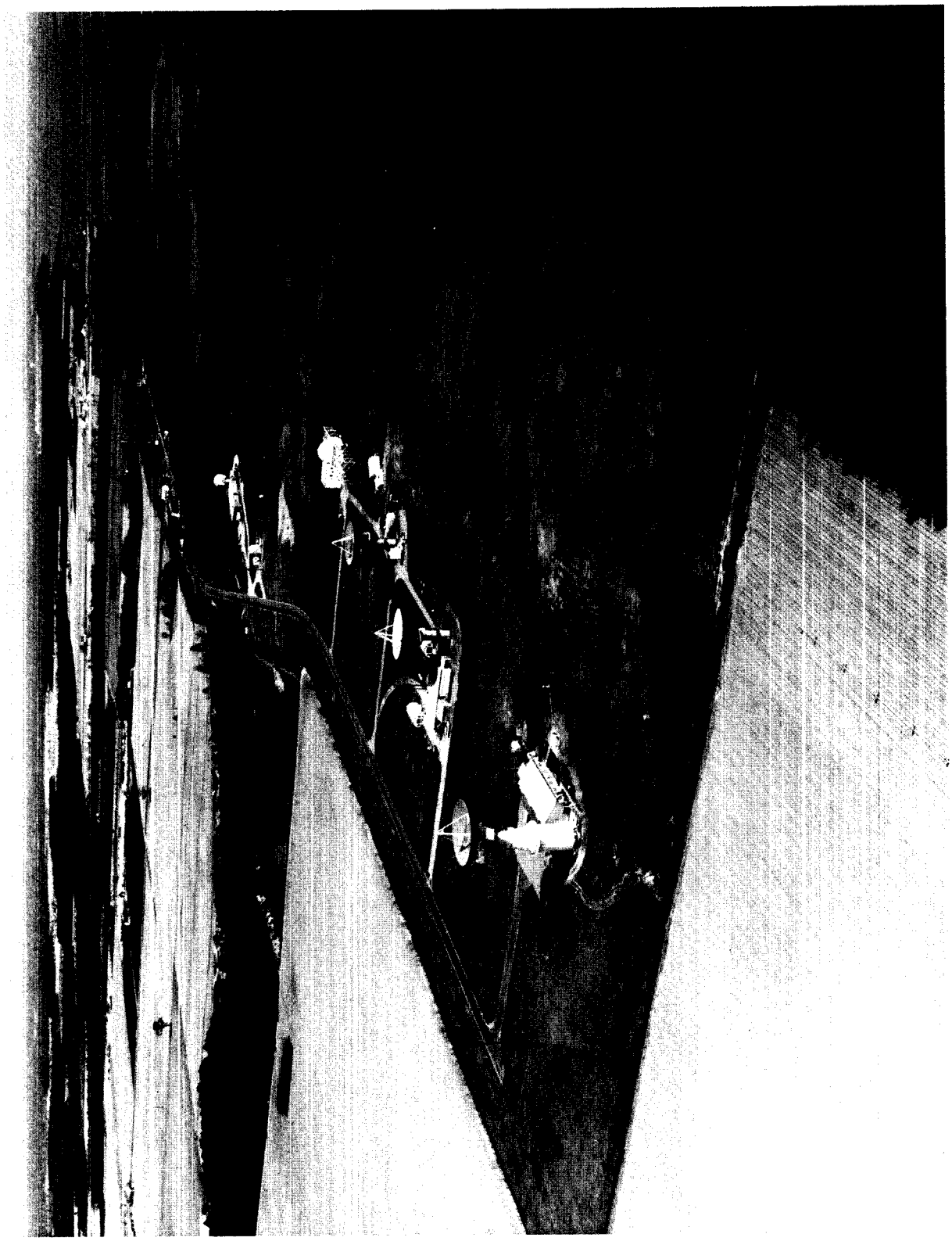
WALLOPS STATION

FISCAL YEAR 1971 ESTIMATES

LOCATION PLAN



RPM 118



RPM 119

RPM 120

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

AMES RESEARCH CENTER

MISSION

The programs at the Ames Research Center are directed at research and development in the fields of aeronautics, space science, life sciences and spacecraft technology, as well as at applications to national needs of the new science and technology growing out of the aerospace program. Specifically, the Center's major responsibilities are concentrated in six areas: Aeronautics, Space Shuttle, Life Sciences, Planetary and Earth Science and Astronomy, Applications, and the Pioneer Project.

The aeronautical research program at Ames is among the most important research and development efforts at the Center. To provide a guide for pursuing our experimental research, emphasis is placed on theoretical analyses as a basis for the prediction and understanding of fluid flows. This emphasis will lead to a much stronger role of the computer in the design of aeronautical vehicles throughout the speed range. Efforts are under way to exploit the great potential for using computational fluid dynamics in the future in place of certain types of more costly and time comsuming wind tunnel experiments. The ILLIAC IV computer will provide greatly expanded numerical computational capability for exploitation of this potential. In addition to the more basic areas, the Center is also a major contributor to V/STOL technology. VTOL and STOL aircraft systems are important in both civil and military aviation. Success in these applications will depend upon efficient flight and upon the ability to land and takeoff quickly and precisely from small areas with safety and regularity under all weather conditions. Research investigations are being carried out on specific concepts to achieve these broad objectives. This research involves systematic analytical studies and wind tunnel investigations to define and evaluate concepts, study of the flight characteristics of the concepts using flight simulators, and finally verification with flight vehicles of the technological advances indicated in the research program.

Military aircraft development programs historically have been supported through investigations in the Center's wind tunnels and simulators, many of which have unique test capabilities. This activity will be continued at a high level because it is vital to specific aircraft programs and because it affords insight into problems requiring further research for application to the design of future aircraft.

491-310 O - 73 - 18

The Space Shuttle program is being supported in a number of areas at Ames. Past research at the Center has contributed significantly to the solution of the problem of the survival of spacecraft during the very high aerodynamic heating attendant to high speed entry into the earth's atmosphere. The heat-protection systems for a relatively high maneuverable reusable craft such as the Space Shuttle present a very different problem from that of previous spacecraft which followed essentially a ballistic trajectory and were designed on the basis of a single mission. Thermal protection systems research is one area of space shuttle support being carried out at Ames. Other areas involve studies of the aerodynamic performance, stability and control of booster and orbiter vehicles, response to be expected, and the guidance control and piloting problems to be encountered in landing such vehicles. Studies are also being made to help provide for the design of the life support systems, a better understanding of space vehicle environmental effects on human performance, and the effects of long-term exposure to weightlessness on the physiology of humans.

Research in the life sciences is conducted in three major areas: (1) basic research in the physiological and behavioral sciences concerned with obtaining an understanding of the effects of aeronautical and space flight stresses upon man; (2) research in long-term advanced life support systems and in the human factors aspects of the relationships between man and the and the machine which transport and support him in a hostile environment; and (3) studies in exobiology oriented towards the prediction, detection and study of extraterrestrial fossils, chemicals, and life forms.

Research in space science includes studies of solar physics, planetary environments and geophysics. The studies pertain to magnetic fields and plasmas in space, the composition and structure of planets and planetary and stellar atmospheres. The work is both theoretical and experimental using laboratory equipment, sounding rockets and experiments carried on satellites and space probes. Experiments are also conducted on specifically outfitted aircraft which serve as airborne laboratories to provide, for example, a platform for an infrared telescope for astronomical observations that would otherwise be degraded from surface locations by the filtering effects of the atmosphere. Researchers throughout the scienctific community are invited to participate in studies conducted from the airborne laboratories.

Programs are being conducted to apply the technology developed by the space program to problems of the earth and its resources. These include Earth Survey Aircraft used to map the resources of selected areas and to assess damage from man-caused and natural disasters, laboratory experiments to understand the dynamics of the atmosphere, and computational studies of the effects of man's activities on regional air quality.

Ames has flight project management responsibility for the Pioneer Project. Pioneer provides scientific observations of phenomena in interplanetary space from unmanned spacecraft. Four Pioneer spacecraft are currently in separate orbits about the sun near the earth's orbit and all regularly provide information on solar radiation. One of these is in its seventh year of operation. Pioneer 10, launched in March 1972, will provide the first close-up studies of the planet Jupiter. Pioneer G will follow in April 1973. Design studies are being conducted on Pioneer Venus with plans to prove the Venutian atmosphere in detail.

In carrying out its mission, Ames works closely with the aerospace and educational communities and with other Government agencies. A number of cooperative of joint programs are currently in progress with the Army, Air Force, Navy, FAA and state and local agencies.

DESCRIPTION

The Ames Research Center was established in 1940 and is located at the southern end of San Francisco Bay on land contiguous to the U.S. Naval Air Station, Moffett Field, California. Its physical plant comprises many specialized facilities for aerospace research in the physical sciences as well as the space sciences and life sciences, all of which are included in the mission of the Center. These include wind tunnels, flight simulators, entry-heating simulators, and laboratories equipped to study solar and geophysical phenomena, life synthesis, life detection and life environmental factors. The Ames Research Center occupies about 365 acres of land. Certain other facilities, such as the utilities and airfield runways, are used jointly by NASA and the Department of the Navy, Also housed at the Ames Research Center is the U.S. Army Air Mobility, Research and Development Laboratory. Personnel from this laboratory work closely with Ames personnel on research of mutual interest. The capital investment at the Ames Research Center, including fixed assets in progress and contractor-held facilities at various locations as of June 30, 1972, was $280,564,000.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

Functions	1972	1973	1974
Personnel	$35,402,000	$35,471,000	$35,933,000
Travel	931,000	771,000	771,000
Facilities services	4,121,000	3,960,000	4,189,000
Technical services	339,000	338,000	391,000
Administrative support	1,424,000	1,440,000	1,535,000
Total, fund requirements	$42,217,000	$41,980,000	$42,819,000

	1972	1973	1974	Change in 1974
I. PERSONNEL.....	$35,402,000	$35,471,000	$35,933,000	$+462,000

Basis of Fund Requirements

	1972	1973	1974
A. Compensation and Benefits:			
1. Compensation:			
a. Permanent positions.....	$31,780,000	$31,611,000	$32,097,000
b. Nonpermanent positions..	423,000	491,000	481,000
c. Reimbursable details....	48,000	108,000	108,000
d. Overtime and other compensation.....	244,000	265,000	265,000
Subtotal, Compensation..	$32,495,000	$32,475,000	$32,951,000
2. Benefits.....	2,860,000	2,772,000	2,795,000
Subtotal, Compensation and Benefits.....	$35,355,000	$35,247,000	$35,746,000
B. Supporting Costs:			
1. Transfer of personnel.....	$37,000	$104,000	$67,000
2. Personnel training.....	10,000	120,000	120,000
Subtotal, Supporting Costs	$47,000	$224,000	$187,000
Total, Personnel and Related Costs.....	$35,402,000	$35,471,000	$35,933,000
1. Compensation.....	$32,495,000	$32,475,000	$32,951,000
a. Permanent positions.....	31,780,000	31,611,000	32,097,000

The cost for permanent positions is the largest part of the personnel and related costs. The funds shown above will support 1,729 permanent positions in 1973 and 1,699 in FY 1974. This represents a reduction of 30 from 1973 related to changes in the level of support for various space research program areas.

	1972	1973	1974
Permanent Positions by Program:			
Manned Space Flight			
Space flight operations	122	108	74
Space shuttle	10	10	24
Apollo	15	11	5
Space Sciences			
Physics and astronomy	70	74	69
Lunar and planetary exploration	152	152	155
Applications			
Space applications	44	45	51
Aeronautics and Space Technology			
Aeronautical research and technology	602	623	647
Space research and technology	231	196	191
Nuclear power and propulsion	25	25	---
Technology Utilization	6	6	6
Subtotal, positions by program	1,277	1,250	1,222
Indirect Positions			
Director and staff	35	33	33
Administrative support	159	152	152
Research and development support	300	294	292
Subtotal, indirect positions	494	479	477
Total, permanent positions	1,771	1,729	1,699
Other Than Permanent Positions	160	160	150
Total	1,931	1,889	1,849

The preceding table illustrates the use of civil service positions. The distribution by occupation of these positions illustrates a significant characteristic of the Ames work force. Professional scientific and engineering positions comprise about 48% of the Ames staff, technicians and technically oriented wage board positions comprise about 31% and administrative support positions amount to another 21%.

Occupational Group	1972 Number	1972 Percent	1973 Number	1973 Percent	1974 Number	1974 Percent
Professional scientists and engineers	841	47.5	824	47.6	809	47.6
Technicians	268	15.1	262	15.2	258	15.2
Wage board	284	16.0	273	15.8	268	15.8
Professional administrative	146	8.3	143	8.3	141	8.3
Clerical	232	13.1	227	13.1	223	13.1
Total	1,771	100.0	1,729	100.0	1,699	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the start of the year, as modified by within grade advances, career development, hiring at lower grade and step, etc. After these modifications, the year end position structure is established and the cost effect for the year is calculated based on the estimated period that these modifications are in effect.

In 1974 the cost of permanent positions will be $32,097,000, an increase of $486,000 from FY 1973. This is based upon turnover savings which will be partially off-set by increased costs for within-grade advances and promotions. This increase is projected as follows:

Cost of permanent positions in 1973		$31,611,000
Cost increases in 1974		1,332,000
Within grade advances and career development:		
Full year effect of 1973 actions	$966,000	
Partial year effect of 1974 actions	366,000	
Cost decreases in 1974		-846,000
Abolished positions:		
Full year effect of 1973 actions	-546,000	
Partial year effect of 1974 actions	-104,000	
Turnover savings	-196,000	
Cost of permanent positions in 1974		$32,097,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent Positions.....	$423,000	$491,000	$481,000

The 1973 and 1974 plan include 160 positions in FY 1973 and 150 in FY 1974. These positions are required for a variety of programs, the largest of which is NASA summer employment. Ames hires 75 college students and high school and college faculty members during the summer to provide these people exposure to NASA programs and government operations. Ames benefits from the employment of these highly skilled individuals through the support they provide to the permanent professional staff, and the education and training they receive are a considerable asset to themselves and to the Nation.

Sixty-five of the nonpermanent positions are used to provide for NASA participation in the President's Summer Aide Program and the Stay in School Program which enables disadvantaged youths to work at unskilled jobs at Ames. The participants in the program gain work experience and training which assist them in finding their place in the employment community.

Ames continues to provide training opportunities for technically oriented college students participating in the cooperative training program throughout the year. Currently there is only one student employed under a cooperative training agreement who works for a term at Ames and then spends a term in regular study at his university. This work-study program combines practical experience with theory and has served as a recruitment source for Ames.

c. Reimbursable Details.....	$48,000	$108,000	$108,000

The services of seven military officers with training in specialized scientific disciplines are utilized at Ames where such assignments are of mutual benefit to NASA and the military agency. In accordance with existing agreements, Ames reimburses the parent organization for the salaries and related costs of the detailees. Costs in 1972 are below projections for 1973 and 1974 because Ames was below its authorized ceiling of seven at that time.

d. Overtime and Other Compensation.....	$244,000	$265,000	$265,000

Overtime and other compensation is divided into $225,000 for overtime and $40,000 for night differential. Approximately half of each category is used for off-shift operation of major wind tunnel facilities such as the Unitary Plan Wind Tunnel System, the 40- by 80-Foot Wind Tunnel, the 14-Foot Transonic Wind Tunnel, and the 6- by 6-Foot Supersonic Wind Tunnel. Use of these tunnels during these periods not only increases the number of productive hours

but makes possible substantial savings because of available reduced rates for "off peak" electric power. The remainder of night differential provides for off-shift maintenance and shop work. The remainder of overtime is utilized for emergency maintenance and for some administrative work such as year end closing of fiscal records.

	1972	1973	1974
2. Benefits.....	$2,860,000	$2,772,000	$2,795,000

In addition to compensation, Ames makes an employer's contribution to personnel benefits as authorized and required by law. The following table indicates the cost of personnel benefits by the major categories:

Category of Cost			
Contribution to the Civil Service Retirement Fund.....	$2,275,000	$2,273,000	$2,307,000
Contribution for employee life insurance.....	101,000	102,000	102,000
Contribution for employee health insurance.....	330,000	351,000	351,000
FICA.....	19,000	21,000	21,000
Incentive awards.....	8,000	14,000	14,000
Severance pay.....	127,000	11,000	---
Total.....	$2,860,000	$2,772,000	$2,795,000
B. Supporting Costs.....	$47,000	$224,000	$187,000

Supporting personnel costs provide for the moving expenses of employees to their initial duty station or reassignment and for maintaining and expanding the skills of our employees. These costs are summarized as follows:

1. Transfer of personnel.....	$37,000	$104,000	$67,000

The costs support the transfer of personnel from other NASA installations and from other government agencies. The decrease in FY 1974 is because of a lower number of planned transfers.

2. Personnel training.....	$10,000	$120,000	$120,000

The maintenance and expansion of the skills of personnel are essential in carrying out the Center's technical and administrative programs. These train-

ing activities include the development of supervisory and management skills, improvement of clerical and secretarial support, administrative data processing, general and specific courses in safe work practices, and development of specific skills such as technical writing. Part of this training is offered by other government agencies, usually for a fee. The remainder is provided through non-governmental sources such as colleges and technical institutes. The estimates for 1973 and 1974 are based upon a continuation of current training programs and new programs for extensive training of research test pilots.

	1972	1973	1974	Change in 1974
II. TRAVEL	$931,000	$771,000	$771,000	---

Basis of Fund Requirements

Summary of Travel by Major Category

	1972	1973	1974
A. Program Related Travel			
1. Direction, coordination, and management of Research and Development and Construction of Facilities program activities	$559,000	$501,000	$501,000
2. Flight mission support	59,000	80,000	80,000
3. Overseas travel to launch and tracking sites	---	3,000	3,000
Subtotal	$618,000	$584,000	$584,000
B. Meetings and Technical Seminars			
1. Government-sponsored meetings	148,000	69,000	69,000
2. Other than government-sponsored meetings and technical seminars	97,000	18,000	18,000
Subtotal	$245,000	$87,000	$87,000
C. Administrative Travel	$68,000	$100,000	$100,000
Total, Travel	$931,000	$771,000	$771,000
A. Program Related Travel	$618,000	$584,000	$584,000

491-316 O - 73 - 19

Program related travel is the travel most directly related to the NASA mission. It is the largest part of the travel function and accounts for approximately 76% of the travel requirements for 1974.

	1972	1973	1974
1. Direction, coordination, and management of programs.....	$559,000	$501,000	$501,000

The largest individual part of program related travel is for direction, coordination, and management of Research and Development program activities. Because of the complexity of the programs and associated experiments and the distribution of contractor and subcontractor effort throughout the entire United States, coordination and management of activities require frequent examination by personnel responsible for the programs. The three most significant examples of these activities are the Pioneer Program, the STOLAND Program, and the Solar Pointing Aerobee Rocket Control System.

2. Flight mission support.....	$59,000	$80,000	$80,000

As projects reach the flight stage, support is required for prelaunch, launch and postlaunch activities. The amount of travel required for this purpose is directly related to both the number and complexity of the launches. The estimate for 1974 is in consonance with twelve scheduled launches of the Solar Pointing Aerobee Rocket Control System and experiment support to other launches.

3. Overseas travel to launch and tracking sites.....	---	$3,000	$3,000

Overseas travel to launch and tracking sites provides for coordination with Madrid, Johannesburg, and Woomera tracking sites for Pioneer launches.

B. Meeting and Technical Seminars...	$245,000	$87,000	$87,000

Travel to meetings and technical seminars permits employees engaged in program activities to particpate at both government-sponsored and non-government-sponsored meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to advances in the field which arise outside NASA, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the government-sponsored meetings are made up of working panels convened to solve certain problems for the benefit of the government. Authorization to attend meetings of the types described is granted only after assurance that attendance will be in the best interest of NASA. The geographical distance from NASA Headquarters increases the relative cost for this participation. The reductions in 1973 and in 1974 result from the overall constraint on the Center's travel limitation.

	1972	1973	1974
C. Administrative Travel.....	$68,000	$100,000	$100,000

Administrative travel includes travel for the direction and coordination of general management matters. It includes travel by functional managers in such areas as personnel, financial management, and procurement to assure that policies and procedures are being implemented properly. The travel of Center officials to NASA Headquarters in connection with advanced planning and other management matters is provided for in this category.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES....	$4,121,000	$3,960,000	$4,189,000	$-229,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Minor rehabilitation and modification, and construction.....	$3,000	---	---
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds.....	$344,000	$120,000	$165,000
2. Maintenance of equipment....	37,000	38,000	40,000
3. Custodial services.....	903,000	837,000	897,000
Subtotal.....	$1,284,000	$995,000	$1,102,000
C. Operation of Facilities			
1. Utilities.....	$2,641,000	$2,770,000	$2,892,000
2. Supplies and equipment.....	193,000	195,000	195,000
Subtotal.....	$2,834,000	$2,965,000	$3,087,000
Total, Facilities Services.....	$4,121,000	$3,960,000	$4,189,000
A. Acquisition of Facilities.....	$3,000	---	---
1. Minor rehabilitation and modification, and construction.....	$3,000	---	---

This activity provides for additions, minor rehabilitation and modification, and construction of institutional facilities within statutory limitations; however, no projects are planned within these limitations for 1973 and 1974.

	1972	1973	1974
B. Maintenance and Related Services	$1,284,000	$995,000	$1,102,000
1. Maintenance of buildings and grounds.....	$344,000	$120,000	$165,000

The year-around requirement for landscaping care requires six man-years of effort. Building maintenance and repair expenditures chargeable to this appropriation are restricted to seven institutional buildings which contain no special purpose equipment other than normal heating and ventilating systems. A revision to the contracting plan in FY 1973 is the cause for the increase in FY 1974.

2. Maintenance of equipment....	$37,000	$38,000	$40,000

Maintenance and repair of equipment consists of contracted services necessary to keep operational the mechanical, electrical, and electronic office and shop equipment such as 67 adding machines, 346 calculators, 601 typewriters, 180 dictating and transcribing machines, etc., necessary for general support of Center activities. The estimate provides for on-call repair only. There is a slight increase in FY 1974 due to increased labor costs previously negotiated.

3. Custodial services.....	$903,000	$837,000	$897,000

The estimate for custodial services includes the cost for janitorial cleaning, protective security, fire protection, and refuse handling services. Ames has 1,445,000 square feet of office, laboratory, and shop area under care with each building area meeting a specified level of cleaning dependent upon use. Bid price on refuse handling is based on 51 stops for a total of 134 cubic yards daily. Fire protection for sixty buildings and sixteen aircraft is provided by NAS Moffett Field at a cost negotiated on a basis of building size and numbers of aircraft relative to the Naval installation. Bid price on security service is based on providing twenty-five man-years of twenty-four hour duty. The change in FY 1974 is to provide for negotiated increases in the support service contracts.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES.....	$339,000	$338,000	$391,000	$+53,000

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment.....	$34,000	$32,000	$35,000
2. Purchase of equipment.....	24,000	18,000	18,000
3. Maintenance of equipment.....	22,000	23,000	23,000
Subtotal, equipment.....	$80,000	$73,000	$76,000
4. Programming and operations services.....	254,000	255,000	305,000
Subtotal.....	$334,000	$328,000	$381,000
B. Engineering Services.....	$1,000	---	---
C. Scientific and Technical Information and Educational Programs			
1. Educational/information programs.....	$4,000	$10,000	$10,000
Total, Technical Services.....	$339,000	$338,000	$391,000
A. Automatic Data Processing.....	$334,000	$328,000	$381,000

The R&PM appropriation provides for that portion of the lease, purchase and maintenance of ADP equipment and programming and operations services of ADP systems which are in support of administrative programs. These include the maintenance of financial records and controls, and a management information system which identifies status on manpower utilization, program expenditures, procurement and travel. The change in FY 1974 is due to negotiated increases in the support contract.

B. Engineering Services.....	$1,000	---	---

Engineering services provide for building and equipment design studies and other related engineering services. No funds are projected for 1974 because no building alterations are projected.

C. Scientific and Technical Information and Educational Programs.....	$4,000	$10,000	$10,000
1. Educational/informational programs.....	$4,000	$10,000	$10,000

The educational/informational programs provide for the gathering and dissemination of information about the agency's programs to the mass communications media, the general public, and to the educational community at the elementary and secondary levels. Assistance to the mass communications media includes the gathering and exposition of newsworthy materials in support of their requests, and takes such forms as press kits, news releases, television and radio information tapes and clips, and feature material.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT..	$1,424,000	$1,440,000	$1,535,000	$+95,000

Basis of Fund Requirements

Summary of Administrative Support

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$217,000	$213,000	$220,000
2. Local telephone service.....	296,000	270,000	270,000
3. Other communications.....	25,000	44,000	40,000
Subtotal.....	$538,000	$527,000	$530,000
B. Administrative Printing.....	$23,000	$25,000	$30,000
C. Supplies, Materials and Equipment.....			
1. Supplies and materials.....	$151,000	$164,000	$165,000
2. Equipment.....	31,000	22,000	22,000
Subtotal.....	$182,000	$186,000	$187,000
D. Transportation.....			
1. Center operations.....	$3,000	$43,000	$43,000
2. Common carrier.....	63,000	43,000	36,000
Subtotal.....	$66,000	$86,000	$79,000
E. Administrative Support Services			
1. Medical.....	$93,000	$106,000	$115,000
2. Other administrative.....	522,000	510,000	594,000
Subtotal.....	$615,000	$616,000	$709,000
Total, Administrative Support Services.....	$1,424,000	$1,440,000	$1,535,000

	1972	1973	1974
A. Communications.....	$538,000	$527,000	$530,000

Included in this estimate are the costs of leased lines, long distance tolls, local telephone exchange service and other communications such as TWX. Ames has twenty incoming trunk lines and 2,185 installed telephone instruments. Past experience has shown that there are approximately 100,000 long distance calls and 180,000 FTS calls per year.

Costs for certain operational communications related to flight activities, such as Pioneer, and dedicated leased lines are excluded from the Research and Program Management appropriation, but are included in the relevant program in the Research and Development appropriation.

B. Administrative Printing.....	$23,000	$25,000	$30,000

Administrative printing includes the publication of information and operating materials such as telephone directories semi-annually, in-house organ bi-weekly, in-house forms, stores stock catalog revisions, and employee brochures. Estimates include funds for contractual printing and the related composition and binding operations. This includes services performed by other agencies, chiefly the Government Printing Office, or by commercial printing firms. All common processes of duplication, including photographic reproductions, are included.

C. Supplies, Materials and Equipment..	$182,000	$186,000	$187,000

Administrative supplies, materials and equipment include office supplies of a general nature and general office equipment such as furniture, typewriters, and calculators.

D. Transportation.....	$66,000	$86,000	$79,000

Transportation services include costs for local motor pool operations and associated services, as well as the movement of supplies, materials, equipment and related items by common carrier. Fifty-four motor pool vehicles are leased from GSA and are used for the delivery of supplies and materials and internal mail within the Center, security patrols, off-site pickup of special supplies and for local transportation of personnel. Increase in FY 1973 reflects increase in GSA rates. Decrease in FY 1974 anticipates release of several vehicles.

E. Administrative Support Services...	$615,000	$616,000	$709,000

Administrative support services include those services which support the installation generally, such as twenty-one man-years for the operation of the Center's supply and warehousing facilities, eleven man-years for the distri-

bution of internal mail and special messenger service, three man-years for providing logistic support to the Public Affairs program. The increase in FY 1974 is for the full year effect of higher support contractor costs which were previously negotiated.

(NASA HEADQUARTERS)

PATENT COUNSEL

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	1	1
WAGE GRADE	–	–
TOTAL PERMANENT	3	3

CHIEF COUNSEL

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	–	
ALL OTHER GS	2	2
WAGE GRADE	–	–
TOTAL PERMANENT	3	3

HEALTH AND SAFETY OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	3	3
WAGE GRADE	–	–
TOTAL PERMANENT	4	4

DIRECTOR OF ADMINISTRATION

	73	74
EXCEPTED	1	1
GS–16	1	1
GS–15	–	–
GS–14	–	–
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	6	6

DIRECTOR OF RESEARCH SUPPORT

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	2	2
GS–14	–	–
ALL OTHER GS	3	3
WAGE GRADE	–	–
TOTAL PERMANENT	7	7

ADVANCED CONCEPTS & MISSIONS DIVISION

	73	74
EXCEPTED	1	1
GS–16	1	1
GS–15	5	5
GS–14	10	10
ALL OTHER GS	27	27
WAGE GRADE	–	–
TOTAL PERMANENT	44	44

RESOURCES MANAGEMENT OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	6	6
WAGE GRADE	–	–
TOTAL PERMANENT	8	8

RESEARCH FACILITIES & INSTRUMENTATION DIVISION

	73	74
EXCEPTED	–	–
GS–16	2	2
GS–15	5	5
GS–14	13	13
ALL OTHER GS	120	120
WAGE GRADE	50	50
TOTAL PERMANENT	190	190

FINANCIAL MANAGEMENT DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	41	41
WAGE GRADE	–	–
TOTAL PERMANENT	42	42

TECHNICAL SERVICES DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	
GS–14	1	1
ALL OTHER GS	81	79
WAGE GRADE	156	156
TOTAL PERMANENT	238	236

PERSONNEL DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	35	35
WAGE GRADE	–	–
TOTAL PERMANENT	37	37

COMPUTATION DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	1	1
GS–14	4	4
ALL OTHER GS	57	58
WAGE GRADE	–	–
TOTAL PERMANENT	63	64

PROCUREMENT DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	6	6
ALL OTHER GS	48	48
WAGE GRADE	–	–
TOTAL PERMANENT	55	55

INSTITUTE FOR ADVANCED COMPUTATION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	4	4
GS–14	–	
ALL OTHER GS	10	11
WAGE GRADE	–	–
TOTAL PERMANENT	15	16

TECHNICAL INFORMATION DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	28	28
WAGE GRADE	5	5
TOTAL PERMANENT	34	34

SERVICES & SUPPLY DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	30	30
WAGE GRADE	9	9
TOTAL PERMANENT	40	40

JANUARY 1973

RPM 137

	73	74
GS–15	3	3
GS–14	1	1
ALL OTHER GS	6	6
WAGE GRADE	–	–
TOTAL PERMANENT	14	14

I OFFICE

	73	74
	–	–
	–	–
	–	–
	2	2
	2	2
	–	–
	4	4

PUBLIC AFFAIRS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	7	7
WAGE GRADE	–	–
TOTAL PERMANENT	8	8

PATENT COUNSEL

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	1	1
WAGE GRADE	–	–
TOTAL PERMANENT	3	3

CHIEF COUNSEL

	73
EXCEPTED	–
GS–16	–
GS–15	1
GS–14	–
ALL OTHER GS	2
WAGE GRADE	–
TOTAL PERMANENT	3

AUTICS

	73	74
	2	2
	–	–
	2	2
	–	–
	1	1
	–	–
	5	5

DIRECTOR OF LIFE SCIENCES

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	1	1
GS–14	2	2
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	9	9

DIRECTOR OF DEVELOPMENT

	73	74
EXCEPTED	1	1
GS–16	1	1
GS–15	2	2
GS–14	1	1
ALL OTHER GS	5	5
WAGE GRADE	–	–
TOTAL PERMANENT	10	10

DIRECTOR OF ADMINISTRATION

	73	74
EXCEPTED	1	1
GS–16	1	1
GS–15	–	–
GS–14	–	–
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	6	6

DI

EX	
GS	
GS	
GS	
AL	
WA	
TO	

IICS DIVISION

	73	74
	1	1
	–	–
	18	18
	25	25
	99	99
	8	8
	151	151

PLANETARY BIOLOGY DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	2	2
GS–14	4	4
ALL OTHER GS	36	36
WAGE GRADE	–	–
TOTAL PERMANENT	43	43

FLIGHT PROJECT DEVELOPMENT DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	7	7
GS–14	14	14
ALL OTHER GS	41	41
WAGE GRADE	–	–
TOTAL PERMANENT	63	63

RESOURCES MANAGEMENT OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	6	6
WAGE GRADE	–	–
TOTAL PERMANENT	8	8

EX
GS
GS
GS
AL
WA
TO

VISION

	73	74
	1	1
	–	–
	18	18
	20	20
	69	69
	1	1
	109	109

BIOMEDICAL RESEARCH DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	4	4
GS–14	7	7
ALL OTHER GS	24	24
WAGE GRADE	3	3
TOTAL PERMANENT	39	39

PROJECT PIONEER

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	5	5
GS–14	13	13
ALL OTHER GS	26	26
WAGE GRADE	–	–
TOTAL PERMANENT	45	45

FINANCIAL MANAGEMENT DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	41	41
WAGE GRADE	–	–
TOTAL PERMANENT	42	42

E
G
G
A
T

OJECTS OFFICE

	73	74
	–	–
	–	–
	1	1
	2	2
	18	18
	–	–
	21	21

BIOTECHNOLOGY DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	2	2
GS–14	13	13
ALL OTHER GS	35	35
WAGE GRADE	–	–
TOTAL PERMANENT	51	51

RELIABILITY AND QUALITY ASSURANCE OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	–	–
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	5	5

PERSONNEL DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	35	35
WAGE GRADE	–	–
TOTAL PERMANENT	37	37

IAFT SUPPORT FFICE

	73	74
	–	–
	–	–
	1	1
	1	1
	4	4
	–	–
	6	6

PROCUREMENT DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	6	6
ALL OTHER GS	48	48
WAGE GRADE	–	–
TOTAL PERMANENT	55	55

TECHNICAL INFORMATION DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	28	28
WAGE GRADE	5	5
TOTAL PERMANENT	34	34

RGANIZATION

SERVICES & SUPPLY DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	30	30
WAGE GRADE	9	9
TOTAL PERMANENT	40	40

GS–15	128	128
GS–14	204	204
ALL OTHER GS	1093	1063
WAGE GRADE	267	267
TOTAL PERMANENT	1729	1699

GS–14		
ALL OTHER GS		
WAGE GRADE		
TOTAL PERMANENT		

TECHNOLOGY UTILIZATION OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	2	2
ALL OTHER GS	2	2
WAGE GRADE	–	–
TOTAL PERMANENT	4	4

PUBLIC AFFAIRS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	7	7
WAGE GRADE	–	–
TOTAL PERMANENT	8	8

DIRECTOR OF AERONAUTICS & FLIGHT SYSTEMS

	73	74
EXCEPTED	1	1
GS–16	1	1
GS–15	–	–
GS–14	1	1
ALL OTHER GS	3	3
WAGE GRADE	–	–
TOTAL PERMANENT	6	6

DIRECTOR OF ASTRONAUTICS

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	2	2
GS–14	–	–
ALL OTHER GS	1	1
WAGE GRADE	–	–
TOTAL PERMANENT	5	5

DIRECTOR OF LIFE SCIENCES

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	1	1
GS–14	2	2
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	9	9

DIRECTOR OF DEVI

EXCEPTED		
GS–16		
GS–15		
GS–14		
ALL OTHER GS		
WAGE GRADE		
TOTAL PERMANENT		

AERONAUTICS DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	11	11
GS–14	17	17
ALL OTHER GS	87	72
WAGE GRADE	28	28
TOTAL PERMANENT	144	129

FLIGHT SYSTEMS RESEARCH DIVISION

	73	74
EXCEPTED	–	–
GS–16	4	4
GS–15	19	19
GS–14	23	23
ALL OTHER GS	72	57
WAGE GRADE	6	6
TOTAL PERMANENT	124	109

SIMULATION SCIENCES DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	4	4
GS–14	8	8
ALL OTHER GS	31	31
WAGE GRADE	1	1
TOTAL PERMANENT	45	45

V/STOL PROJECT OFFICE

	73	74
EXCEPTED	–	–
GS–16	2	2
GS–15	5	5
GS–14	8	8
ALL OTHER GS	23	23
WAGE GRADE	–	–
TOTAL PERMANENT	38	38

THERMO- AND GAS-DYNAMICS DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	18	18
GS–14	25	25
ALL OTHER GS	99	99
WAGE GRADE	8	8
TOTAL PERMANENT	151	151

SPACE SCIENCE DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	18	18
GS–14	20	20
ALL OTHER GS	69	69
WAGE GRADE	1	1
TOTAL PERMANENT	109	109

CHEMICAL RESEARCH PROJECTS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	2	2
ALL OTHER GS	18	18
WAGE GRADE	–	–
TOTAL PERMANENT	21	21

*APPLICATIONS AIRCRAFT SUPPORT PROGRAMS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	6	6

PLANETARY BIOLOGY DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	2	2
GS–14	4	4
ALL OTHER GS	36	36
WAGE GRADE	–	–
TOTAL PERMANENT	43	43

BIOMEDICAL RESEARCH DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	4	4
GS–14	7	7
ALL OTHER GS	24	24
WAGE GRADE	3	3
TOTAL PERMANENT	39	39

BIOTECHNOLOGY DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	2	2
GS–14	13	13
ALL OTHER GS	35	35
WAGE GRADE	–	–
TOTAL PERMANENT	51	51

FLIGHT PROJECT DEVELO

EXCEPTED		
GS–16		
GS–15		
GS–14		
ALL OTHER GS		
WAGE GRADE		
TOTAL PERMANENT		

PROJECT PION

EXCEPTED		
GS–16		
GS–15		
GS–14		
ALL OTHER GS		
WAGE GRADE		
TOTAL PERMANENT		

RELIABILITY AND ASSURANCE O

EXCEPTED		
GS–16		
GS–15		
GS–14		
ALL OTHER GS		
WAGE GRADE		
TOTAL PERMANENT		

*PROPOSED CHANGES TO BASIC ORGANIZATION

AUTICS AND SPACE ADMINISTRATION
TION AND STAFFING CHART
ES RESEARCH CENTER

DIRECTOR

	73	74
CEPTED	4	4
-16	–	–
-15	3	3
-14	1	1
L OTHER GS	6	6
GE GRADE	–	–
TAL PERMANENT	14	14

OFFICE OF AERONAUTICS AND SPACE TECHNOLOGY

(NASA HEADQUARTERS)

PATENT COUNSEL

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	1	1
WAGE GRADE	–	–
TOTAL PERMANENT	3	3

CHIEF COUNSEL

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	–	
ALL OTHER GS	2	2
WAGE GRADE	–	–
TOTAL PERMANENT	3	3

HEALTH AND SAFETY OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	3	3
WAGE GRADE	–	–
TOTAL PERMANENT	4	4

DIRECTOR OF DEVELOPMENT

	73	74
CEPTED	1	1
-16	1	1
-15	2	2
-14	1	1
. OTHER GS	5	5
GE GRADE	–	–
TAL PERMANENT	10	10

DIRECTOR OF ADMINISTRATION

	73	74
EXCEPTED	1	1
GS–16	1	1
GS–15	–	–
GS–14	–	–
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	6	6

DIRECTOR OF RESEARCH SUPPORT

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	2	2
GS–14	–	–
ALL OTHER GS	3	3
WAGE GRADE	–	–
TOTAL PERMANENT	7	7

ADVANCED CONCEPTS & MISSIONS DIVISION

	73
EXCEPTED	1
GS–16	1
GS–15	5
GS–14	10
ALL OTHER GS	27
WAGE GRADE	–
TOTAL PERMANENT	44

IT PROJECT DEVELOPMENT DIVISION

	73	74
CEPTED	1	1
–16	–	–
–15	7	7
–14	14	14
L OTHER GS	41	41
GE GRADE	–	–
TAL PERMANENT	63	63

RESOURCES MANAGEMENT OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	6	6
WAGE GRADE	–	–
TOTAL PERMANENT	8	8

RESEARCH FACILITIES & INSTRUMENTATION DIVISION

	73	74
EXCEPTED	–	–
GS–16	2	2
GS–15	5	5
GS–14	13	13
ALL OTHER GS	120	120
WAGE GRADE	50	50
TOTAL PERMANENT	190	190

PROJECT PIONEER

	73	74
CEPTED	1	1
-16	–	–
-15	5	5
-14	13	13
L OTHER GS	26	26
GE GRADE	–	–
TAL PERMANENT	45	45

FINANCIAL MANAGEMENT DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	41	41
WAGE GRADE	–	–
TOTAL PERMANENT	42	42

TECHNICAL SERVICES DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	
GS–14	1	1
ALL OTHER GS	81	79
WAGE GRADE	156	156
TOTAL PERMANENT	238	236

RELIABILITY AND QUALITY ASSURANCE OFFICE

	73	74
CEPTED	–	–
–16	–	–
–15	1	1
–14	–	–
L OTHER GS	4	4
GE GRADE	–	–
TAL PERMANENT	5	5

PERSONNEL DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	35	35
WAGE GRADE	–	–
TOTAL PERMANENT	37	37

COMPUTATION DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	1	1
GS–14	4	4
ALL OTHER GS	57	58
WAGE GRADE	–	–
TOTAL PERMANENT	63	64

PROCUREMENT DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	6	6
ALL OTHER GS	48	48
WAGE GRADE	–	–
TOTAL PERMANENT	55	55

INSTITUTE FOR ADVANCED COMPUTATION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	4	4
GS–14	–	
ALL OTHER GS	10	11
WAGE GRADE	–	–
TOTAL PERMANENT	15	16

TECHNICAL INFORMATION DIVISION

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	28	28
WAGE GRADE	5	5
TOTAL PERMANENT	34	34

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING CHART
AMES RESEARCH CENTER

DIRECTOR

	73	74
EXCEPTED	4	4
GS–16	–	–
GS–15	3	3
GS–14	1	1
ALL OTHER GS	6	6
WAGE GRADE	–	–
TOTAL PERMANENT	14	14

TECHNOLOGY UTILIZATION OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	2	2
ALL OTHER GS	2	2
WAGE GRADE	–	–
TOTAL PERMANENT	4	4

PUBLIC AFFAIRS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	7	7
WAGE GRADE	–	–
TOTAL PERMANENT	8	8

PATENT COUNSEL

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	1	1
WAGE GRADE	–	–
TOTAL PERMANENT	3	3

DIRECTOR OF ASTRONAUTICS

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	2	2
GS–14	–	–
ALL OTHER GS	1	1
WAGE GRADE	–	–
TOTAL PERMANENT	5	5

THERMO- AND GAS-DYNAMICS DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	18	18
GS–14	25	25
ALL OTHER GS	99	99
WAGE GRADE	8	8
TOTAL PERMANENT	151	151

SPACE SCIENCE DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	18	18
GS–14	20	20
ALL OTHER GS	69	69
WAGE GRADE	1	1
TOTAL PERMANENT	109	109

CHEMICAL RESEARCH PROJECTS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	2	2
ALL OTHER GS	18	18
WAGE GRADE	–	–
TOTAL PERMANENT	21	21

*APPLICATIONS AIRCRAFT SUPPORT PROGRAMS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	6	6

DIRECTOR OF LIFE SCIENCES

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	1	1
GS–14	2	2
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	9	9

PLANETARY BIOLOGY DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	2	2
GS–14	4	4
ALL OTHER GS	36	36
WAGE GRADE	–	–
TOTAL PERMANENT	43	43

BIOMEDICAL RESEARCH DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	4	4
GS–14	7	7
ALL OTHER GS	24	24
WAGE GRADE	3	3
TOTAL PERMANENT	39	39

BIOTECHNOLOGY DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	2	2
GS–14	13	13
ALL OTHER GS	35	35
WAGE GRADE	–	–
TOTAL PERMANENT	51	51

DIRECTOR OF DEVELOPMENT

	73	74
EXCEPTED	1	1
GS–16	1	1
GS–15	2	2
GS–14	1	1
ALL OTHER GS	5	5
WAGE GRADE	–	–
TOTAL PERMANENT	10	10

FLIGHT PROJECT DEVELOPMENT DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	7	7
GS–14	14	14
ALL OTHER GS	41	41
WAGE GRADE	–	–
TOTAL PERMANENT	63	63

PROJECT PIONEER

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	5	5
GS–14	13	13
ALL OTHER GS	26	26
WAGE GRADE	–	–
TOTAL PERMANENT	45	45

RELIABILITY AND QUALITY ASSURANCE OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	–	–
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	5	5

DIRECTOR OF ADMINIS

EXCEPTED	
GS–16	
GS–15	
GS–14	
ALL OTHER GS	
WAGE GRADE	
TOTAL PERMANENT	

RESOURCES MANAGEMENT

EXCEPTED	
GS–16	
GS–15	
GS–14	
ALL OTHER GS	
WAGE GRADE	
TOTAL PERMANENT	

FINANCIAL MANAGEMENT

EXCEPTED	
GS–16	
GS–15	
GS–14	
ALL OTHER GS	4
WAGE GRADE	
TOTAL PERMANENT	4

PERSONNEL DIVISION

EXCEPTED	–
GS–16	–
GS–15	
GS–14	
ALL OTHER GS	3
WAGE GRADE	–
TOTAL PERMANENT	37

PROCUREMENT DIVISI

EXCEPTED	–
GS–16	–
GS–15	
GS–14	
ALL OTHER GS	4
WAGE GRADE	–
TOTAL PERMANENT	5

TECHNICAL INFORMATION DI

EXCEPTED	–
GS–16	–
GS–15	–
GS–14	1
ALL OTHER GS	28
WAGE GRADE	5
TOTAL PERMANENT	34

*PROPOSED CHANGES TO BASIC ORGANIZATION

NATIONAL AERONAUTICS AND
ORGANIZATION AND S
AMES RESEARCH

CENTER TOTAL

	73	74
EXCEPTED	22	22
GS–16	15	15
GS–15	128	128
GS–14	204	204
ALL OTHER GS	1093	1063
WAGE GRADE	267	267
TOTAL PERMANENT	1729	1699

DIRECTOR

EXCEPTED	
GS–16	
GS–15	
GS–14	
ALL OTHER GS	
WAGE GRADE	
TOTAL PERMANENT	

TECHNOLOGY UTILIZATION OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	2	2
ALL OTHER GS	2	2
WAGE GRADE	–	–
TOTAL PERMANENT	4	4

PUBLIC AFFAIRS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	–	–
GS–14	1	1
ALL OTHER GS	7	7
WAGE GRADE	–	–
TOTAL PERMANENT	8	8

DIRECTOR OF AERONAUTICS & FLIGHT SYSTEMS

	73	74
EXCEPTED	1	1
GS–16	1	1
GS–15	–	–
GS–14	1	1
ALL OTHER GS	3	3
WAGE GRADE	–	–
TOTAL PERMANENT	6	6

DIRECTOR OF ASTRONAUTICS

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	2	2
GS–14	–	–
ALL OTHER GS	1	1
WAGE GRADE	–	–
TOTAL PERMANENT	5	5

DIRECTOR OF LIFE SCIENCES

	73	74
EXCEPTED	2	2
GS–16	–	–
GS–15	1	1
GS–14	2	2
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	9	9

DIRECTOR OF DEVI

EXCEPTED	
GS–16	
GS–15	
GS–14	
ALL OTHER GS	
WAGE GRADE	
TOTAL PERMANENT	

AERONAUTICS DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	11	11
GS–14	17	17
ALL OTHER GS	87	72
WAGE GRADE	28	28
TOTAL PERMANENT	144	129

FLIGHT SYSTEMS RESEARCH DIVISION

	73	74
EXCEPTED	–	–
GS–16	4	4
GS–15	19	19
GS–14	23	23
ALL OTHER GS	72	57
WAGE GRADE	6	6
TOTAL PERMANENT	124	109

SIMULATION SCIENCES DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	4	4
GS–14	8	8
ALL OTHER GS	31	31
WAGE GRADE	1	1
TOTAL PERMANENT	45	45

V/STOL PROJECT OFFICE

	73	74
EXCEPTED	–	–
GS–16	2	2
GS–15	5	5
GS–14	8	8
ALL OTHER GS	23	23
WAGE GRADE	–	–
TOTAL PERMANENT	38	38

THERMO- AND GAS-DYNAMICS DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	18	18
GS–14	25	25
ALL OTHER GS	99	99
WAGE GRADE	8	8
TOTAL PERMANENT	151	151

SPACE SCIENCE DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	18	18
GS–14	20	20
ALL OTHER GS	69	69
WAGE GRADE	1	1
TOTAL PERMANENT	109	109

CHEMICAL RESEARCH PROJECTS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	2	2
ALL OTHER GS	18	18
WAGE GRADE	–	–
TOTAL PERMANENT	21	21

*APPLICATIONS AIRCRAFT SUPPORT PROGRAMS OFFICE

	73	74
EXCEPTED	–	–
GS–16	–	–
GS–15	1	1
GS–14	1	1
ALL OTHER GS	4	4
WAGE GRADE	–	–
TOTAL PERMANENT	6	6

PLANETARY BIOLOGY DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	2	2
GS–14	4	4
ALL OTHER GS	36	36
WAGE GRADE	–	–
TOTAL PERMANENT	43	43

BIOMEDICAL RESEARCH DIVISION

	73	74
EXCEPTED	1	1
GS–16	–	–
GS–15	4	4
GS–14	7	7
ALL OTHER GS	24	24
WAGE GRADE	3	3
TOTAL PERMANENT	39	39

BIOTECHNOLOGY DIVISION

	73	74
EXCEPTED	–	–
GS–16	1	1
GS–15	2	2
GS–14	13	13
ALL OTHER GS	35	35
WAGE GRADE	–	–
TOTAL PERMANENT	51	51

FLIGHT PROJECT DEVEL

EXCEPTED	
GS–16	
GS–15	
GS–14	
ALL OTHER GS	
WAGE GRADE	
TOTAL PERMANENT	

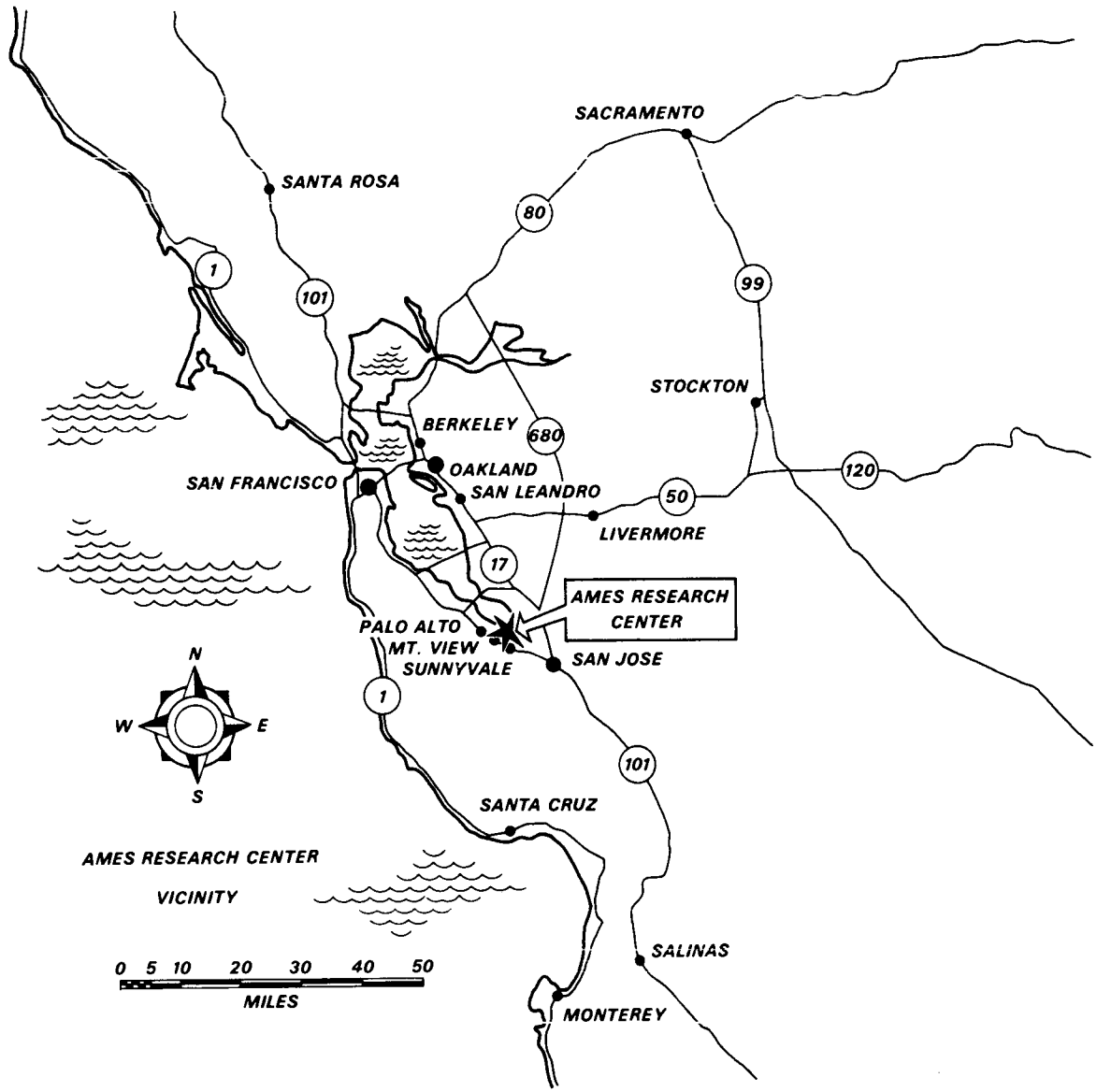
PROJECT PIO

EXCEPTED	
GS–16	
GS–15	
GS–14	
ALL OTHER GS	
WAGE GRADE	
TOTAL PERMANENT	

RELIABILITY AN ASSURANCE

EXCEPTED	
GS–16	
GS–15	
GS–14	
ALL OTHER GS	
WAGE GRADE	
TOTAL PERMANENT	

*PROPOSED CHANGES TO BASIC ORGANIZATION



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA

491-316 C1 - 73 - 20

RPM 138

LOCATION PLAN

JANUARY 1973

N-223	HYPERVELOCITY BALLISTIC RANGE
N-224	PAYLOAD INTEGRATION AND TEST FACILITY
N-225	SUBSTATION
N-226	6- BY 6-FOOT SUPERSONIC W.T.
N-227	UNITARY PLAN W.T. BLDG.
N-227A	11-FOOT TRANSONIC W.T.
N-227B	9- BY 7-FOOT SUPERSONIC W.T.
N-227C	8- BY 7-FOOT SUPERSONIC W.T.
N-227D	UNITARY PLAN W.T. AUXILIARIES BLDG.
N-228	42-INCH SHOCK TUNNEL
N-229	3.5-FOOT HYPERSONIC W.T.
N-229A	3.5-FOOT HYPERSONIC W.T. AUXILIARIES BLDG.
N-230	PHYSICAL SCIENCES RESEARCH LABORATORY
N-231	HYPERSONIC HELIUM TUNNEL
N-232	PILOT MODEL OF 4FT
N-233	DATA REDUCTION BLDG.
N-234	GASDYNAMICS LAB.
N-234A	MASS TRANSFER BOILER HOUSE
N-235	CAFETERIA BLDG.
N-236	BIOSCIENCE LAB.
N-237	HYPERVELOCITY FREE FLIGHT FACILITY
N-238	MACH 50 HELIUM TUNNEL
N-239	LIFE SCIENCES RESEARCH LAB.
N-239A	LIFE SCIENCES HIGH BAY
N-240	SPACE ENVIRONMENT RESEARCH FACILITY
N-241	ADMINISTRATIVE MANAGEMENT BUILDING
N-242	STRUCTURAL DYNAMICS LAB.
N-243	FLIGHT AND GUIDANCE SIMULATION LABORATORY
N-243A	SIMULATION EQUIPMENT BLDG.
N-244	SYSTEMS ENGINEERING FACILITY
N-245	SPACE SCIENCE RESEARCH LABORATORY

APPROVED FISCAL YEAR 1972 PROJECT:

(A) MODERNIZATION OF THE 40 BY 80 FOOT WIND TUNNEL.

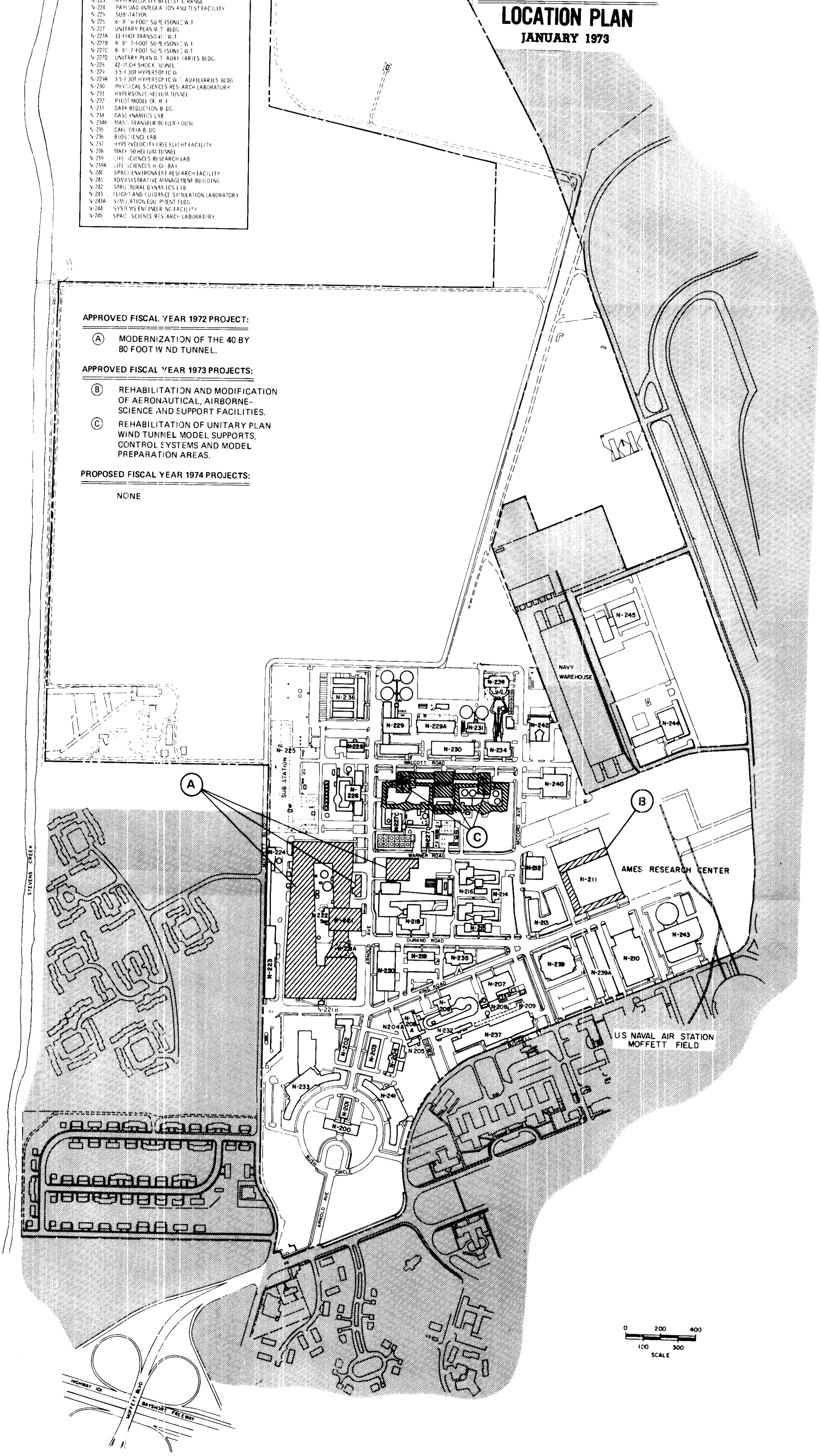
APPROVED FISCAL YEAR 1973 PROJECTS:

(B) REHABILITATION AND MODIFICATION OF AERONAUTICAL, AIRBORNE-SCIENCE AND SUPPORT FACILITIES.

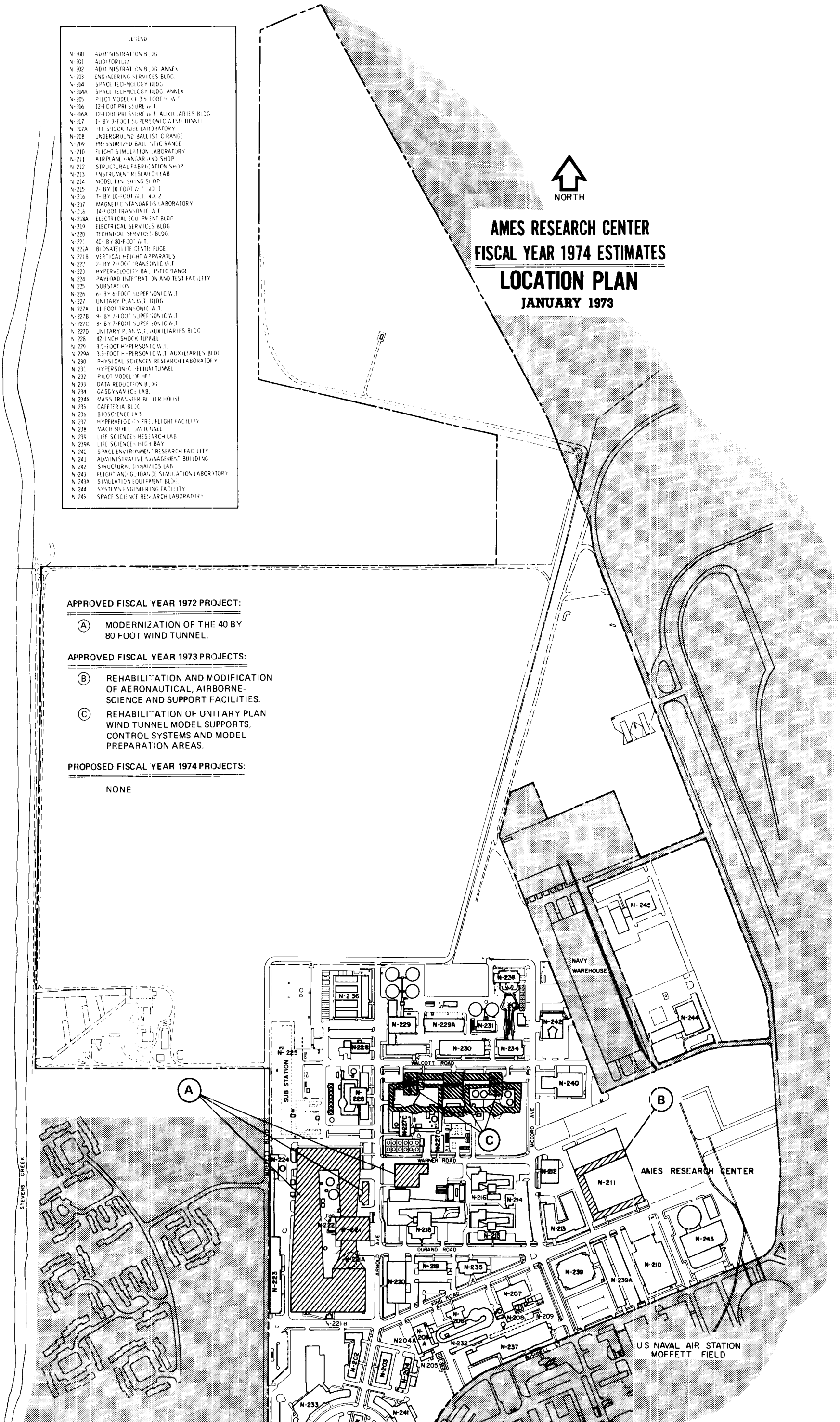
(C) REHABILITATION OF UNITARY PLAN WIND TUNNEL MODEL SUPPORTS, CONTROL SYSTEMS AND MODEL PREPARATION AREAS.

PROPOSED FISCAL YEAR 1974 PROJECTS:

NONE



491-316 O - 73 (Follows p. RPM 138) No. 7



A70-2768

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA

RPM 140

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

FLIGHT RESEARCH CENTER

MISSION

The Flight Research Center, established in 1947, conducts aeronautical and space related research using a variety of aerospace vehicles. The work includes effort on problems of take-off, landing, low-speed flight, supersonic and hypersonic flight, and re-entry to verify predicted characteristics and to identify unexpected problems in actual flight.

The current and projected programs at this Center include: aeronautical projects concerning general aviation, STOL research, subsonic and supersonic cruise research; space vehicle systems projects in which the flight behavior of advanced re-entry vehicles such as the X-24B heavyweight lifting body is studied; and electronic systems projects such as display, guidance, and control in advanced flight missions and improvements on systems and sensors used in bio-medical monitoring, tracking, and data acquisition.

Most important of the facilities and special equipment for conducting programs at the Flight Research Center are the aircraft. They range from general aviation aircraft for handling qualities investigations to supersonic aircraft, such as the YF-12, used for various research investigations having application to both civil and military aviation. Special purpose vehicles such as the lifting body, variable stability aircraft, or airborne simulators, are contractor procured or developed in-house. Specialized laboratory facilities are available to complement the flight activities with proper preliminary research and testing. Simulation equipment is used to guide and assist in the performance of productive flight activities. A two-station radar for tracking and data acquisition is operated to support the flight activity.

DESCRIPTION

The Flight Research Center, Edwards, California, is 65 air miles northeast of Los Angeles. The Center is located at the north end of Edwards Air Force Base on 218 acres of land leased from the Air Force. Utilities are provided by the Air Force on a reimbursable basis. The Center is adjacent to Rogers Dry Lake, a 55-square-mile area with a complex of runways varying in length from 5 to 11 miles.

The physical plant consists of an office-laboratory building with adjoining shops, a flight maintenance hangar and a calibration hangar, and a high

temperature loads calibration facility. Auxiliary buildings include warehouses, an auxiliary power systems building, communications buildings, and an aircraft maintenance dock. The main station of the two-station radar range operated by the Center is located on the third floor of the office-laboratory building. The total capital investment of the Flight Research Center, including fixed assets in progress, and contractor-held facilities at various locations, as of June 30, 1972, was $59,099,000.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

Functions	1972	1973	1974
Personnel	$9,599,000	$9,510,000	$9,287,000
Travel	222,000	230,000	230,000
Facilities services	1,562,000	1,254,000	1,292,000
Technical services	34,000	65,000	65,000
Administrative support	238,000	227,000	250,000
Total, fund requirements	$11,655,000	$11,286,000	$11,124,000

	1972	1973	1974	Change in 1974
I. PERSONNEL	$9,599,000	$9,510,000	$9,287,000	$-223,000

Basis of Fund Requirements

	1972	1973	1974
A. Compensation and Benefits:			
1. Compensation:			
a. Permanent positions	$8,427,000	$8,331,000	$8,148,000
b. Nonpermanent positions	201,000	227,000	222,000
c. Reimbursable details	102,000	67,000	72,000
d. Overtime and other compensation	85,000	85,000	90,000
Subtotal, Compensation	$8,815,000	$8,710,000	$8,532,000

	1972	1973	1974
2. Benefits	$747,000	$738,000	$695,000
Subtotal, Compensation and Benefits.....	$9,562,000	$9,448,000	$9,227,000
B. Supporting Costs:			
1. Transfer of personnel.....	$11,000	$22,000	$20,000
2. Civil Service Commission services.....	---	---	---
3. Personnel training.....	26,000	40,000	40,000
Subtotal, Supporting Costs.....	$37,000	$62,000	$60,000
Total, Personnel and Related Costs.....	$9,599,000	$9,510,000	$9,287,000
1. Compensation.....	$8,815,000	$8,710,000	$8,532,000
a. Permanent positions.....	$8,427,000	$8,331,000	$8,148,000

The reduction of 11 permanent positions from the end of 1972 through 1973 and the continuation at the same reduced level results in a $178 thousand decrease in the cost of permanent personnel. The losses occurred primarily in the area of aeronautical research and its associated disciplines. The 1974 staffing will reduce the number of direct programmatic employees to 401 with 81 indirect positions allocated to the Office of the Director and Administrative support.

	1972	1973	1974
Permanent Positions by Program:			
Manned Space Flight			
Space flight operations.....	5	5	2
Aeronautics and Space Technology			
Aeronautical research and technology.....	323	322	325
Space research and technology.....	50	45	45

	1972	1973	1974
Tracking and Data Acquisition.....	31	28	28
Technology Utilization.....	1	1	1
Subtotal, positions by program.....	410	401	401
Indirect Positions			
Director and staff.....	15	15	15
Administrative support.....	68	66	66
Subtotal, indirect positions.....	83	81	81
Total, permanent positions.....	493	482	482
Other than Permanent Positions.....	90	90	90
Total.....	583	572	572

The above table illustrates the use of civil service positions. The following table summarizes the FRC work force by occupational group:

	1972		1973		1974	
Occupational Group	Number	Percent	Number	Percent	Number	Percent
Professional scientists and engineers.....	182	36.9	176	36.5	176	36.5
Technicians.....	224	45.5	220	45.7	220	45.7
Wage board.....	3	.6	2	.4	2	.4
Professional administrative.....	41	8.3	41	8.5	41	8.5
Clerical.....	43	8.7	43	8.9	43	8.9
Total.....	493	100.0	482	100.0	482	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the start of the year, as modified by the addition of new positions and abolishment of existing positions, within-grade advances, career development, etc. After these modifications, the year-end position structure is established and the cost effect for the year is calculated based on the estimated period that these modifications are in effect.

In 1974 the cost of permanent positions will be $8,148,000. This results as follows:

Cost of permanent positions in 1973.....		$8,331,000
Cost of increases in 1974.....		146,000
Within-grade advances and career development:		
Full year effect of 1973 actions.....	$76,000	
Partial year effect of 1974 actions...	70,000	
Cost of decreases in 1974.....		-329,000
Abolished positions:		
Full year effect of 1973 actions.....	-329,000	
Cost of permanent positions in 1974.....		$8,148,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent Positions.....	$201,000	$227,000	$222,000

The 1973 and 1974 plans include 90 nonpermanent positions each year. These positions are required for a variety of programs, a portion of which provides for summer employment. Flight hires college and high school students during the summer to provide these people exposure to NASA programs and Government operations.

A portion of the nonpermanent positions is used to provide for FRC's participation in the President's Youth Opportunity Campaign, which enables disadvantaged youths to work at unskilled jobs both during the summer and throughout the regular school year.

As in the past, the FRC continues to provide significant training opportunities for technically oriented college students participating in the cooperative training program throughout the year. The student employed under a cooperative training agreement works for a term at Flight Research Center than spends a term in regular study at his college or university. This work-study program combines practical experience with theory and has been a significant recruitment source for the FRC. We have programmed for 28 participants in the cooperative student program.

	1972	1973	1974
c. Reimbursable Details.....	$102,000	$67,000	$72,000

The services of a small group of military officers are utilized in FRC's programs where such assignments are of mutual benefit. In accordance with

existing agreements, Flight reimburses the parent organization for the salaries and related costs of the detailees. Currently we plan for 10 such detailees.

	1972	1973	1974
d. Overtime and Other Compensation.....	$85,000	$85,000	$90,000

This is restricted to emergency repairs and that work requiring other than normal duty time. Requirements include overtime pay for personnel involved with flight launches, emergency repair of equipment and facilities which occurs outside normal working hours and completion of special projects and programs to meet specific deadlines. In addition, personnel required to work other than normal working hours are entitled to night work differential pay which falls under this category.

2. Benefits.....	$747,000	$738,000	$695,000

In addition to compensation, NASA makes an employer's contribution to personnel benefits as authorized and required by law. The cost of benefits is $43,000 lower in 1974 than in 1973 because of the gradual reductions in civil service personnel through 1973. The following table indicates the costs of personnel benefits by the major categories:

Category of Cost			
Contribution to the Civil Service Retirement Fund.....	$593,000	$591,000	$556,000
Contribution for employees life insurance.....	31,000	30,000	29,000
Contribution for employee health insurance.....	98,000	96,000	92,000
FICA.....	6,000	7,000	8,000
Incentive awards.....	5,000	10,000	10,000
Severance pay.....	14,000	4,000	---
Total.....	$747,000	$738,000	$695,000

	1972	1973	1974
B. Supporting Costs.....	$37,000	$62,000	$60,000

The estimated amount for 1973 represents tuition and training costs associated with maintaining and expanding the skills of our employees. Supporting personnel costs also provide for the expenses associated with movement of employees to initial duty stations.

1. Transfer of personnel.....	$11,000	$22,000	$20,000

The costs support the transfer of personnel from other NASA installations and from other government agencies The decrease in FY 1974 is because of a lower number of planned transfers.

2. Personnel training.....	26,000	40,000	40,000

The maintenance and expansion of the skills of personnel are essential in carrying out the agency's many complex technical programs. Such training is provided within the framework of the Government Employees Training Act of 1958. Part of the training consists of courses offered by other Government agencies; the remainder of the training is provided through non-governmental sources. The cost is for tuition, fees and related costs for training at colleges, universities, technical institutes and related institutions. It is estimated that 256 participants will request continuation of current training programs or other courses to meet the growing requirements to re-orient skills of employees into channels compatible with the direction of the NASA program in the 1970's.

	1972	1973	1974	Change in 1974
II. TRAVEL.....	$222,000	$230,000	$230,000	---

Basis of Fund Requirements

Summary of Travel by Major Category

	1972	1973	1974
A. Program Related Travel			
1. Direction, coordination, and management of Research and Development and Construction of Facilities program activities	$121,000	$121,000	$121,000

491-316 O - 73 - 21

	1972	1973	1974
B. Meetings and Technical Seminars			
1. Government-sponsored meetings...	$65,000	$55,000	$55,000
2. Other than Government-sponsored meetings and technical seminars.....	9,000	7,000	7,000
Subtotal.....	$74,000	$62,000	$62,000
C. Administrative Travel.....	$27,000	$47,000	$47,000
Total, Travel.....	$222,000	$230,000	$230,000
A. Program Related Travel.....	$121,000	$121,000	$121,000

The largest individual part of program related travel is for direction, coordination, and management of Research and Development program activities. Because of the complexity of the programs and distribution of contractor and subcontractor effort throughout the entire United States, coordination and management of activities require frequent trips by personnel responsible for programs such as the YF-12, X-24A, B-1, F-15, F-111 TACT, Fly-By-Wire areas of research. As projects reach the flight stage, support is required for preflight and postflight activities. The two categories are combined to represent the experience and projections by type of program. The major portion of the travel will be support of the aeronautics program. The number of trips and travel funds estimated are listed below for the categories of both program support and flight mission support.

	No. of Trips	Amount
Aeronautics:		
Research and technology.....	150	$33,000
Vehicle configurations.....	40	9,000
Flight experiment programs.....	200	40,000
Space:		
Lifting body.....	40	15,000
General support.....	62	23,000
Network operations.....	10	1,000
Total.....	502	$121,000

	1972	1973	1974
B. Meetings and Technical Seminars.....	$74,000	$62,000	$62,000

Travel to meetings and technical seminars permits employees engaged in program activities to participate at both Government sponsored and non-government sponsored meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to advances in the field which arise outside NASA, as well as allowing them to present both accomplishments and problems to their associates. Many of the Government sponsored meetings are made up of working panels convened to solve particular problems. Authorization to attend outside meetings is granted only after assurance that attendance will be in the best interest of NASA.

C. Administrative Travel.....		$27,000	$47,000	$47,000

Administrative travel includes travel for the direction and coordination of general management matters.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES	$1,562,000	$1,254,000	$1,292,000	+38,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Minor rehabilitation and modifications, and construction.....	$29,000	---	---
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds.....	$430,000	$434,000	$430,000
2. Maintenance of equipment.....	477,000	334,000	358,000
3. Custodial services.....	326,000	285,000	289,000
Subtotal.....	$1,233,000	$1,053,000	$1,077,000

	1972	1973	1974
C. Operation of Facilities			
1. Utilities	$111,000	$110,000	$124,000
2. Supplies and equipment	189,000	91,000	91,000
Subtotal	$300,000	$201,000	$215,000
Total, Facilities Services	$1,562,000	$1,254,000	$1,292,000
A. Acquisition of Facilities	$29,000	---	---

The cost of minor construction projects will be funded under the CoF appropriation in 1974.

B. Maintenance and Related Services	$1,233,000	$1,053,000	$1,077,000
1. Maintenance of buildings and grounds	$430,000	$434,000	$430,000

The amount required for maintenance of buildings and grounds represent costs to repair and maintain 374,000 square feet of building space, represented by 21 permanent structures, utility plants and systems, 225 acres of improved and unimproved grounds, and other real property items. The funding in 1974 supports 33 manyears of effort.

2. Maintenance of equipment	$477,000	$334,000	$358,000

Maintenance of equipment consists of work necessary to keep mechanical, electrical, electronic, laboratory and shop equipment operational. The estimate is based on maintaining approximately 300 pieces of office, shop and laboratory equipment through service maintenance contracts or on-call contracts.

3. Custodial services	$326,000	$285,000	$289,000

This category includes janitorial services, security guard services, laundry, rodent and pest control, refuse handling and fire protection.

The estimate for janitorial services will provide 13 manyears of effort to clean 207,000 square feet of floor space.

The estimate for adequate security protection services will support 19 manyears of effort. Security coverage includes 11 guard posts, five of which are manned on a 24-hour basis. The remaining posts are manned on an eight-hour basis or less depending on requirements.

	1972	1973	1974
C. Operation of Facilities.....	$300,000	$201,000	$215,000
1. Utilities.....	111,000	110,000	124,000

The estimates provide for 40.7 million gallons of water at a cost of $.12285 per 1,000 gallons ($5,000), and approximately 8.7 million gallons sewage disposal at a cost of $.45891 per 1,000 gallons ($4,000). The estimate for electricity ($66,000) will provide approximately 8,205,077 KWH of electricity at a cost of $8.0438 per 1,000 KWH. A total of $49,000 is included in the budget for natural gas. This will provide approximately 76 billion BTU's of gas at a cost of $.6474 per million BTU's annually. Electricity and water are obtained from the Air Force and natural gas for heating is obtained from a commercial source.

2. Supplies and equipment.....		$189,000	$91,000	$91,000

The supplies and equipment used in the operation of the Center are budgeted for in this subcategory. The majority of the items required consist of air-conditioning, heating and plumbing materials, hand tools, brushes, sealers, and hardware items to maintain our facilities.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES.....	$34,000	$65,000	$65,000	---

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Purchase of equipment.....	$2,000	---	---
2. Programming and operations services	9,000	$10,000	$10,000
Subtotal.....	$11,000	$10,000	$10,000

	1972	1973	1974
B. Engineering Services.....	---	$10,000	$10,000
C. Scientific and Technical Information and Educational Programs			
1. Operation of NASA technical libraries.....	$17,000	$20,000	$20,000
2. Educational/information programs.....	3,000	10,000	10,000
3. Scientific and technical information.....	3,000	15,000	15,000
Subtotal.....	$23,000	$45,000	$45,000
Total, Technical Services.....	$34,000	$65,000	$65,000
A. Automatic Data Processing.....	$11,000	$10,000	$10,000

During the budget year, it is estimated contractor support of $10,000 will be required for keypunch support at the current rate.

B. Engineering Services.....	---	$10,000	$10,000

Funding in this area is in support of the Center facilities management function. Engineering services are required primarily for drafting and design work which exceed in-house capability, engineering consulting services, and civil engineering facility design approvals.

C. Scientific and Technical Information and Educational Programs.....	$23,000	$45,000	$45,000
1. Operation of NASA technical libraries.....	$17,000	$20,000	$20,000

Funding in this area is required to procure scientific and technical books and periodicals in support of research programs; technical and administrative publications for the benefit of FRC personnel to maintain a current knowledge of the latest techniques and applications of engineering data and management practices; and various other publications such as volumes of microfilm data, and foreign publications of scientific value, and approximately 300 subscriptions for periodicals.

2. Educational/informational programs.....	$3,000	$10,000	$10,000

The educational/information programs provide for the gathering and dissemination of information about the center's programs to the mass communications media, the general public, and to the educational community at the elementary and secondary levels. Assistance to the mass communications media includes the gathering and exposition of newsworthy material in support of their requests and takes such forms as press kits, news releases, television and radio information tapes and clips, and feature material. It is estimated that 150 calls will be made upon the support photographic contracts. Half of the cost is distributed to this category.

	1972	1973	1974
3. Scientific and technical information.....	$3,000	$15,000	$15,000

Funding in this area will allow the procurement of documentation, publication services and photographic services. The majority of the funds will be used to procure photographic services which exceed our in-house capability. Services will include processing of 16mm film, contact timed prints, color corrected optical masters and various other processing and printing of still and motion picture technical film.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT.....	$238,000	$227,000	$250,000	$+23,000

Basis of Fund Requirements

Summary of Administrative Support

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$39,000	$32,000	$47,000
2. Local telephone service.....	66,000	66,000	68,000
3. Other communications.....	4,000	5,000	5,000
Subtotal.....	$109,000	$103,000	$120,000
B. Administrative Printing.....	$10,000	$4,000	$5,000

	1972	1973	1974
C. Supplies, Materials, and Equipment			
1. Supplies and materials.....	$57,000	$50,000	$50,000
2. Equipment.....	19,000	29,000	29,000
Subtotal.....	$76,000	$79,000	$79,000
D. Transportation			
1. Common carrier.....	$7,000	$10,000	$11,000
E. Administrative Support Services			
1. Medical services.....	$35,000	$30,000	$30,000
2. Installation support services....	1,000	1,000	5,000
Subtotal.....	$36,000	$31,000	$35,000
Total, Administrative Support....	$238,000	$227,000	$250,000
A. Communications.....	$109,000	$103,000	$120,000

Included in this estimate are the costs of leased lines, long distance tolls, local telephone services, and other communications, such as TWX. Funding is required to support three Federal Telephone System circuits. The costs of FTS services and long distance tolls are estimated at $47,000. For local telephone service $68,000 is required for 400 telephones and terminal equipment. The remaining $5,000 included for communications is for rental of lease lines and equipment for our teletype/crypto system.

B. Administrative Printing.....	$10,000	$4,000	$5,000

Administrative printing includes the contractual publication of information and materials such as in-house organ weekly, center brochures, and the related composition and binding operations. All common processes of duplicating, including photostating, blueprinting and microfilming are included.

C. Supplies, Materials, and Equipment...	$76,000	$79,000	$79,000

Administrative supplies, materials, and equipment include those items of a general nature which service the entire installation. The majority of the funds are budgeted for office supplies and equipment to support administrative operations.

	1972	1973	1974
D. Transportation.....	$7,000	$10,000	$11,000

Estimates in this area are to fund the costs of government bills of lading issued to common carriers to move freight by rail, truck, water and air and to fund shipments provided by United Parcel Service. The estimate is to fund approximately 300 GBL's and 300 UPS shipments.

E. Administrative Support Services.....	$36,000	$31,000	$35,000

Administrative support services represent the Center's occupational health program under contract to the Lovelace Clinic and court reporting services. All Center personnel are eligible for an annual physical under the program and flight physicals are also performed as the requirements necessitate. Court reporting services are required in EEO hearings and various other matters requiring legal services.

491-316 O - 73 - 22

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ORGANIZATION AND STAFFING CHART

FLIGHT RESEARCH CENTER

STAFFING SUMMARY

	CY	BY
Excepted	6	6
GS-16	7	7
GS-15	16	16
GS-14	36	36
All Other GS	415	415
Wage Board	2	2
Total Permanent	482	482

OFFICE OF THE DIRECTOR

	CY	BY
Excepted	3	3
GS-16	1	1
GS-15	3	3
GS-14	-	-
All Other GS	26	26
Wage Board	-	-
Total Permanent	33	33

RESEARCH DIVISION

	CY	BY
Excepted	1	1
GS-16	4	4
GS-15	6	6
GS-14	19	19
All Other GS	69	69
Wage Board	-	-
Total Permanent	99	99

OPERATIONS DIVISION

	CY	BY
Excepted	2	2
GS-16	1	1
GS-15	4	4
GS-14	6	6
All Other GS	141	141
Wage Board	-	-
Total Permanent	154	154

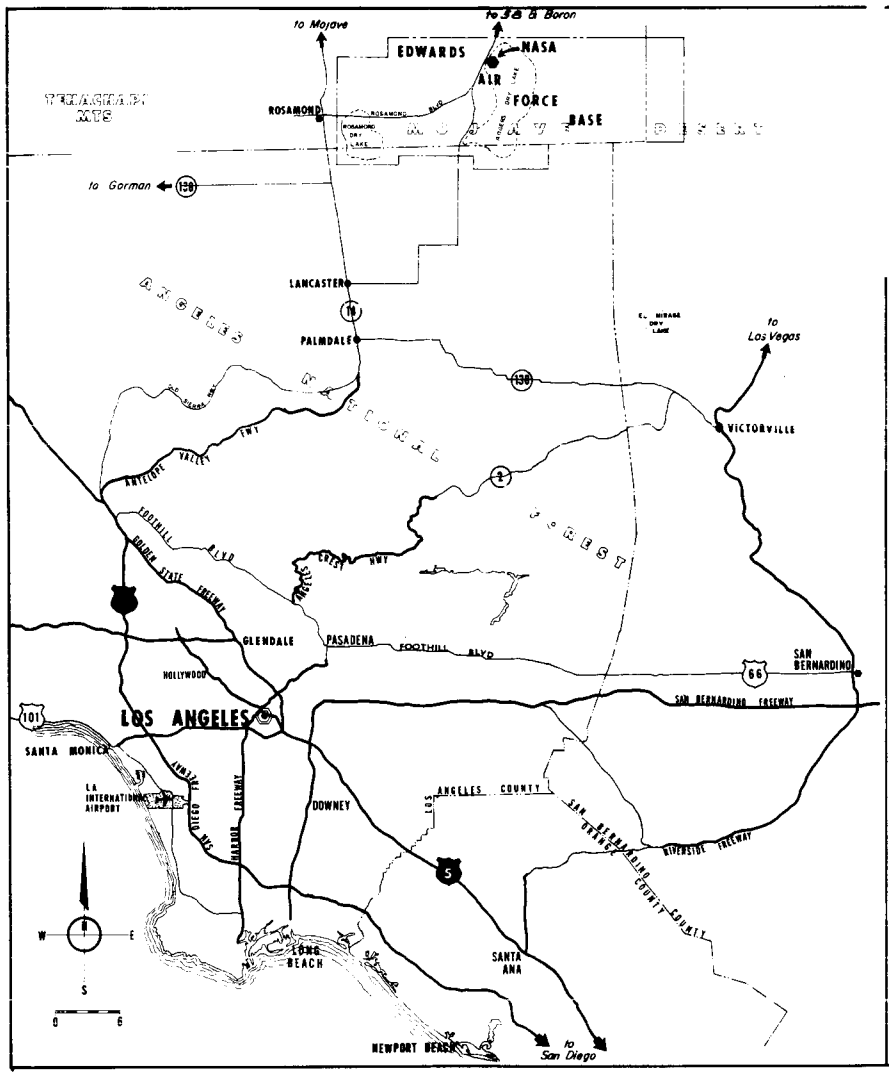
DATA SYSTEMS DIVISION

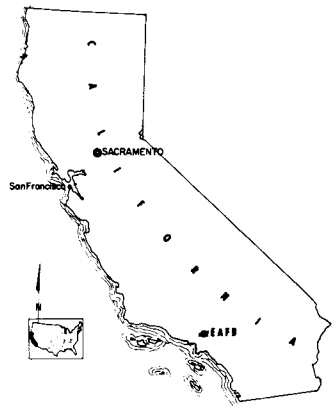
	CY	BY
Excepted	-	-
GS-16	1	1
GS-15	1	1
GS-14	7	7
All Other GS	121	121
Wage Board	-	-
Total Permanent	130	130

ADMINISTRATIVE DIVISION

	CY	BY
Excepted	-	-
GS-16	-	-
GS-15	2	2
GS-14	4	4
All Other GS	58	58
Wage Board	2	2
Total Permanent	66	66

FLIGHT RESEARCH CENTER
FISCAL YEAR 1974 ESTIMATES
VICINITY MAP





KEY PLAN

FLIGHT RESEARCH CENTER
FISCAL YEAR 1974 ESTIMATES
LOCATION PLAN

1 LABORATORY BUILDING (4800)
2 FLIGHT SYSTEMS LABORATORY (4801)
3 MAIN HANGAR (4802)
4 FIBERGLASS SPRAY BOOTH (4803)
5 TRAILER PARK AND MODULAR BUILDINGS
6 BOILER HOUSE (4805)
7 SHOPS (AGE, MODEL, BATTERY, GARAGE)(4806)
8 STORAGE BUILDING (4807A)
9 PHYSIOLOGY STRESS LAB. (4807B)
10 WAREHOUSE Nº 2 (4808)
11 WAREHOUSE Nº 3 (4809)
12 WAREHOUSE Nº 4 (4810)
13 HIGH TEMPERATURE LOADS CALIBRATION FACILITY (4820)
14 PAINT SPRAY BUILDING (4821)
15 PAINT STORAGE BUILDING (4822)
16 COMMUNICATIONS BUILDING (4824)
17 MAINTENANCE DOCK (4826)
18 AUXILIARY POWER UNIT (4830)
19 WAREHOUSE Nº 5 (4831)
20 RADAR BUILDING (4870)
21 100 FT. TOWER, BORESIGHT TARGET ASSEMBLY AND EQUIPMENT (4887)
22 CENTRAL STANDBY ELECTRICAL POWER FACILITY (4889)
23 STORAGE BUILDING (4804)

FLIGHT RESEARCH CENTER

FISCAL YEAR 1974 ESTIMATES

LANGLEY RESEARCH CENTER

MISSION

The Langley Research Center is responsible for complex research programs in aeronautics, space science, electronics, and structures, all of which help insure United States leadership in aeronautics and space exploration. Major projects at Langley include management of the Viking Project; development of several aeronautical and space vehicle concepts; consultation and research aid to many governmental agencies, industry and universities; and release of research results to scientific and technical communities.

A substantial percentage of Langley's research work is development of advanced concepts and technology for future aircraft, with particular emphasis on environmental effects, performance, range, safety, and economy. Examples of this research are projects involving the supercritical wing, composite structural materials, and automatic flight control systems. Work continues in the development of technology for helicopters and avionic systems for reliable operations in terminal areas of the future.

Vigorous efforts continue to improve supersonic flight capabilities for both transport and military aircraft. Configurations under study attempt to maximize the favorable interference effects of aerodynamics, with advanced structures and propulsion. The advanced research program is also aimed at the technology required for aircraft performance in the hypersonic speed range.

Langley works with the general aviation industry to help solve problems concerning aircraft design, to generate and consolidate data and techniques for new designs and load requirements, and to develop new devices to improve flight operations. Simplified, low-cost electronic systems that will aid stability, navigation, and collision warning are also being developed.

Materials and structural systems are being evolved to work efficiently in critical environments; practical methods of cooling high-heat areas of aircraft surfaces are being studied; and the technology of hypersonic ramjet engines is being developed.

Other aeronautical research at Langley focuses on critical problems of aircraft engine noise, alleviation of trailing vortices, increased traction and control of landing gear, and improved physical comfort in aircraft.

Langley has complete responsibility for NASA's Viking, a spacecraft that will orbit and land on Mars in 1976. Viking will permit a detailed study of Martian geophysics, atmospheric characteristics, surface properties and, most significantly, experiments that will indicate if life forms are present on the planet. Langley was selected to manage the Viking project because of the Center's experience and contribution to advanced technology in the fields of atmospheric entry heat shielding, space vehicle recovery systems, rocket propulsion, instrumentation, and electronics.

Langley supports unmanned spacecraft programs by the development of experiments and sensors, communications, and data handling systems. These programs include the remote sensing of ocean and atmospheric pollution, survey of earth resources, and measurement of micrometeoroid hazard in space.

Scout launch vehicle operations and improvements in national and international satellite experiments are long-time Langley responsibilities.

A ground-based research program at Langley is the investigation of effects on space vehicles such as heat, vacuum, noise, and meteoroids; the development and use of advanced composite and polymeric materials to structures and thermal control systems, and improved technology for horizon sensing, antenna and power amplifiers, batteries, high-capacity computer memories, logic circuits and other advanced micro-electronic devicies.

DESCRIPTION

The Langley Research Center, Hampton, Virginia, is located approximately 100 air miles south of Washington, D. C. The Center occupies 772 acres of Government-owned land, divided into two areas by the runway facilities of Langley Air Force Base. The West Area consists of 749 acres, 430 owned by NASA and 318 under permit from the Air Force. The East Area comprises 23 acres under Air Force permit. Runways, some utilities, and certain other facilities are used jointly by NASA and the Air Force. In addition, there are 110 acres of NASA-owned land located in the City of Newport News, Virginia, 3,277 acres under permit from the Air Force, and 9 acres under lease. The total acreage presently owned, under permit, or leased, is 4,168. The total capital investment at the Langley Research Center, including fixed assets in progress, and contractor-held facilities at various locations as of June 30, 1972, was $428,199,000.

SUMMARY OF RESOURCES REQUIREMENTS

	FUNDS		
	1972	1973	1974
Personnel.....	$66,955,000	$66,496,000	$67,345,000
Travel.....	1,662,000	1,665,000	1,665,000
Facilities services.....	6,401,000	5,208,000	5,354,000
Technical services.....	1,146,000	1,178,000	1,290,000
Administrative support...	4,032,000	3,455,000	3,597,000
Total, fund requirements	$80,196,000	$78,002,000	$79,251,000

	1972	1973	1974	Change in 1974
I. PERSONNEL....	$66,955,000	$66,496,000	$67,345,000	$+849,000

A. Compensation and Benefits:

1. Compensation:

	1972	1973	1974
a. Permanent positions....	$60,381,000	$59,315,000	$60,164,000
b. Nonpermanent positions....	489,000	509,000	494,000
c. Reimbursable details.....	31,000	32,000	27,000
d. Overtime and other compensation.	417,000	519,000	506,000
Subtotal, Compensation.....	$61,318,000	$60,375,000	$61,191,000
2. Benefits.....	$5,205,000	$5,606,000	$5,644,000
Subtotal, Compensation and Benefits.....	$66,523,000	$65,981,000	$66,835,000

	1972	1973	1974
B. Supporting Costs:			
1. Transfer of personnel.....	109,000	150,000	145,000
2. Personnel training	323,000	365,000	365,000
Subtotal, Supporting Costs.....	432,000	515,000	510,000
Total, Personnel and Related Costs.....	$66,955,000	$66,496,000	$67,345,000
1. Compensation.....	$61,318,000	$60,375,000	$61,191,000
a. Permanent Positions...	$60,381,000	$59,315,000	$60,164,000

The cost of compensation of permanent positions is the largest part of Personnel and Related Costs. The funds shown above will support 3411 permanent positions in 1973 and 3371 in 1974. This represents a reduction of 40 positions in 1974 related to changes in the level of support for various space research program areas.

	1972	1973	1974
Permanent Positions by Program:			
Manned Space Flight			
Space flight operations..	69	2	1
Space shuttle.....	22	58	60
Advanced manned missions	0	1	1
Apollo.....	3	1	1
Space Science			
Physics and astronomy....	51	67	49
Lunar and planetary exploration.....	231	294	301
Launch vehicle procurement	42	44	44
Space Applications.....	66	110	134
Aeronautics and Space Technology			
Aeronautical research and technology.....	1,222	1,135	1,170
Space research and technology.....	616	463	402
Nuclear power and propulsion.....	29	14	---

491-316 O - 73 - 23

	1972	1973	1974
Tracking and Data Acquisition.....	30	12	12
Subtotal, positions by program.....	2,381	2,201	2,175
Indirect Positions			
Director and staff.....	11	11	11
Administrative support	440	446	440
Research and development support.....	663	753	745
Subtotal, indirect positions.....	1,114	1,210	1,196
Total, permanent positions	3,495	3,411	3,371
Other Than Permanent Positions.....	250	250	225
Total.....	3,745	3,661	3,596

The above table illustrates the use of civil service positions. The distribution by occupation of these positions illustrates a significant characteristic of the Langley work force. Professional engineers and scientist comprise about 44% of the Center work force. Technicians and technically oriented wage board employees, working in direct support of the professional technical staff, make up another 41% of the complement. The following table summarizes the Center's work force by occupational group:

Occupational Group	1972		1973		1974	
	Number	Percent	Number	Percent	Number	Percent
Professional scientists and engineers.....	1,534	43.9	1,494	43.8	1,476	43.8
Technicians.....	1,366	39.1	1,339	39.3	1,325	39.3
Wage board.....	60	1.7	42	1.2	41	1.2
Professional administrative..	189	5.4	195	5.7	192	5.7
Clerical.....	346	9.9	341	10.0	337	10.0
Total.....	3,495	100.0	3,411	100.0	3,371	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the start of the year, as modified by the addition of new positions and abolishment of existing positions, within grade advances, career development, etc. After these modifications, the year-end position structure is established and the cost effect for the year is calculated based on the estimated period that these modifications are in effect.

In 1974 the cost of permanent positions will be $60,164,000, an increase of $849,000 from 1973. This increase results as follows:

Cost of permanent positions in 1973.....		$59,315,000
Cost increases in 1974.....		1,639,000
Within grade advances and career development:		
Full year effect of 1973 actions.....	$740,000	
Partial year effect of 1974 actions.....	899,000	
Cost decreases in 1974.....		-790,000
Abolished positions:		
Full year effect of 1973 actions.	-650,000	
Partial year effect of 1974 actions	-65,000	
Turnover savings.....	-75,000	
Cost of permanent positions in 1974.....		$60,164,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent positions.....	$489,000	$509,000	$494,000

The 1974 plans include 225 nonpermanent positions; 60 of these positions are required for a variety of programs, the largest of which is NASA summer employment. Langley hires college students during the summer to provide these people with exposure to NASA programs and government operations. Langley benefits from the employment of these individuals and the education and training they receive are considerable assets to themselves and to the nation.

Seventy-five positions are used for participation in the President's Youth Opportunity Campaign. This enables disadvantaged youths, the majority of which are from minority groups, to work in unskilled positions at NASA installations.

Work-study cooperative training programs account for 77 of the nonpermanent positions in 1973 and 85 in 1974. They provide significant training opportunities for technically oriented students by supplementing classroom instruction with practical experience. The program is an excellent source for recruiting individuals where requirements exist for highly specialized training.

The remaining 13 positions are used to employ individuals of varying skills to meet temporary requirements, usually less than six months. These positions are used only when the need is of such short duration that employment in a permanent position would be impractical.

	1972	1973	1974
c. Reimbursable Details.....	$31,000	$32,000	$27,000

The services of military officers and civilian detailees from other Government agencies are utilized in Langley's programs where such assignments are of mutual benefit. In accordance with existing agreements, Langley reimburses the parent organization for the salaries and related costs of the detailees.

d. Overtime and Other Compensation.....	$417,000	$519,000	$506,000

The use of oevetime and other compensation is limited to emergency repairs and work that cannot be accomplished during normal working hours. This includes the monitoring of on-site contracts being performed during off-duty hours and wind tunnel work required at night because of power limitations during the normal high peak hours of day. Increases in FY 1973 and 1974 estimates are due an increasing need to support Viking as it approaches the 1976 launch date.

2. Benefits.....	$5,205,000	$5,606,000	$5,644,000

In addition to compensation, NASA makes an employer's contribution to personnel benefits as authorized and required by law.

	1972	1973	1974
Category of Cost			
Contribution to the Civil Service Retirement Fund.....	$4,205,000	$4,422,000	$4,453,000
Contribution for employee life insurance.....	228,000	234,000	237,000
Contribution for employee health insurance.....	661,000	690,000	699,000
Contribution to FICA...	18,000	15,000	15,000
Incentive awards.....	18,000	30,000	30,000
Severance pay.....	75,000	215,000	210,000
Total.....	$5,205,000	$5,606,000	$5,644,000
B. Supporting Costs.....	$432,000	$515,000	$510,000

Supporting personnel costs provide for the expenses of moving employees to their initial duty station or reassignment, and for maintaining and expanding the skills of our employees. These costs are summarized as follows:

1. Transfer of personnel	$109,000	$150,000	$145,000

The 1966 legislation provided that the Government would pay for certain relocation costs. Included in these costs are the actual travel expenses involved in the movement of the employee and movement of his household goods.

2. Personnel training...	$323,000	$365,000	$365,000

The maintenance and expansion of the skills of personnel are essential in carrying out the Center's many complex technical programs. Such training is provided within the framework of the Government Employees Training Act of 1958. Part of the training consists of courses offered by other Government agencies, usually for a fee. The remainder of the training is provided through non-governmental sources; the cost is for tuition, fees, and related expenses for training at colleges, universities, and technical institutes; and for the cost of seminars and workshops in which groups of NASA employees receive training in subjects of agency-wide interest. The increase indicated for 1973 results from the requirement of additional training for aircraft pilots. It is necessary for all these pilots to have specific test pilot training prior to assuming test pilot duties. This training enables them to better report and analyze behavior of the aircraft being tested.

	1972	1973	1974	Change in 1974
II. TRAVEL.....	$1,662,000	$1,665,000	$1,665,000	---

Basis of Fund Requirements

Summary of Travel by Major Category

	1972	1973	1974
A. Program Related Travel			
1. Direction, coordination and management of Research and Development and Construction of Facilities program activities.....	$1,390,000	$1,480,000	$1,485,000
2. Flight mission support.....	66,000	10,000	12,000
3. Overseas travel to launch and tracking sities.....	11,000	13,000	13,000
Subtotal.....	$1,467,000	$1,503,000	$1,510,000
B. Meetings and Technical Seminars			
1. Government sponsored meetings.....	59,000	37,000	35,000
2. Other than government sponsored meetings and technical seminars.....	69,000	60,000	55,000
Subtotal.....	128,000	97,000	90,000
C. Administrative Travel.....	67,000	65,000	65,000
Total, Travel.....	$1,662,000	$1,665,000	$1,665,000
A. Program Related Travel.....	1,467,000	1,503,000	1,510,000
1. Direction, coordination, and management of programs.....	1,390,000	1,480,000	1,485,000

Space Projects

The Viking Program, for which Langley has project management responsibility, will be the first United States mission to land on Mars. The landings are scheduled for 1976. This project involves Lander Systems Development and Systems Integration by the Martin Company, Denver, Colorado; Orbiter System Development by Jet Propulsion Laboratory in Pasadena, California; Launch Vehicle System Development by Lewis Research Center, Cleveland, Ohio; and a large number of scientists and major subcontractors at a wide number of geographical locations. Critical design reviews and hardware fabrication activities will be peaking in 1973 and 1974. Preflight planning activities at the Kennedy Space Center launch site and the Jet Propulsion Laboratory Space Flight Operations Facility will be increasing in frequency as the launch date draws closer. Langley travel requirements for Viking will grow from about $750,000 in 1973 to at least $800,000 in 1974 to keep pace with the increasing project activities.

Langley is playing a major role in development of space technologies. Key technology support to the Shuttle program will continue to require travel in 1973 and 1974 of about $88,000 as final systems design and contractors are selected and monitored.

The on-going Langley-managed Scout launch vehicle project will require a level for program management travel (exclusive of flight mission support) of about $90,000 in 1974.

The Air Density/Hawkeye Neutral Point Explorer space flight project will require about $26,000 in 1973 and 1974 to support the initial design and hardware development.

These space projects require a majority of the travel funds in this category.

Aeronautics Projects

Major on-going or newly emerging aeronautics projects, and general aeronautics research programs, will require increasing travel in accordance with the increasing agency aeronautics R&D effort in 1974 and therefore will require the majority of the remaining travel funds in this category. Major aeronautics programs planned in 1974 are:

The advanced supersonic technology program in which Langley will play the lead role with a strong involvement of other Centers; vectored in forward flight (VIFF), a joint United States-United Kingdom program coordinated with the United States Marine Corps to develop techniques for exploiting maneuverability capability of thrust vectoring using the Harrier fighter as a research test system; a Rotor Systems Research Aircraft, to develop new rotor concepts in a joint NASA/Army program led by Langley; Lift Fan Transport studies with heavy Langley involvement on a task team directed by Ames to assess the future potential of this type of aircraft and develop future research plans;

advanced technology transport studies managed by Langley which will continue with several large industry contracts supplemented by special technical studies; hypersonic research aircraft technology development to define a research aircraft which, like the X-1 through X-15 series, would provide research flight data that could be applied to an air-breathing launch vehicle, commercial transport, or military aircraft of the future.

Other aeronautics systems-related research programs include active control technology for gust or load alleviation and improved aircraft handling qualities; vehicle requirements aspects of air traffic control systems; noise reduction research; automated take-off and landing (ATOL) systems for conventional and vertical take-off and landing machines (CTOL and VTOL); and examination of new facility requirements, on an inter-Center-inter-Agency basis, such as large high Reynolds number subsonic and transonic wind tunnels.

Aeronautics projects involve a broad matrix of technical disciplines including aerodynamics, structures and structural dynamics, materials, control systems, and avionics. The coordination of these disciplines in a viable research effort requires program management travel.

Due to the heavy travel demands of the major space and aeronautics programs, availability of travel funds to support technology applications, basic research, and general research and technology programs will continue to be severely curtailed.

Langley's current programs (exclusive of Viking, Scout and Shuttle) involve about 1,000 significant (over $10,000) contracts and grants with a dollar value of over $100 million placed in over 40 states. Over 200 of these contracts and grants, with a value of more than $12 million, were with more than 50 academic institutions. Travel to monitor these contracts, which represent a substantial investment, will be approximately $150,000 in 1974, an increase of $20,000 over 1973.

Our major travel requirement in FY 1974 is in the area of project coordination tion and direction. The Viking project, now entering the critical final design and hardware fabrication phase will demand more travel support as necessities develop with contractors and subcontractors. The increasing number of larger aeronautics projects at this Center will demand more travel by Center personnel to coordinate and integrate inter-Agency and inter-Center activities. The expanding role of this Center in pollution and environmental related programs will necessitate increased travel especially in the FY 1973 and FY 1974 time period. To carry out the current planned programs in this area, we anticipate a level of nearly $100,000 would be required in FY 1974.

	1972	1973	1974
2. Flight Mission Support...	$66,000	$10,000	$12,000

These funds are required to support prelaunch planning, launch, and post-launch operations for space flight projects. The 1974 level is consistent with the currently planned launch schedule of three Scout vehicles from domestic launch sites.

3. Overseas Travel to Launch and Tracking Sites.....	$11,000	$13,000	$13,000

This travel is primarily in support of overseas launches and includes planned Scout launches in 1973 and 1974 from the San Marco launch site in Africa.

B. Meetings and Technical Seminars.....	$128,000	$97,000	$90,000

Travel to meetings and technical seminars is an essential part of the effective utilization of Langley human resources and talent. Meeting travel is a principal means by which:

1. Inter-Center and inter-agency research topics of mutual interest are discussed and ideas exchanged.

2. Langley technical knowledge is focused on an applied to solution of national problems.

3. Research technology is exchanged and transferred to users.

4. Program duplication is avoided through exchange of information on research program results and future plans.

In FY 1972, Langley personnel published approximately 260 technical papers and presented over 325 at technical symposia. The FY 1973 travel budget limitations allow approximately 40% of our professional work force to travel. The limiting factor on presentation of papers has been the availability of travel funds rather than a paucity of technical papers. The FY 1974 level for meeting travel will allow our professionals to participate in technical meetings and symposia at about the same level as this year. Participation in other than government sponsored meetings and seminars is becoming ever more important and attendance is being limited mainly by the availability of travel funds.

The need to expose more of our professionals to the work being done by others and the requirement to distribute the results of our research has resulted in a conscious effort to increase this Center's participation in professional society meetings and symposia.

491-316 O - 73 - 24

	1972	1973	1974
C. Administrative Travel....	$67,000	$65,000	$65,000

Administrative travel is necessary for direction and coordination of general management matters and the continued training of our professional and technical personnel.

The increasing emphasis on new evolving management techniques being applied Agency-wide will require a sustained level in FY 1974 for coordination by Center personnel with Headquarters and other Centers for effective implementation of these systems.

The upgrading of personnel and their skills requires a viable training program. This, in turn, requires travel funds to carry out off-site training of personnel. In many cases, this type of training is only available in off-site locations.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES...	$6,401,000	$5,208,000	$5,354,000	$+146,000

Basis of Fund Requirements

Summary of Facilities Services

A. Acquisition of Facilities			
1. Rental of real property	---	---	---
2. Minor rehabilitation and modification, and construction..	$605,000	---	---
Subtotal.....	$605,000	---	---
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds.....	$1,012,000	$950,000	$929,000
2. Maintenance of equipment.....	73,000	75,000	75,000
3. Custodial services	1,226,000	1,250,000	1,250,000
Subtotal.....	$2,311,000	$2,275,000	$2,254,000

	1972	1973	1974
C. Operation of Facilities			
1. Utilities.....	1,845,000	1,933,000	2,100,000
2. Supplies and equipment.....	1,640,000	1,000,000	1,000,000
Subtotal.....	$3,485,000	$2,933,000	$3,100,000
Total, Facilities Services.....	$6,401,000	$5,208,000	$5,354,000

A. Acquisition of Facilities.....	$605,000	---	---
1. Rental of real property.....	---	---	---
2. Minor rehabilitation and modification, and construction..	605,000	---	---

This reflects the cost of minor rehabilitation/modification and construction. The decrease in FY 1973 reflects the change of funding for minor construction projects in excess of $10,000 to the Construction of Facilities appropriation.

B. Maintenance and Related Services.....	$2,311,000	$2,275,000	$2,254,000
1. Maintenance of buildings and grounds.....	1,012,000	950,000	929,000

This level of maintenance is required in order to prevent the deterioration of facilities and grounds currently valued at approximately $405 million. Maintenance costs are high because of the facilities advanced age and heavy usage. Half of the facilities are over 20 years old and facility utilization has consistently been 100 percent. The slight decrease in FY 1973 and FY 1974 reflects continuing emphasis on identification of research facility maintenance to identifiable benefitting programs.

The 1974 estimate includes general maintenance costs for grounds of approximately 881 acres, and the maintenance costs for approximately 2,658,000 square feet of space in 213 buildings and 16 electrical substations.

2. Maintenance of equipment.....	73,000	75,000	75,000

This subcategory includes maintenance of instruments, as well as office and shop equipment. The 1974 estimate reflects a minimal level of effort to support this Center's office and shop equipment of over 30,000 items.

	1972	1973	1974
3. Custodial Services.....	$1,226,000	$1,250,000	$1,250,000

This subcategory includes estimates for the cost of janitorial, cleaning, protective, security, and refuse handling services.

The 1974 estimate reflects the cost for the major support service contracts and for supplies and materials. The security guard contract will require renewal by the end of the current year.

The custodial contract involves approximately 110 man-years of effort. The level of custodial effort in 1974 is considered the minimum commensurate with efficient operations of this Center. Over 2,383,000 square feet of space, located in 120 buildings and 54 trailers, must be custodially serviced.

Security guard services are provided by a support service contract involving 43 man-years of effort annually, comprising principally a two-shift operation.

C. Operation of Facilities	$3,485,000	$2,933,000	$3,100,000
1. Utilities.....	1,845,000	1,933,000	2,100,000

These estimates include the cost of electricity, gas, water, and sewage disposal. A negotiated contract with VEPCO for electrical power provided for an estimated 15 percent increase in power costs in 1972 with another moderate increase in 1973. The 1974 estimate reflects the full year costs of the previous increases in power rates and an overall increase in power usage. Over half of this electrical power is used to operate specific major wind tunnels with an additional one-fourth of this power going to operate small research facilities and equipment. The cost of other utilities used for research and administrative support has also increased for the same level of usage.

The 1974 estimate for the consumption of utilities includes anticipated usages of over 270 million killowatt hours of electrical power, 64 thousand cubic feet of natural gas, and over 291 million gallons of water.

2. Supplies and equipment.....	$1,640,000	$1,000,000	$1,000,000

This subcategory includes chemicals, electronic materials, fuels, and lubricants, general services materials, instrumentation, metals, pipes, valves, and fittings. It also includes mechanical, laboratory, electrical, and electronic equipment in addit on to shop machinery and non-capitalized equipment.

Approximately one-third of the supplies and materials included in this subfunction are stock items or general services materials. This comprises approximately 20 percent of the total stock issues required to support daily operations. Purchases of fuel oil, used to provide heat and steam for the facilities, account for approximately one-third of the 1974 estimate.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES...	$1,146,000	$1,178,000	$1,290,000	$+112,000

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment....	$15,000	$15,000	$15,000
2. Purchase of equipment.....	565,000	181,000	28,000
3. Maintenance of equipment.....	35,000	43,000	85,000
Subtotal, equipment.....	615,000	239,000	128,000
4. Programming and operation services.....	389,000	799,000	1,022,000
Subtotal.....	$1,004,000	$1,038,000	$1,150,000
B. Engineering Services	$124,000	$120,000	$120,000
C. Scientific and Technical Information and Educational Programs			
1. Operation of NASA technical libraries..	$7,000	$9,000	$9,000
2. Educational/information programs.....	10,000	10,000	10,000
3. Scientific and technical information....	1,000	1,000	1,000
Subtotal.....	$18,000	$20,000	$20,000
Total, Technical Services.....	$1,146,000	$1,178,000	$1,290,000

	1972	1973	1974
A. Automatic Data Processing.....	$1,004,000	$1,038,000	$1,150,000
1. Lease of equipment.....	15,000	15,000	15,000

The FY 1973 cost includes the lease of a more efficient off-line printer for use with other computers. The FY 1974 cost includes the lease of a terminal for the new business data machine.

2. Purchase of equipment.....	565,000	181,000	28,000

The FY 1972 amount reflects the procurement of a new IBM 360 computer. The FY 1973 and FY 1974 estimates reflect procurement of associated equipment and hardware for the new IBM 360 computer--additional core memory in FY 1973 and peripheral equipment (terminal) in FY 1974.

3. Maintenance of equipment.....	35,000	43,000	85,000

This covers the maintenance contract to maintain the administrative computer system and its associated equipment and reflects the full implementation of the new computer systems by July 1974.

4. Programming and operations services....	389,000	799,000	1,022,000

This requirement includes the cost in FY 1974 of 17 additional man-years of contractual effort for administrative computer design, programming operations, and document conversion. These services are required for operation of the administrative and financial management systems computers. This ADP equipment is not dedicated to specific research or operational systems but rather is used to maintain financial transactions and other business records.

The basis for the FY 1974 fund requirements is historical cost data projected to match future plans for programming and systems support of Langley's new business computer. Costs were estimated based on the anticipated hours of operation of Langley's EDP and EAM equipment, and planned implementation software costs associated with the new IBM 360 computer.

B. Engineering Services.....	124,000	120,000	120,000

Estimates include engineering services for reliability and quality assurance studies; maintenance projects, special tooling, equipment and machine parts; and other related engineering services. These services are necessary to provide reliable design work for required maintenance of facilities. The costs of eight manyears of contractual effort for engineering design and drafting services are included in the 1974 estimate.

	1972	1973	1974
C. Scientific and Technical Information and Educational Programs....	$18,000	$20,000	$20,000
1. Operation of NASA technical libraries.....	7,000	9,000	9,000

These estimates include costs of technical documentation services required to provide the necessary publications for the operation of the Center's library. Services include the key punching into the library's computerized index system of analytical data for approximately 5,000 new reference items annually.

2. Educational/informational programs.....	10,000	10,000	10,000

These estimates include costs for press kits, news releases, television and radio information tapes and clips, and feature material for motion pictures to enable this Center to fulfill its Educational Information Program responsibilities in the states of Virginia, West Virginia, Kentucky, North Carolina, and South Carolina.

3. Scientific and technical information.....	1,000	1,000	1,000

This includes translating services which are necessary in order for personnel to use research publications of other countries. This requires the translation of approximately on hundred documents each year.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT.....	$4,032,000	$3,455,000	$3,597,000	$+142,000

Basis of Fund Requirements

Summary of Administrative Support

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$212,000	$235,000	$355,000
2. Local telephone service	577,000	665,000	755,000
3. Other communications...	5,000	9,000	9,000
Subtotal.....	$794,000	$909,000	$1,119,000
B. Administrative Printing....	133,000	125,000	139,000
C. Supplies, Materials, and Equipment			
1. Supplies and materials.....	$955,000	$723,000	$733,000
2. Equipment.....	127,000	60,000	60,000
Subtotal.....	$1,082,000	$783,000	$793,000
D. Transportation			
1. Center operations.....	$260,000	$240,000	$265,000
2. Common carrier.....	207,000	200,000	202,000
Subtotal.....	$467,000	$440,000	$467,000
E. Administrative Support Services			
1. Installation support services.....	$1,521,000	$1,163,000	$1,044,000
2. Medical services.....	35,000	35,000	35,000
Subtotal.....	$1,556,000	$1,198,000	$1,079,000
Total, Administrative Support.....	$4,032,000	$3,455,000	$3,597,000

	1972	1973	1974
A. Communications.....	$794,000	$909,000	$1,119,000
1. Leased lines and long distance tolls	212,000	235,000	355,000

These estimates include the cost of 12 IDS lines to Washington, D. C., and two constant use business lines to Norfolk, Virginia. The C&P Telephone Company of Virginia has increased the rate 10% during 1972 and 1973. The FY 1974 level includes the projected FTS rate increase. Langley conducts business in nearly all other states and the leased lines and long distance services are required to effectively manage and coordinate the research programs and business operations. These services are continually reviewed, to insure that costs are maintained at the lowest practical level.

2. Local telephone service.....	$577,000	$665,000	$755,000

Includes local telephone and exchange service, as well as the maintenance, repair, installation, and relocation of telephones. The C&P Telephone Company of Virginia has increased its rates by 30% during 1972. In addition, the recently negotiated contract between the telephone company and its union provides for 26% graduated rate increases over its three-year term.

3. Other communications..	5,000	9,000	9,000

Services under this subcategory include datafax and telegraph services. These services are part of the communication network essential to effective operation of the Center. The increase in cost for these services for 1973 and 1974 shown in the estimate reflects rate increases for these services.

B. Administrative printing...	133,000	125,000	139,000

Estimates for administrative printing include funds for contractual printing and the related composition and binding operations. This includes services performed by other agencies, chiefly the Government Printing Office, or by commercial printing firms. All common processes of duplicating, including photostating, blueprinting, microfilming, and other photographic reproductions are included.

The projected increase for 1974 reflects the planned use of contractual services to accomplish these services. The increased use of contractors is the result of recent legislation under Title 44 of the U.S. Code which, in effect, causes the elimination of a substantial portion of in-house printing and reproduction capability. These services are required not only for the publication of research documents but also for the administrative printing workload performed for NASA Headquarters and other Centers. The budget year estimate includes anticipated costs for printing for over 60 million page units.

491-316 O - 73 - 25

	1972	1973	1974
C. Supplies, Materials, and Equipment.....	$1,082,000	$783,000	$793,000
1. Supplies and materials.....	955,000	723,000	733,000

These estimates include general maintenance materials, office supplies, and photographic supplies. These supplies are the basic tools for the daily operation for both research and business. The FY 1974 estimate reflects the higher cost for these items.

2. Equipment.....	$127,000	$60,000	$60,000

This includes photographic, training, and office equipment. Procurement under this subcategory has been reduced to the lowest practical level. A modest amount, as indicated by the budget year estimate, must be purchased each year to support certain elements of Center operations. The 1973 and 1974 estimate includes the necessary replacements for administrative office equipment.

D. Transportation.....	$467,000	$440,000	$467,000
1. Center operations....	260,000	240,000	265,000

These estimates include the cost of local transportation and rental of passenger motor vehicles; the maintenance, repair, and storage of vehicles; aircraft servicing; the purchase of motor vehicles and the supporting supplies and materials.

The rental and purchase of equipment, as well as the support services covered in this subcategory, are essential to the operation of the Center. For example, the purchase of vehicles is required to transport Center employees to Washington, D. C., and to other locations when it is most economical to do so. The local transportation contract, which accounts for $193,000 of the estimate, is required because the Center is spread over a total of 772 acres which are divided into two areas approximately three miles apart. This is a 16 manyear of effort contract which also includes the cost of the contractor's taxi vehicles.

Included in the estimate for 1974 is $35,000 to cover the aircraft servicing costs for this Center's one administrative aircraft which also serves NASA Headquarters personnel. Supplies and materials costs under this category are for this aircraft and for the Center's motor vehicles.

	1972	1973	1974
2. Common carrier.....	$207,000	$200,000	$202,000

This includes freight, rail, and truck shipments and local movement services. The 1973 estimate actually reflects a reduced level of service accompained by projected increased cost rates. Local delivery service is required in order to handle and distribute the mail and other communications for the Center. This contract is for 24 manyears of effort estimated to cost over $200,000 during the budget year. This contract also includes the cost of the contractor's delivery vehicles.

E. Administrative Support Services.....	$1,556,000	$1,198,000	$1,079,000
1. Installation Support Services.....	1,521,000	1,163,000	1,044,000

Installation support services include those services which support the installation in the areas of supply operations, mail and messenger services, procurement, public affairs and other general administrative activities. The reduction of $119,000 in FY 1974 is attributed to cost reductions affecting all elements of this subfunction.

2. Medical Services.....	$35,000	$35,000	$35,000

Includes employee physical examiniations and other medical services necessary to maintain the health of employees working with potentially dangerous radiation sources such as X-ray machines and lasers.

Approximately 575 medical examinations of various types will be required for personnel during 1973.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Organization and Staffing Chart
Langley Research Center

JANUARY 19, 1973

STAFFING SUMMARY

	73	74
Excepted	31	31
GS-16	24	24
GS-15	191	191
GS-14	295	295
Other GS	2830	2790
Wage Grade	40	40
Total	3411	3371

OFFICE OF DIRECTOR

	73	74
Excepted	4	4
GS-16	1	1
GS-15	2	2
Other GS	5	5
Total	12	12

VIKING PROJECT OFFICE

	73	74
Excepted	2	2
GS-16	3	3
GS-15	15	15
GS-14	31	31
Other GS	101	101
Total	152	152

DIRECTOR FOR CENTER DEVELOPMENT AND EXTERNAL AFFAIRS

	73	74
Excepted	1	1
GS-16	1	1
GS-15	3	3
GS-14	3	3
Other GS	18	18
Total	26	26

OFFICE OF SCIENTIFIC AND TECHNICAL INFORMATION PROGRAMS

	73	74
GS-15	1	1
Other GS	56	56
Wage Grade	19	19
Total	76	76

DIRECTOR FOR ELECTRONICS

	73	74
Excepted	1	1
GS-14	1	1
Other GS	2	2
Total	4	4

ANALYSIS AND COMPUTATION DIVISION

	73	74
Excepted	1	1
GS-16	1	1
GS-15	6	6
GS-14	11	11
Other GS	112	112
Total	131	131

INSTRUMENT RESEARCH DIVISION

	73	74
Excepted	1	1
GS-16	0	0
GS-15	4	4
GS-14	15	15
Other GS	150	145
Total	170	165

FLIGHT DYNAMICS AND CONTROL DIVISION

	73	74
Excepted	1	1
GS-16	3	3
GS-15	7	7
GS-14	10	10
Other GS	56	56
Total	77	77

FLIGHT INSTRUMENTATION DIVISION

	73	74
Excepted	1	1
GS-15	9	9
GS-14	28	28
Other GS	176	172
Total	214	210

DIRECTOR FOR STRUCTURES

	73	74
Excepted	2	2
Other GS	3	3
Total	5	5

LOADS DIVISION

	73	74
Excepted	1	1
GS-16	2	2
GS-15	10	10
GS-14	20	20
Other GS	74	74
Total	107	107

STRUCTURES DIVISION

	73	74
Excepted	1	1
GS-16	1	1
GS-15	10	10
GS-14	15	15
Other GS	57	57
Total	84	84

MATERIALS DIVISION

	73	74
Excepted	1	1
GS-16	2	2
GS-15	6	6
GS-14	7	7
Other GS	55	55
Total	71	71

DIRECTOR FOR AERONAUTICS

	73	74
Excepted	1	1
GS-16	1	1
Other GS	4	4
Total	6	6

AERONAUTICAL SYSTEMS OFFICE

	73	74
Excepted	1	1
GS-16	1	1
GS-15	8	8
GS-14	3	3
Other GS	8	8
Total	21	21

RESEARCH AIRCRAFT FLIGHT DIVISION

	73	74
Excepted	1	1
GS-15	5	5
GS-14	12	12
Other GS	53	53
Total	71	71

HIGH-SPEED AIRCRAFT DIVISION

	73	74
Excepted	1	1
GS-16	3	3
GS-15	15	15
GS-14	14	14
Other GS	89	87
Total	122	120

HYPERSONIC VEHICLES DIVISION

	73	74
Excepted	1	1
GS-16	2	2
GS-15	12	12
GS-14	10	10
Other GS	66	66
Total	91	91

LOW-SPEED AIRCRAFT DIVISION

	73	74
Excepted	1	1
GS-15	11	11
GS-14	11	11
Other GS	50	50
Total	73	73

DIRECTOR FOR ADMINISTRATION

	73	74
Excepted	2	2
GS-15	4	4
GS-14	3	3
Other GS	10	10
Total	19	19

FINANCIAL MANAGEMENT DIVISION

	73	74
GS-15	1	1
Other GS	57	57
Total	58	58

MANAGEMENT SUPPORT DIVISION

	73	74
GS-15	1	1
Other GS	78	74
Total	79	75

PERSONNEL DIVISION

	73	74
GS-15	1	1
GS-14	2	2
Other GS	49	49
Total	52	52

BUSINESS DATA SYSTEMS DIVISION

	73	74
Excepted	1	1
Other GS	21	21
Total	22	22

PROCUREMENT DIVISION

	73	74
Excepted	1	1
GS-15	1	1
GS-14	6	6
Other GS	68	68
Total	76	76

PROGRAMS AND RESOURCES DIVISION

	73	74
GS-15	1	1
Other GS	14	14
Total	15	15

DIRECTOR FOR SYSTEMS ENGINEERING AND OPERATIONS

	73	74
Excepted	1	1
GS-15	3	3
GS-14	2	2
Other GS	4	4
Total	10	10

FABRICATION DIVISION

	73	74
GS-15	1	1
GS-14	1	1
Other GS	418	408
Total	420	410

SYSTEMS ENGINEERING DIVISION

	73	74
GS-15	9	9
GS-14	16	16
Other GS	153	153
Total	178	178

RESEARCH FACILITIES ENGINEERING DIVISION

	73	74
GS-15	8	8
GS-14	15	15
Other GS	69	69
Total	92	92

OPERATIONS SUPPORT DIVISION

	73	74
GS-15	1	1
GS-14	2	2
Other GS	470	455
Total	473	458

PLANT ENGINEERING DIVISION

	73	74
GS-15	1	1
GS-14	4	4
Other GS	89	89
Wage Grade	21	21
Total	115	115

DIRECTOR FOR SPACE

	73	74
Excepted	1	1
GS-15	2	2
GS-14	2	2
Other GS	6	6
Total	11	11

ENVIRONMENTAL AND SPACE SCIENCES DIVISION

	73	74
Excepted	1	1
GS-16	1	1
GS-15	9	9
GS-14	9	9
Other GS	44	44
Total	64	64

SPACE SYSTEMS DIVISION

	73	74
GS-15	9	9
GS-14	12	12
Other GS	63	63
Total	84	84

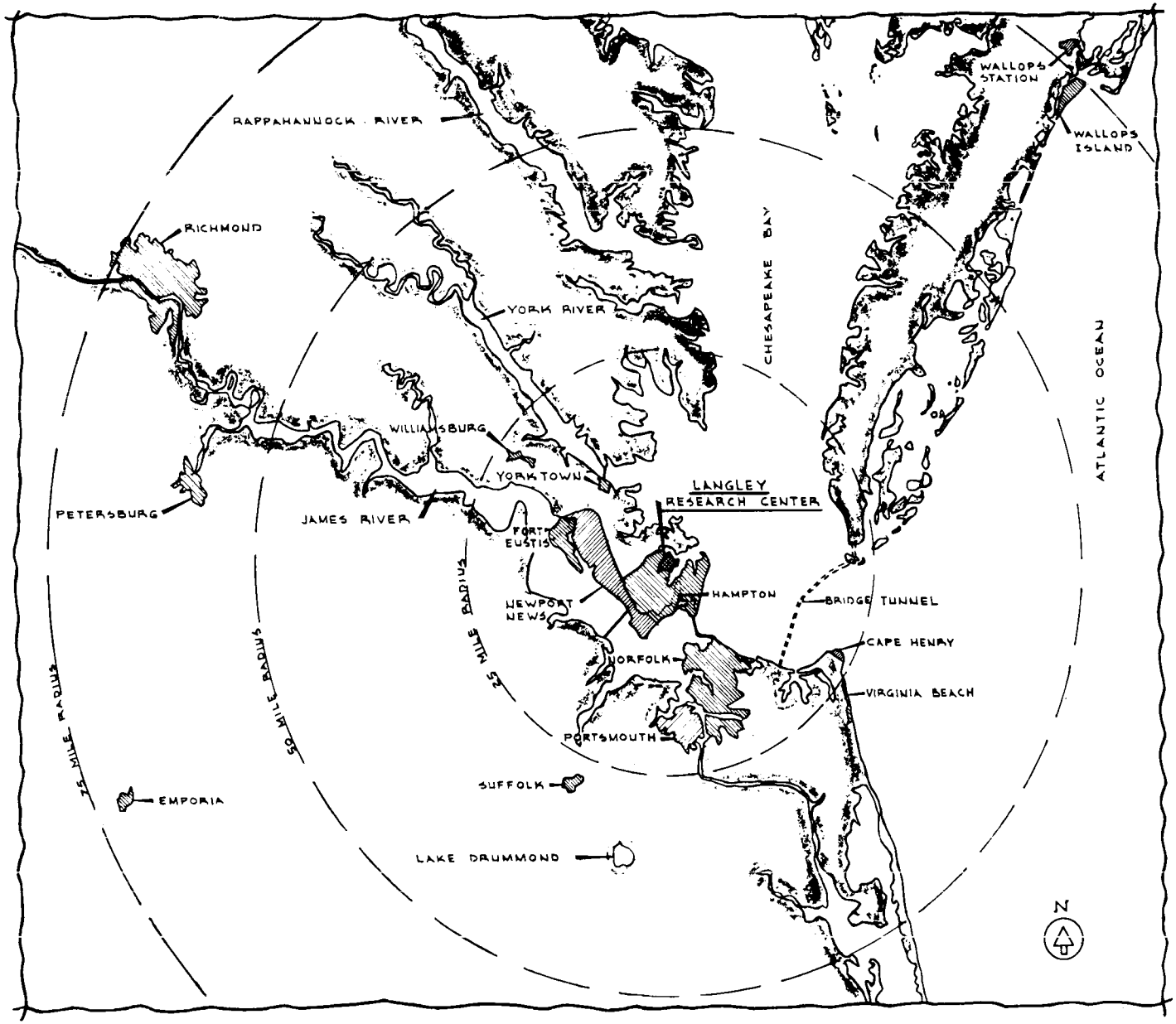
SCOUT PROJECT OFFICE

	73	74
GS-15	3	3
GS-14	11	11
Other GS	27	27
Total	41	41

SPACE APPLICATIONS AND TECHNOLOGY DIVISION

	73	74
Excepted	1	1
GS-16	2	2
GS-15	13	13
GS-14	18	18
Other GS	55	55
Total	89	89

491-316 O - 73 (Follows RPM 181)



LANGLEY RESEARCH CENTER AND VICINITY

1" = 8 MILES

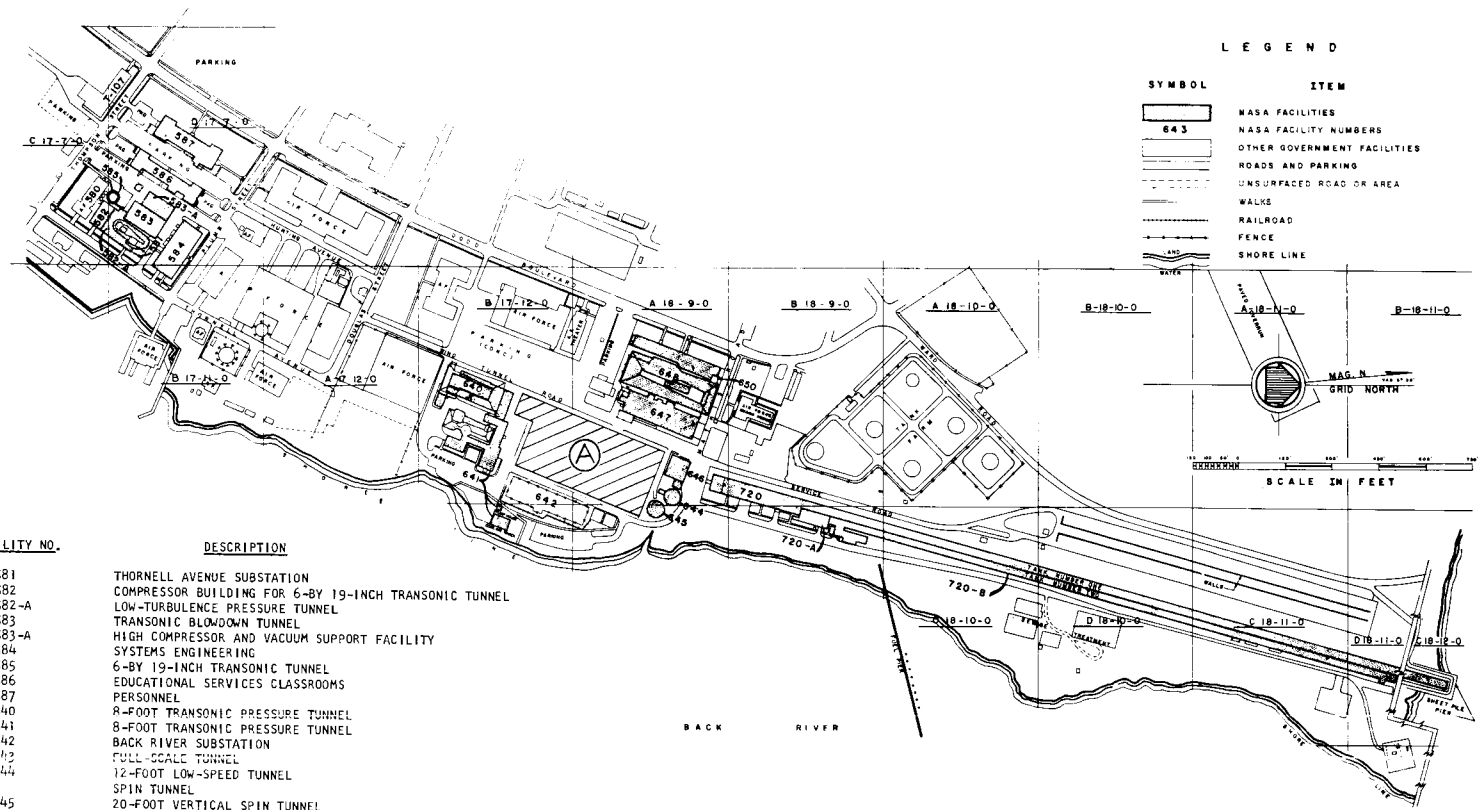
LANGLEY RESEARCH CENTER

FISCAL YEAR 1974 ESTIMATES

LOCATION PLAN

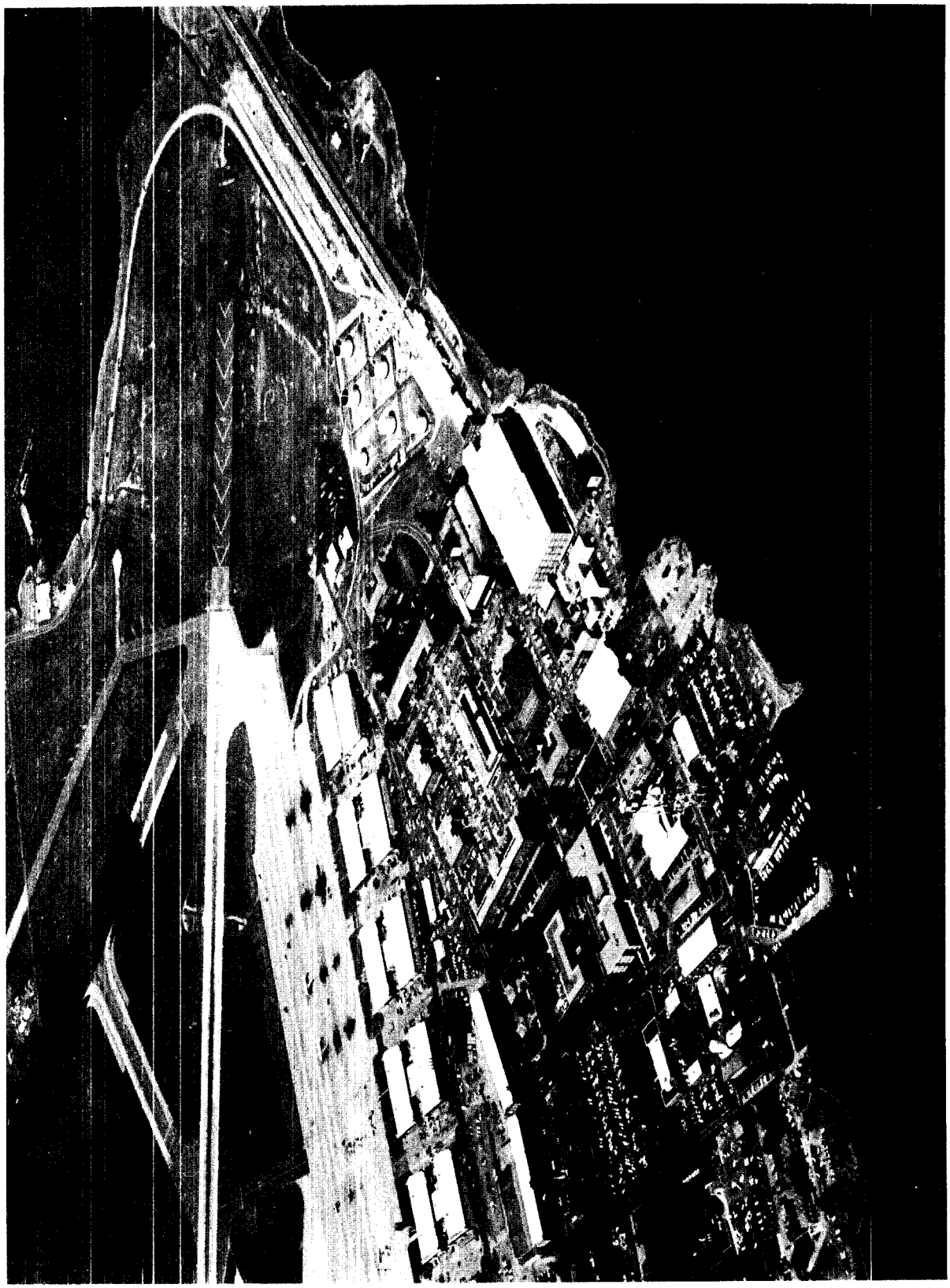
FACILITIES AUTHORIZED AND/OR UNDER CONSTRUCTION

A. Repairs To Full Scale Tunnel



FACILITY NO.	DESCRIPTION
581	THORNELL AVENUE SUBSTATION
582	COMPRESSOR BUILDING FOR 6-BY 19-INCH TRANSONIC TUNNEL
582-A	LOW-TURBULENCE PRESSURE TUNNEL
583	TRANSONIC BLOWDOWN TUNNEL
583-A	HIGH COMPRESSOR AND VACUUM SUPPORT FACILITY
584	SYSTEMS ENGINEERING
585	6-BY 19-INCH TRANSONIC TUNNEL
586	EDUCATIONAL SERVICES CLASSROOMS
587	PERSONNEL
640	8-FOOT TRANSONIC PRESSURE TUNNEL
641	8-FOOT TRANSONIC PRESSURE TUNNEL
642	BACK RIVER SUBSTATION
643	FULL-SCALE TUNNEL
644	12-FOOT LOW-SPEED TUNNEL SPIN TUNNEL
645	20-FOOT VERTICAL SPIN TUNNEL
646	ENGINEERING TECHNOLOGY LABORATORY
647	SYSTEMS SUPPORT
648	TRANSONIC DYNAMICS TUNNEL FLUTTER AND AEROELASTICITY
650	MATHIS ROAD SUBSTATION
720	NAVAL SHIP R&D CENTER BUILDING
720-A	DYNAMIC MODEL SHOP
720-B	IMPACTING STRUCTURES FACILITY

EAST AREA



RPM 185

RPM 186

LEWIS RESEARCH CENTER

MISSION

The Lewis Research Center's principal mission is research and technology in the areas of Propulsion and Electric Power Generation Systems for aircraft and spacecraft. The emphasis is predominantly on research and technology; however, the entire spectrum of activities is undertaken from basic research to development. The scope of technology ranges from work on individual components through complete systems. Most of the critical areas which limit the performance of engines and power systems are the subjects of in-house research effort at this Center. Research by commercial and university laboratories is also conducted under contracts and grants directed by Lewis Research Center personnel.

Lewis is responsible for Centaur launches of medium weight spacecraft on high energy missions, particularly planetary and synchronous orbits in support of NASA and non-NASA missions. Additional objectives of the program include increases in the Centaur reliability and mission flexibility by the introduction of an updated improved Centaur stage. Additional vehicle performance capability in support of the Viking and subsequent missions is being provided by the integration of the Titan III booster with the Centaur stage. This added capability is to be demonstrated in an engineering flight test (proof flight).

In the area of aeronautical propulsion, Lewis research supports many specific technology efforts. Examples are: advanced supersonic technology, vertical-lift fans for VTOL applications, subsonic/sonic CTOL transport propulsion, externally blown flaps and augmentor wing concepts for STOL aircraft. The engine technology for these applications requires new engine configurations for which the operating parameters and optimum geometry must be established. One element of the in-house program is to determine the effects of cross flow on high pressure ratio lift-fans. This is being done in the V/STOL research section of the 8X6 Foot Transonic Wind Tunnel.

High performance engines increase the urgency for finding means to reduce aircraft noise. Lewis is conducting in-house research to identify noise sources and to develop prototype noise reducing components, particularly for current turbojet engine installations and VTOL or STOL systems. A full-scale Quiet Engine has been built, by contract, and evaluated at the Engine Noise Test Stand; during FY 1973, work started on a Mark II Quiet Engine to incorporate new advances in technology. A substantial contract effort was started in FY 1973 to modify the JT8D jet engine and implement the

reduction of noise generated by current commercial aircraft operations. The Quiet Fan Test Stand continues to provide valuable data in that area of noise reduction research. A contract effort was also initiated in FY 1973 to define and begin development of a Quiet, Clean STOL Experimental Engine. In attacking the ecological problems of aircraft operations, the Center is also conducting several investigations in the area of technology for controlling atmospheric pollutants generated by aircraft engines. The Clean Combustor program (contract) and Global Atmospheric Sampling Program (in-house) are examples of these activities.

Aircraft engines for future subsonic and supersonic aircraft will incorporate high compressor pressure ratios and high turbine inlet temperatures. A substantial part of the aeronautics research effort at Lewis is directed toward solving the problems imposed by these two factors. Among these research efforts are: compressor casing treatment to increase compressor off-design performance; cooled turbine blades; high-speed bearings, seals, and lubricants for operation at high temperature; engine inlets; engine exhaust nozzles; combustor configurations; and engine controls.

The problems of high flight Mach number aircraft engines are also being investigated. This research spans the problems of inlets, combustion, nozzles, and engine systems.

A flight test program is being conducted with an F-106 airplane to determine the interaction of engine inlets and exhaust nozzles with wings and fuselage at transonic speeds. These flight tests complement wind tunnel tests which have limited capability in simulating the engine-airframe interactions at transonic speeds.

An experimental flight program will be carried out utilizing the YF-12 aircraft in cooperation with the Flight Research Center. The flight tests will determine static performance and dynamic characteristics of the inlet and the dynamic interaction between the propulsion system and the airframe.

Advanced integrated propulsion control systems for use on subsonic/supersonic aircraft are under active analysis and development. Propulsion control techniques are being developed to increase compatibility of engine/inlet propulsion interactions with airframe and aircraft end-use requirements.

Research and development programs are prividing the essential technology groundwork for an advanced high-performance reusable H_2O_2 Upper Stage Space Propulsion System (Tug) destined to play a key role in NASA near earth space missions. Engine size and weight constraints, together with payload and service demands, will require a propulsion system that can operate for a total life of up to 10 hours and hundreds of cycles at chamber pressures and heat flux rates far beyond the current operating regime. This work is furnishing needed technology pertaining to cooling and combustion, materials and thermal fatigue, high-speed long-life turbomachinery, ACS thrusters, integrated auxiliary propulsion systems, cryogenic storage, inspection,

491-316 O - 73 - 26

validation, and refurbishment techniques, reduced gravity propellant handling techniques, and safety.

Electric thrusters for satellite and deep space application have been developed in the Electric Propulsion Research Building and the Electric Propulsion Laboratory. Tests on board SERT I and SERT II flights have demonstrated the performance and endurance necessary to establish the use of electric thrusters.

Power generation technology encompasses a variety of approaches for generating electric power including photovoltaic and electrochemical processes, static and dynamic systems for converting heat to electricity. The conversion system of broadest application in the space program has been solar cells. A major concern of solar cell systems is their high cost, and Lewis is investigating methods for significantly reducing the cost of such systems without materially affecting their performance. The objective of our battery program is to provide batteries superior in power density and life-time to present Ni-Cd types. The Ag-Zn battery with an improved organic separator shows every indication of meeting these objectives.

Longer range studies, utilizing solid electrolytes to achieve very high energy-density batteries, are also being investigated.

In the area for fuel cell research, Lewis is studying life-limiting characteristics of H-O cells in order to provide longer lived, lighter weight systems.

Our principal emphasis has been on the development of dynamic systems, such as Brayton and Rankine, and a greater understanding of the technology associated with such systems. Recently, a 2-15KWe Brayton engine, developed under Lewis cognizance, completed 10,000 hours of operation. As part of a continuing Brayton technology program, we are investigating a lower power range, improved component reliability, and improved system efficiency.

The performance of propulsion and power generation systems, launch vehicles, spacecraft, and practically all hardware is paced by physical limitations of available materials. The Center has maintained a substantial materials research effort aimed at raising these limitations and improving component and system performance. The goals of materials R&D are to achieve weight savings, permit higher operating temperatures, increase life and reliability, and lower cost. Materials being investigated include composites, titanium alloys, superalloys of nickel and cobalt base, refractory metals, dispersion strengthened metals, and ceramics. We are also investigating various fabrication methods to produce unique structure and properties in these materials as well as manufacturing technology in certain critical problem areas.

In the field of ecology, Lewis research on combustion and high-temperature resistant catalytic materials for thermal reactors will help to reduce the amount of smoke and noxious pollutants in automobile and aircraft engine

exhausts. Lewis acientists are cooperating with local, state and national agencies in their efforts to reduce air and water pollution.

The NASA Aerospace Safety Research and Data Institute is located at the Lewis Center. The Institute's staff of specialists surveys the research needs and directs research efforts in this field. A data bank of research information is being compiled and cataloged for ready access. A computer system and data retrieval methods are being established to provide the safety information to requestors.

A joint NASA/Canadian communications technology satellite project is being conducted to advance the state-of-the-art in spacecraft and related ground-based technologies.

DESCRIPTION

The Lewis Research Center occupies two sites in north central Ohio. The older one was established in 1941 on 200 acres adjacent to the Cleveland-Hopkins International Airport. The original area has been expanded to 366 acres including 14 acres leased from the City of Cleveland. Here there are over 90 buildings, including two large supersonic wind tunnels, a V/STOL tunnel, fan noise and jet noise rigs, two zero gravity research facilities (free drop shafts, one of which is an underground evacuated shaft 477 feet deep in which zero gravity durations of about 10 seconds are obtained), a large Propulsion Systems Laboratory in which full-scale engines are operated under simulated high-altitude conditions, three rocket laboratories, five materials research buildings, eighteen major space simulation facilities ranging from four to thirty feet in diameter, a 50-foot diameter Space Power Chamber 120 feet long in which altitudes up to 100,000 feet are simulated, an Energy Conversion Laboratory, an Instrument Research Laboratory, a High Energy Fuels Laboratory, a Chemistry Laboratory, an Engine Research Building containing 64 test cells and covering nearly four acres, four office buildings, machine shops and other service buildings.

The Plum Brook Station established in 1956, is located south of Sandusky, Ohio, about fifty miles west of Cleveland, on land occupied by the Plum Brook Ordnance Works. It occupies 8,045 acres of which 7,999 are owned by the Government and 46 are in easements. There are over 200 buildings, 55 built by NASA and the rest by the former tenants. The major facilities include a Reactor Facility, an Altitude Rocket Test Facility, a Cryogenic Propellant Tank Facility, a Spacecraft Dynamics Research Facility, a Rocket Systems Hydraulic Laboratory, a Fluorine Pump Laboratory, a Spacecraft Propulsion Research Facility, a Space Power Facility, and a Hypersonic Tunnel Facility.

Consistent with NASA's announced plan to reduce or terminate long-range research and technology efforts that are not expected to be needed until sometime in the distant future, the Plum Brook Station Reactor Facility is being placed in a standby condition in FY 1973. The remainder of the Plum Brook Station will be placed in standby condition by the end of FY 1974.

Testing of nuclear propulsion systems is accomplished at the Nuclear Rocket Development Station (NRDS). The NRDS is located on a 92,518 acre site adjacent to the AEC's Nevada Test Site approximately 90 miles northwest of Las Vegas in southern Nevada and is the national site for the static ground testing of reactors, engines, components and eventually of vehicles associated with nuclear rocket development. This installation will be closed down by the end of FY 1973.

The total capital investment of the Lewis Research Center including fixed assets in progress, and contractor-held facilities at various locations, as of June 30, 1972, was $482,468,000 of which $253,112,000 represents facilities at Cleveland, $115,701,000 at Plum Brook, $30,227,000 at Nuclear Rocket Development Station, and $83,428,000 at various locations.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

Functions	1972	1973	1974
Personnel.....	$73,946,000	$72,609,000	$68,607,000
Travel.....	1,178,000	1,184,000	1,134,000
Facilities services.....	8,039,000	5,393,000	5,216,000
Technical services.....	246,000	1,367,000	311,000
Administrative support.....	1,287,000	1,346,000	1,189,000
Total, fund requirements.....	$84,696,000	$81,899,000	$76,457,000

	1972	1973	1974	Change in 1974
I. PERSONNEL.....	$73,946,000	$72,609,000	$68,607,000	$-4,002,000

Basis of Fund Requirements

	1972	1973	1974
A. Compensation and Benefits:			
1. Compensation:			
a. Permanent positions..	$66,626,000	$65,177,000	$58,872,000
b. Nonpermanent positions	320,000	385,000	385,000
c. Reimbursable details.	51,000	35,000	35,000
d. Overtime and other compensation.....	731,000	864,000	859,000
Subtotal, Compensation...	$67,728,000	$66,461,000	$60,151,000

	1972	1973	1974
2. Benefits.....	$6,038,000	$6,023,000	$8,312,000
Subtotal, Compensation and Benefits.....	$73,766,000	$72,484,000	$68,463,000
B. Supporting Costs:			
1. Transfer of personnel...	$90,000	$72,000	$84,000
2. Personnel training.....	90,000	53,000	60,000
Subtotal, Supporting Costs.....	$180,000	$125,000	$144,000
Total, Personnel and Related Costs.....	$73,946,000	$72,609,000	$68,607,000
1. Compensation.....	$67,728,000	$66,461,000	$60,151,000
a. Permanent Positions.....	$66,626,000	$65,177,000	$58,872,000

In FY 1974 the cost of permanent positions will be $58,872,000, a decrease of $6,305,000 from 1973. This decrease is due to a cancellation of nuclear program work, closing of the Nuclear Rocket Development Station and putting the Plum Brook Station in a standby condition.

Permanent Positions by Program:

Space Science			
Lunar and planetary exploration	1	1	1
Launch vehicle procurement.....	256	248	195
Applications			
Space applications.....	78	70	100
Aeronautics and Space Technology			
Aeronautical research and technology.....	1,361	1,370	1,335
Space research and technology..	732	666	672
Nuclear power and propulsion...	481	155	---
Technology Utilization.....	7	5	5
Subtotal, positions by program.	2,916	2,515	2,308

	1972	1973	1974
Indirect Positions			
Director and staff.....	5	5	5
Administrative support.....	394	372	346
Research and development.....	520	470	425
Subtotal, indirect positions...	919	847	776
Total, Permanent Positions.....	3,835	3,362	3,084
Other than Permanent Positions.....	250	250	235
Total.....	4,085	3,612	3,319

The distribution of the Lewis work force on NASA programs is illustrated above.

The following table illustrates a significant characteristic of the Lewis work force. Professional scientists and engineers make up 44% of the work force. Technicians and technically oriented wage board employees, working in direct support of the professional technical staff, drop from 42% of the staff in FY 1972 to approximately 40% of the permanent complement. The remaining percentage is composed of administrative and clerical.

	1972		1973		1974	
Occupational Group	Number	Percent	Number	Percent	Number	Percent
Professional scientists and engineers.....	1,672	43.6	1,476	43.9	1,348	43.7
Technicians.....	322	8.4	286	8.5	253	8.2
Wage Board.....	1,292	33.7	1,079	32.1	975	31.6
Professional Administrative.....	207	5.4	202	6.0	200	6.5
Clerical.....	342	8.9	319	9.5	308	10.0
Total.....	3,835	100.0	3,362	100.0	3,084	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the start of the year, as modified by the addition of new positions and abolishment of existing positions, within-grade advances, career development, etc. After these modifications, the year-end position structure is established and the cost effect for the year is calculated based on the estimated period that these modifications are in effect.

In FY 1974 the cost of permanent positions will be $58,791,000, a decrease of $6,305,000. This decrease results as follows:

Cost of permanent positions in 1973.....		$65,177,000
Cost of increases in 1974.....		2,615,000
Within-grade advances and career development:		
Full year effect of 1973 actions.....	$1,965,000	
Partial year effect of 1974 actions.....	650,000	
Cost of decreases in 1974.....		-8,920,000
Abolished positions:		
Full year effect of 1973 actions.....	$-428,000	
Partial year effect of 1974 actions.....	-8,405,000	
Turnover savings.....	-87,000	
Cost of permanent positions in 1974.....		$58,872,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent Positions.....	$320,000	$385,000	$385,000

These positions are required for a variety of programs, the largest of which is summer employment. Lewis hires college students and high school and college faculty during the summer to provide these people exposure to NASA programs and Government operations. NASA benefits from the employment of these highly skilled individuals, and the education and training they receive is a considerable asset to themselves and to the Nation.

A portion of the nonpermanent positions is used to provide for the Lewis participation in the President's Youth Opportunity Campaign, which enables disadvantaged youths to work at unskilled summer jobs at NASA installations.

As in the past, the Center continues to provide significant training opportunities for technically oriented college students participating in the cooperative training program throughout the year. The student employed under a cooperative training agreement works for a term at a NASA installation and then spends a term in regular study at his college or university. The work-study program combines practical experience with theory and has been a significant recruitment source for NASA.

c. Reimbursable Details.....	$51,000	$35,000	$35,000

Three military man-years are to be utilized in Lewis programs where such assignments are of mutual benefit. The programs to which they were assigned were electric propulsion, solid state physics, nuclear power systems, and direct energy conversion (fuel cells and batteries). In accordance with

existing agreements, Lewis reimburses the military for the salaries and related costs of the detailees. It is anticipated that this program will be at the same level in FY 1973 and FY 1974.

	1972	1973	1974
d. Overtime and Other Compensation	$731,000	$864,000	$859,000

Lewis operates major wind tunnel facilities which require a significant amount of the electrical capacity of the Cleveland electric utility. To obtain a significant electricity rate reduction, these Lewis facilities are operated during off-peak-demand times for electricity, which are in the evening and early morning. The savings in electrical power cost more than offset the increased personnel costs required for second and third shift operation. Holiday pay is kept to a minimum and is used to maintain only the necessary functions of protecting equipment and providing minimal security and safety forces. A slight decrease in FY 1974 is planned.

2. Benefits	$6,038,000	$6,023,000	$8,312,000

In addition to compensation, Lewis makes an employer's contribution to personnel benefits as authorized and required by law. The following table indicates the costs of personnel benefits by the major categories:

Category of Cost			
Contribution to the Civil Service Retirement Fund	$4,661,000	$4,671,000	$4,220,000
Contribution for employee life insurance	227,000	225,000	235,000
Contribution for employee health insurance	761,000	765,000	770,000
Contribution to FICA	11,000	17,000	24,000
Incentive awards	29,000	35,000	38,000
Other personnel benefits	30,000	30,000	---
Benefits for former personnel	319,000	280,000	3,025,000
Total	$6,038,000	$6,023,000	$8,312,000

The largest part of personnel benefits is the Center's contribution to the Civil Service Retirement Fund. The retirement fund corresponds to the compensation of permanent personnel.

The incentive awards program provides for cash awards for outstanding contributions to NASA, employees' superior performance and for improvement of the Center's operations. The cost of the program remains relatively stable. Other personnel benefits provide for uniform allowances required for fire fighters and nurses.

The severance pay estimate is related to the legal requirement of severance pay for employees who are involuntarily separated from the rolls through no fault of their own. The amounts shown for 1973 and 1974 are necessary to meet our obligation to personnel separated in our reduction-in-force plans.

	1972	1973	1974
B. Supporting Costs.....	$180,000	$125,000	$144,000

Supporting personnel costs provide for the expenses of moving employees to their initial duty station or reassignment; and for maintaining and expanding the skills of our employees. These costs are summarized as follows:

1. Transfer of personnel.....	$90,000	$72,000	$84,000

The 1966 legislation provided that the Government would pay for certain relocation costs. Included in these costs are the actual travel expenses involved in the movement of the employee and his household goods. The estimated costs for 1974 are based on the number and historical average cost of relocations. The increase of $12,000 will be required to cover costs of transfers of Lewis personnel which is consistent with the personnel reductions in 1974.

2. Personnel training.....	$90,000	$53,000	$60,000

The maintenance and expansion of the skills of personnel is essential in carrying out the agency's many complex technical programs. Such training is provided within the framework of the Government Employees Training Act of 1958. Part of the training consists of courses offered by other Government agencies, usually for a fee. The remainder of the training is provided through non-governmental sources; the cost is for tuition, fees and related costs for training at colleges, universities, technical institutes and related institutions. The increased costs in FY 1974 are needed to offset the rising costs of course credit hours.

	Number of Enrollments		
	1972	1973	1974
Scientific, engineering and related professional training.....	1,251	1,150	1,250
Technical support and administrative skills training.....	863	800	800
Supervision, management, and executive development.....	449	400	400
Secretarial, office support, safety, and personnel skills.....	171	150	150
Total, Enrollments.....	2,734	2,500	2,600

491-316 O - 73 - 2"

	1972	1973	1974	Change in 1974
II. TRAVEL.....	$1,178,000	$1,184,000	$1,134,000	$-50,000

Basis of Fund Requirements

Summary of Travel by Major Category

	1972	1973	1974
A. Program Related Travel			
1. Direction, coordination, and management of Research and Development and Construction of Facilities program activities.....	$783,000	$805,000	$729,000
2. Flight mission support.....	19,000	19,000	45,000
Subtotal.....	$802,000	$824,000	$774,000
B. Meetings and Technical Seminars			
1. Government-sponsored meetings..	$152,000	$158,000	$158,000
2. Other than Government-sponsored meetings and technical seminars.....	178,000	162,000	162,000
Subtotal.....	$330,000	$320,000	$320,000
C. Administrative Travel.....	$46,000	$40,000	$40,000
Total, Travel.....	$1,178,000	$1,184,000	$1,134,000

In fiscal year 1972 the average cost was $300 per employee at Lewis.

The following activities at Lewis Research Center make us somewhat unique in our requirement for travel funds.

1. Our growing launch vehicle business is a heavy demand and most of our contractors are on the West Coast--Convair, Lockheed, Teledyne, and Rocketdyne.

2. All centers must maintain close working interfaces with one or two other centers on their flight projects. We interface with nearly all of them, as follows:

Goddard Space Flight Center - Helios
Langley Research Center - Viking
Jet Propulsion Laboratory - Mariner Venus/Mercury Flyby (MVM), Mariner Jupiter/Saturn Flybys (MJS)
Manned Spacecraft Center - Modular-sized Integrated Utility Systems (MIUS)
Kennedy Space Center - Atlas/Centaur, Titan/Centaur
Ames Research Center - Pioneer

3. The Titan/Centaur interfaces are complex. It falls to Lewis Research Center to keep the following together: Langley Research Center/General Dynamics-Convair/Martin/Kennedy Space Center/Space and Mission Systems Office/Pratt and Whitney/Headquarters/Lockheed Missiles and Space Company--and this cannot be done by paper alone.

4. The Communication Technology Satellite requires travel not only to Canada at very frequent intervals, but also to Holland and Germany to help the Canadians on subcontractor problems.

5. Helios requires our attendance in Germany for regular interface meetings.

	1972	1973	1974
A. Program Related Travel.....	$802,000	$824,000	$774,000

Program related travel is the travel most directly related to the NASA mission.

1. Direction, coordination and management of programs.....	$783,000	$805,000	$729,000

The largest individual part of program related travel is for direction, coordination and management of Research and Development and Construction of Facilities program activities. Because of the complexity of the programs and the distribution of contractor and subcontractor effort throughout the entire United States, coordination and management of activities require frequent examination by personnel responsible for the program.

2. Flight mission support.....	$19,000	$19,000	$45,000

As projects reach the flight stage, support is required for prelaunch, launch, and postlaunch activities. The amount required for this purpose is directly related to both the number and complexity of the launches. The estimate for 1974 is in consonance with the launch schedule planned for 1974.

For NASA missions, Lewis is responsible for Centaur launches of medium weight spacecraft on high energy missions, particularly planetary, and synchronous orbits; for increases in the Centaur reliability and mission flexibility by introduction of an updated improved Centaur stage; for providing additional vehicle performance capability in support of the Viking and subsequent missions by integration of the Titan III booster with the Centaur stage.

	1972	1973	1974
B. Meetings and Technical Seminars....	$330,000	$320,000	$320,000

Travel to meetings and technical seminars permits employees engaged in program activities to participate at both Government-sponsored and non-Government sponsored meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to advances in the field which arise outside NASA, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the Government-sponsored meetings are made up of working panels convened to solve certain problems for the benefit of the Government. Authorization to attend meetings of the types described is granted only after assurance that attendance will be in the best interests of NASA.

C. Administrative Travel.....	$46,000	$40,000	$40,000

Administrative travel includes travel for the direction and coordination of general management matters. It includes travel by functional managers in such areas as personnel, financial management, and procurement to assure that policies and procedures are being implemented properly. The travel of center officials to NASA Headquarters is provided for in this category. This category also includes the cost of travel in and around the center, including bus and taxi services and rental of motor vehicles.

	1972	1973	1974	Change in 1974
III. FACILITIES.....	$8,039,000	$5,393,000	$5,216,000	$-177,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Rental of real property.....	$5,000	---	---
2. Minor rehabilitation and modification, and construction...	5,000	$5,000	---
Subtotal.....	$10,000	$5,000	---

	1972	1973	1974
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds	$987,000	$132,000	$45,000
2. Maintenance of equipment	194,000	36,000	36,000
3. Custodial services	2,449,000	2,047,000	1,423,000
Subtotal	$3,630,000	$2,215,000	$1,504,000
C. Operation of Facilities			
1. Utilities	$3,418,000	$3,036,000	$2,822,000
2. Supplies and equipment	981,000	137,000	890,000
Subtotal	$4,399,000	$3,173,000	$3,712,000
Total, Facilities Services	$8,039,000	$5,393,000	$5,216,000
B. Maintenance and Related Services	$3,630,000	$2,215,000	$1,504,000
1. Maintenance of buildings and grounds	987,000	132,000	45,000
2. Maintenance of equipment	194,000	36,000	36,000

Maintenance and repair of equipment consists of work necessary to keep mechanical, electrical, electronic, laboratory, and shop equipment operational.

3. Custodial services	$2,449,000	$2,047,000	$1,423,000

The estimate for custodial services includes the cost for janitorial, cleaning, protective, security, fire protection, and refuse handling services. The decrease in costs in 1973 and 1974 results from complement reduction and the standby condition of the Plum Brook Station.

C. Operation of Facilities	$4,399,000	$3,173,000	$3,712,000
1. Utilities	$3,418,000	$3,036,000	$2,822,000

The cost of utilities (electricity, gas, water, etc.) is related to the types of facilities operated, the time they are operated, and the unit cost rates for each utility consumed. The major cost is electricity at approximately $2,700,000 per year. Major wind tunnels account for most of this cost. Operating these tunnels on second and third shifts at off-peak demand results in significant savings. The standby status of Plum Brook Statio is reflected in a reduction of utilities in FY 1973 and FY 1974.

	1972	1973	1974
2. Supplies and equipment.....	$981,000	$137,000	$890,000

The supplies, materials, and equipment used in the operation and maintenance of the NASA facilities include lumber, chemicals, electrical and electronic materials, fuels and lubricants, general operating and maintenance materials, general service materials, hardware, instrumentation, vehicle maintenance parts, office supplies, photographic materials, and plumbing hardware. All are needed for in-house support of personnel and institutional base activities. Severe funding constraints in FY 1973 resulted in a major depletion of inventories. The increase in FY 1974 is required to restore inventories to a necessary level.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES....	$246,000	$1,367,000	$311,000	$-1,056,000

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment.....	$13,000	$10,000	$20,000
2. Purchase of equipment.....	---	1,075,000	---
3. Maintenance of equipment.....	15,000	17,000	35,000
Subtotal, equipment.....	$28,000	$1,102,000	$55,000
4. Programming and operation services.....	121,000	146,000	137,000
Subtotal.....	$149,000	$1,248,000	$192,000
B. Engineering Services.....	$2,000	$2,000	$2,000
C. Scientific and Technical Information and Educational Programs			
1. Educational/informational programs.....	$80,000	$102,000	$102,000
2. Scientific and technical information.....	15,000	15,000	15,000
Subtotal.....	$95,000	$117,000	$117,000
Total, Technical Services.....	$246,000	$1,367,000	$311,000

	1972	1973	1974
A. Automatic Data Processing.....	$149,000	$1,248,000	$192,000

This category includes the lease, purchase, maintenance, programming and operation services of ADP equipment which is not dedicated to specific research or operational systems. Estimate for FY 1973 provides for a one time procurement of a business computer.

B. Engineering Services.....	$2,000	$2,000	$2,000

This category includes reliability and quality assurance studies; engineering design services for the design of minor construction, repair, and alteration projects, special tooling, equipment and machine parts; and other related engineering services. Funding requirements will remain essentially at the same level as 1972.

C. Scientific and Technical Information and Educational Programs.....	$95,000	$117,000	$117,000

This category includes the costs of educational/informational programs, and the scientific and technical information services. The costs are summarized as follows:

1. Educational/informational programs.....	$80,000	$102,000	$102,000
2. Scientific and technical information.....	15,000	15,000	15,000

The educational/informational programs provide for the gathering and dissemination of information about the agency's programs to the mass communications media, the general public, and to the educational community at the elementary and secondary levels. Assistance to the mass communications media includes the gathering and exposition of news-worthy material in support of their requests, and takes such forms as press kits, news releases, television and radio information tapes and clips and feature material.

	1972	1973	1974	Change In 1974
V. ADMINISTRATIVE SUPPORT	$1,287,000	$1,346,000	$1,189,000	$-157,000

Basis of Fund Requirements

Summary of Administrative Support

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$290,000	$334,000	$284,000
2. Local telephone service.....	187,000	193,000	183,000
3. Other communications.....	30,000	35,000	35,000
Subtotal.....	$507,000	$562,000	$502,000
B. Administrative Printing.....	$73,000	$79,000	$78,000
C. Supplies, Materials and Equipment			
1. Supplies and materials.....	$164,000	$210,000	$210,000
2. Equipment.....	27,000	31,000	31,000
Subtotal.....	$191,000	$241,000	$241,000
D. Transportation			
1. Center operations.....	$162,000	$150,000	$150,000
2. Common carrier.....	64,000	63,000	63,000
Subtotal.....	$226,000	$213,000	$213,000
E. Administrative Support Services			
1. Installation support services..	$194,000	$211,000	$125,000
2. Medical services.....	96,000	40,000	30,000
Subtotal.....	$290,000	$251,000	$155,000
Total, Administrative Support.....	$1,287,000	$1,346,000	$1,189,000
A. Communications.....	$507,000	$562,000	$502,000

This category supports four WATS telephone lines to various areas in the country, five telephone lines between Cleveland and the Plum Beook Station, internal lines for building alarms for security, data-phone to Cape Kennedy for winds aloft data during launches, launch communications telephones, city of Cleveland to Lewis disaster emergency line, switchboards at Cleveland and Plum Brook Station, FTS costs, Western Union Tie-line, TWX line, teleticketing line, UPI-Western Union line, FTS costs to Selfridge AFB in support of high performance aircraft engine flight tests, and facsimile transmission to Sacramento,

and commercial toll charges. The increase in FY 1973 is due to increased costs of the FTS System; the decrease in FY 1974 reflects the standby condition of the Plum Brook Station.

	1972	1973	1974
B. Administrative Printing.....	$73,000	$79,000	$78,000

Estimates for administrative printing include funds for contractual printing and the related composition and binding operations. This includes services performed by other agencies, chiefly the Government Printing Office, or by commercial printing firms. All common processes of duplicating, including photostating, blueprinting, microfilming, and other photographic reproductions, are included.

C. Supplies, Materials and Equipment...	$191,000	$241,000	$241,000

Administrative supplies, materials, and equipment include those items of a general nature which service the entire installation. Excluded are supplies, materials, equipment, and related services which are related directly to a specific project (funded in the R&D appropriation) and those that are facility oriented (included in Facilities Services).

D. Transportation.....	$226,000	$213,000	$213,000

Transportation services include local motor pool operations and associated services, center aircraft operations and services, as well as the movement of supplies, materials, equipment, and related items by common carrier.

E. Administrative Support Services.....	$290,000	$251,000	$155,000

This category includes installation support services, medical support and tort claims.

491-316 O - 73 - 28

National Aeronautic
Organization
LEWIS RE
Cleve

STAFFING SUMMARY

	73	74
EXCEPTED	23	23
GS-16	21	21
GS-15	138	133
GS-14	314	265
OTHER GS	1752	1661
WB	1104	981
TOTAL PERMANENT	3362	3084

DI

EXCEPTED	
OTHER GS	
TOTAL	

DEPUTY DIRE TECHNOLOG

CHIEF SCIENTIST

	73	74
EXCEPTED	1	1
GS-15	1	1
OTHER GS	1	1
TOTAL	3	3

AEROSPACE SAFETY RESEARCH AND DATA INSTITUTE

	73	74
GS-15	4	4
GS-14	3	3
OTHER GS	5	5
TOTAL	12	12

RELIABILITY AND QUALITY ASSURANCE

	73	74
GS-16	1	1
GS-15	10	10
OTHER GS	11	11
TOTAL	22	22

DIRECTOR OF AERONAUTICS

	73	74
EXCEPTED	-	1
OTHER GS	-	1
TOTAL	-	2

AIRBREATHING ENGINES DIVISION

	73	74
GS-16	1	2
GS-15	10	10
GS-14	26	24
OTHER GS	85	88
TOTAL	122	124

WIND TUNNEL AND FLIGHT DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	9	9
GS-14	21	19
OTHER GS	67	74
TOTAL	100	105

V/STOL AND NOISE DIVISION

	73	74
EXCEPTED	1	1
GS-16	4	4
GS-15	11	11
GS-14	24	22
OTHER GS	52	58
TOTAL	92	96

FLUID SYSTEM COMPONENTS DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	13	13
GS-14	17	15
OTHER GS	63	65
TOTAL	96	96

DIRECTOR OF SPACE FLIGHT PROGRAMS

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

CTS PROJECT OFFICE

	73	74
EXCEPTED	1	1
GS-15	-	1
GS-14	5	4
OTHER GS	11	11
TOTAL	17	17

SPACECRAFT TECHNOLOGY

	73	74
EXCEPTED	1	1
GS-16	1	1
GS-15	5	5
GS-14	17	16
OTHER GS	93	94
TOTAL	117	117

ADVANCED COMMUNICATIONS SYSTEMS STUDY OFFICE

	73	74
GS-15	1	-
OTHER GS	1	-
TOTAL	2	-

DIRECTOR OF SPACE TECHNOLOGY AND MATERIALS

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

ENERGY CONVERSION AND MATERIALS SCIENCE DIVISION

	73	74
GS-16	1	1
GS-15	6	6
GS-14	11	10
OTHER GS	44	43
TOTAL	62	60

POWER SYSTEMS DIVISION

	73	74
GS-16	2	2
GS-15	5	5
GS-14	17	15
OTHER GS	40	40
TOTAL	64	62

PHYSICAL SCIENCE DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	21	21
GS-14	31	26
OTHER GS	47	56
TOTAL	102	106

MATERIALS AND STRUCTURES DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	9	9
GS-14	20	18
OTHER GS	85	95
TOTAL	117	125

DIRECTOR OF ENGINEERING SERVICES

	73	74
GS-16	1	1
OTHER GS	1	1
TOTAL	2	2

ENGINEERING DESIGN DIVISION

	73	74
GS-15	4	4
GS-14	10	9
OTHER GS	120	116
TOTAL	134	129

FACILITIES ENGINEERING DIVISION

	73	74
GS-15	5	5
GS-14	8	7
OTHER GS	70	69
TOTAL	83	81

CONSTRUCTION DIVISION

	73	74
GS-14	1	1
OTHER GS	14	14
TOTAL	15	15

CEN

EXCEPT	
OTHER	
TOTAL	

National Aeronautics and Space Administration
Organization and Staffing Chart
LEWIS RESEARCH CENTER
Cleveland, Ohio

DIRECTOR'S OFFICE

	73	74
EXCEPTED	3	3
OTHER GS	3	3
TOTAL	6	6

DEPUTY DIRECTOR TECHNOLOGY

DEPUTY DIRECTOR MANAGEMENT

SCIENTIST

	73	74
[illegible]	1	1
[illegible]	1	1
[illegible]	1	1
	3	3

AEROSPACE SAFETY RESEARCH AND DATA INSTITUTE

	73	74
GS-15	4	4
GS-14	3	3
OTHER GS	5	5
TOTAL	12	12

RELIABILITY AND QUALITY ASSURANCE

	73	74
GS-16	1	1
GS-15	10	10
OTHER GS	11	11
TOTAL	22	22

TECHNOLOGY UTILIZATION AND PUBLIC AFFAIRS

	73	74
EXCEPTED	1	1
GS-15	1	1
GS-14	2	1
OTHER GS	18	18
TOTAL	22	21

OFFICES

	73	74
GS-15	5	5
GS-14	4	4
OTHER GS	36	35
TOTAL	45	44

DIRECTOR OF SPACE TECHNOLOGY AND MATERIALS

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

ENERGY CONVERSION AND MATERIALS SCIENCE DIVISION

	73	74
GS-16	1	1
GS-15	6	6
GS-14	11	10
OTHER GS	44	43
TOTAL	62	60

POWER SYSTEMS DIVISION

	73	74
GS-16	2	2
GS-15	5	5
GS-14	17	15
OTHER GS	40	40
TOTAL	64	62

PHYSICAL SCIENCE DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	21	21
GS-14	31	26
OTHER GS	47	56
TOTAL	102	106

MATERIALS AND STRUCTURES DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	9	9
GS-14	20	18
OTHER GS	85	95
TOTAL	117	125

DIRECTOR OF ENGINEERING SERVICES

	73	74
GS-16	1	1
OTHER GS	1	1
TOTAL	2	2

ENGINEERING DESIGN DIVISION

	73	74
GS-15	4	4
GS-14	10	9
OTHER GS	120	116
TOTAL	134	129

FACILITIES ENGINEERING DIVISION

	73	74
GS-15	5	5
GS-14	8	7
OTHER GS	70	69
TOTAL	83	81

CONSTRUCTION DIVISION

	73	74
GS-14	1	1
OTHER GS	14	14
TOTAL	15	15

DIRECTOR OF CENTER DEVELOPMENT

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

DIRECTOR OF TECHNICAL SERVICES

	73	74
EXCEPTED	1	1
GS-15	1	1
OTHER GS	1	1
TOTAL	3	3

SAFETY AND PROJECT PLANNING OFFICE

	73	74
OTHER GS	45	45
WB	6	6
TOTAL	51	51

INSTRUMENT APPLICATIONS OFFICE

	73	74
GS-15	2	2
GS-14	6	5
OTHER GS	25	26
TOTAL	33	33

PLANT SERVICES DIVISION

	73	74
GS-14	1	1
OTHER GS	14	24
WB	49	49
TOTAL	64	74

TEST INSTALLATIONS DIVISION

	73	74
OTHER GS	5	5
WB	473	470
TOTAL	478	475

FACILITIES OPERATIONS DIVISION

	73	74
GS-14	1	1
OTHER GS	18	28
WB	200	198
TOTAL	219	227

FABRICATION DIVISION

	73	74
GS-14	2	2
OTHER GS	37	37
WB	135	135
TOTAL	174	174

EQUIPMENT AND SUPPLY

DIRECTOR OF LAUNCH VEHICLES

	73	74
EXCEPTED	2	2
GS-15	1	1
GS-14	2	2
OTHER GS	14	14
TOTAL	19	19

ATLAS CENTAUR PROJECT OFFICE

	73	74
GS-15	4	4
GS-14	13	11
OTHER GS	45	47
TOTAL	62	62

TITAN CENTAUR PROJECT OFFICE

	73	74
GS-15	5	5
GS-14	10	9
OTHER GS	53	54
TOTAL	68	68

CHEMICAL PROPULSION DIVISION

	73	74
EXCEPTED	1	1
GS-16	1	1
GS-15	6	6
GS-14	13	12
OTHER GS	58	63
TOTAL	79	83

cs and Space Administration
on and Staffing Chart
ESEARCH CENTER
veland, Ohio

DIRECTOR'S OFFICE

	73	74
EPTED	3	3
R GS	3	3
L	6	6

DIRECTOR NOLOGY

DEPUTY DIRECTOR MANAGEMENT

TECHNOLOGY UTILIZATION AND PUBLIC AFFAIRS

	73	74
EXCEPTED	1	1
GS-15	1	1
GS-14	2	1
OTHER GS	18	18
TOTAL	22	21

OFFICES

	73	74
GS-15	5	5
GS-14	4	4
OTHER GS	36	35
TOTAL	45	44

DIRECTOR OF CENTER DEVELOPMENT

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

DIRECTOR OF TECHNICAL SERVICES

	73	74
EXCEPTED	1	1
GS-15	1	1
OTHER GS	1	1
TOTAL	3	3

DIRECTOR OF LAUNCH VEHICLES

	73	74
EXCEPTED	2	2
GS-15	1	1
GS-14	2	2
OTHER GS	14	14
TOTAL	19	19

DIRECTOR OF PLUM BROOK STATION

	73	74
EXCEPTED	1	-
OTHER GS	4	-
TOTAL	5	-

SAFETY AND PROJECT PLANNING OFFICE

	73	74
OTHER GS	45	45
WB	6	6
TOTAL	51	51

INSTRUMENT APPLICATIONS OFFICE

	73	74
GS-15	2	2
GS-14	6	5
OTHER GS	25	26
TOTAL	33	33

PLANT SERVICES DIVISION

	73	74
GS-14	1	1
OTHER GS	14	24
WB	49	49
TOTAL	64	74

TEST INSTALLATIONS DIVISION

	73	74
OTHER GS	5	5
WB	473	470
TOTAL	478	475

FACILITIES OPERATIONS DIVISION

	73	74
GS-14	1	1
OTHER GS	18	28
WB	200	198
TOTAL	219	227

FABRICATION DIVISION

	73	74
GS-14	2	2
OTHER GS	37	37
WB	135	135
TOTAL	174	174

ATLAS CENTAUR PROJECT OFFICE

	73	74
GS-15	4	4
GS-14	13	11
OTHER GS	45	47
TOTAL	62	62

TITAN CENTAUR PROJECT OFFICE

	73	74
GS-15	5	5
GS-14	10	9
OTHER GS	53	54
TOTAL	68	68

CHEMICAL PROPULSION DIVISION

	73	74
EXCEPTED	1	1
GS-16	1	1
GS-15	6	6
GS-14	13	12
OTHER GS	58	63
TOTAL	79	83

ROCKET SYSTEMS DIVISION

	73	74
GS-15	3	-
GS-14	7	-
OTHER GS	26	-
TOTAL	36	-

REACTOR DIVISION

	73	74
GS-16	1	-
GS-15	1	-
GS-14	5	-
OTHER GS	5	-
TOTAL	12	-

SPACE POWER FACILITY DIVISION

	73	74
GS-15	1	-
GS-14	3	-
OTHER GS	30	-
TOTAL	34	-

ENGINEERING DIVISION

	73	74
GS-14	3	-
OTHER GS	23	-
TOTAL	26	-

ADMINISTRATION DIVISION

	73	74
OTHER GS	18	-
TOTAL	18	-

FACILITIES SERVICE DIVISION

	73	74
GS-14	1	-
OTHER GS	46	-
WB	118	-
TOTAL	165	-

PERSONNEL DIVISION

	73	74
GS-15	1	1
GS-14	2	2
OTHER GS	35	32
TOTAL	38	35

RESOURCES AND FINANCIAL MANAGEMENT DIVISION

	73	74
EXCEPTED	1	1
GS-14	6	5
OTHER GS	64	65
TOTAL	71	71

COMPUTER SERVICES DIVISION

	73	74
EXCEPTED	1	1
GS-15	3	3
GS-14	5	5
OTHER GS	86	83
WB	41	41
TOTAL	136	133

PROCUREMENT DIVISION

	73	74
EXCEPTED	1	1
GS-14	5	4
OTHER GS	92	92
TOTAL	98	97

MANAGEMENT SERVICES DIVISION

	73	74
GS-14	1	1
OTHER GS	105	101
WB	13	13
TOTAL	119	115

eland, Ohio

DIRECTOR'S OFFICE

	73	74
ED	3	3
S	3	3
	6	6

RECTOR OGY

DEPUTY DIRECTOR MANAGEMENT

TECHNOLOGY UTILIZATION AND PUBLIC AFFAIRS

	73	74
EXCEPTED	1	1
GS-15	1	1
GS-14	2	1
OTHER GS	18	18
TOTAL	22	21

OFFICES

	73	74
GS-15	5	5
GS-14	4	4
OTHER GS	36	35
TOTAL	45	44

DIRECTOR OF CENTER DEVELOPMENT

	73	74
EPTED	1	1
ER GS	1	1
AL	2	2

DIRECTOR OF TECHNICAL SERVICES

	73	74
EXCEPTED	1	1
GS-15	1	1
OTHER GS	1	1
TOTAL	3	3

DIRECTOR OF LAUNCH VEHICLES

	73	74
EXCEPTED	2	2
GS-15	1	1
GS-14	2	2
OTHER GS	14	14
TOTAL	19	19

DIRECTOR OF PLUM BROOK STATION

	73	74
EXCEPTED	1	-
OTHER GS	4	-
TOTAL	5	-

SAFETY AND PROJECT PLANNING OFFICE

	73	74
OTHER GS	45	45
WB	6	6
TOTAL	51	51

INSTRUMENT APPLICATIONS OFFICE

	73	74
GS-15	2	2
GS-14	6	5
OTHER GS	25	26
TOTAL	33	33

PLANT SERVICES DIVISION

	73	74
GS-14	1	1
OTHER GS	14	24
WB	49	49
TOTAL	64	74

TEST INSTALLATIONS DIVISION

	73	74
OTHER GS	5	5
WB	473	470
TOTAL	478	475

FACILITIES OPERATIONS DIVISION

	73	74
GS-14	1	1
OTHER GS	18	28
WB	200	198
TOTAL	219	227

FABRICATION DIVISION

	73	74
GS-14	2	2
OTHER GS	37	37
WB	135	135
TOTAL	174	174

EQUIPMENT AND SUPPLY DIVISION

	73	74
GS-14	1	1
OTHER GS	43	43
WB	69	69
TOTAL	113	113

ATLAS CENTAUR PROJECT OFFICE

	73	74
GS-15	4	4
GS-14	13	11
OTHER GS	45	47
TOTAL	62	62

TITAN CENTAUR PROJECT OFFICE

	73	74
GS-15	5	5
GS-14	10	9
OTHER GS	53	54
TOTAL	68	68

CHEMICAL PROPULSION DIVISION

	73	74
EXCEPTED	1	1
GS-16	1	1
GS-15	6	6
GS-14	13	12
OTHER GS	58	63
TOTAL	79	83

ROCKET SYSTEMS DIVISION

	73	74
GS-15	3	-
GS-14	7	-
OTHER GS	26	-
TOTAL	36	-

REACTOR DIVISION

	73	74
GS-16	1	-
GS-15	1	-
GS-14	5	-
OTHER GS	5	-
TOTAL	12	-

SPACE POWER FACILITY DIVISION

	73	74
GS-15	1	-
GS-14	3	-
OTHER GS	30	-
TOTAL	34	-

ENGINEERING DIVISION

	73	74
GS-14	3	-
OTHER GS	23	-
TOTAL	26	-

ADMINISTRATION DIVISION

	73	74
OTHER GS	18	-
TOTAL	18	-

FACILITIES SERVICE DIVISION

	73	74
GS-14	1	-
OTHER GS	46	-
WB	118	-
TOTAL	165	-

PERSONNEL DIVISION

	73	74
GS-15	1	1
GS-14	2	2
OTHER GS	35	32
TOTAL	38	35

RESOURCES AND FINANCIAL MANAGEMENT DIVISION

	73	74
EXCEPTED	1	1
GS-14	6	5
OTHER GS	64	65
TOTAL	71	71

COMPUTER SERVICES DIVISION

	73	74
EXCEPTED	1	1
GS-15	3	3
GS-14	5	5
OTHER GS	86	83
WB	41	41
TOTAL	136	133

PROCUREMENT DIVISION

	73	74
EXCEPTED	1	1
GS-14	5	4
OTHER GS	92	92
TOTAL	98	97

MANAGEMENT SERVICES DIVISION

	73	74
GS-14	1	1
OTHER GS	105	101
WB	13	13
TOTAL	119	115

LEWIS RESEARCH CENTER
Cleveland, Ohio

DIRECTOR'S OFFICE

	73	74
EXCEPTED	3	3
OTHER GS	3	3
TOTAL	6	6

DEPUTY DIRECTOR TECHNOLOGY

DEPUTY DIRECTOR MANAGEMENT

EF SCIENTIST

	73	74
TED	1	1
	1	1
GS	1	1
	3	3

AEROSPACE SAFETY RESEARCH AND DATA INSTITUTE

	73	74
GS-15	4	4
GS-14	3	3
OTHER GS	5	5
TOTAL	12	12

RELIABILITY AND QUALITY ASSURANCE

	73	74
GS-16	1	1
GS-15	10	10
OTHER GS	11	11
TOTAL	22	22

TECHNOLOGY UTILIZATION AND PUBLIC AFFAIRS

	73	74
EXCEPTED	1	1
GS-15	1	1
GS-14	2	1
OTHER GS	18	18
TOTAL	22	21

OFFICES

	73	74
GS-15	5	5
GS-14	4	4
OTHER GS	36	35
TOTAL	45	44

DIRECTOR OF SPACE TECHNOLOGY AND MATERIALS

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

ENERGY CONVERSION AND MATERIALS SCIENCE DIVISION

	73	74
GS-16	1	1
GS-15	6	6
GS-14	11	10
OTHER GS	44	43
TOTAL	62	60

POWER SYSTEMS DIVISION

	73	74
GS-16	2	2
GS-15	5	5
GS-14	17	15
OTHER GS	40	40
TOTAL	64	62

PHYSICAL SCIENCE DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	21	21
GS-14	31	26
OTHER GS	47	56
TOTAL	102	106

MATERIALS AND STRUCTURES DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	9	9
GS-14	20	18
OTHER GS	85	95
TOTAL	117	125

DIRECTOR OF ENGINEERING SERVICES

	73	74
GS-16	1	1
OTHER GS	1	1
TOTAL	2	2

ENGINEERING DESIGN DIVISION

	73	74
GS-15	4	4
GS-14	10	9
OTHER GS	120	116
TOTAL	134	129

FACILITIES ENGINEERING DIVISION

	73	74
GS-15	5	5
GS-14	8	7
OTHER GS	70	69
TOTAL	83	81

CONSTRUCTION DIVISION

	73	74
GS-14	1	1
OTHER GS	14	14
TOTAL	15	15

DIRECTOR OF CENTER DEVELOPMENT

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

DIRECTOR OF TECHNICAL SERVICES

	73	74
EXCEPTED	1	1
GS-15	1	1
OTHER GS	1	1
TOTAL	3	3

SAFETY AND PROJECT PLANNING OFFICE

	73	74
OTHER GS	45	45
WB	6	6
TOTAL	51	51

INSTRUMENT APPLICATIONS OFFICE

	73	74
GS-15	2	2
GS-14	6	5
OTHER GS	25	26
TOTAL	33	33

PLANT SERVICES DIVISION

	73	74
GS-14	1	1
OTHER GS	14	24
WB	49	49
TOTAL	64	74

TEST INSTALLATIONS DIVISION

	73	74
OTHER GS	5	5
WB	473	470
TOTAL	478	475

FACILITIES OPERATIONS DIVISION

	73	74
GS-14	1	1
OTHER GS	18	28
WB	200	198
TOTAL	219	227

FABRICATION DIVISION

	73	74
GS-14	2	2
OTHER GS	37	37
WB	135	135
TOTAL	174	174

EQUIPMENT AND SUPPLY DIVISION

	73	74
GS-14	1	1
OTHER GS	43	43
WB	69	69
TOTAL	113	113

DIRECTOR OF LAUNCH VEHICLES

	73	74
EXCEPTED	2	2
GS-15	1	1
GS-14	2	2
OTHER GS	14	14
TOTAL	19	19

ATLAS CENTAUR PROJECT OFFICE

	73	74
GS-15	4	
GS-14	13	1
OTHER GS	45	4
TOTAL	62	6

TITAN CENTAUR PROJECT OFFICE

	73	74
GS-15	5	
GS-14	10	
OTHER GS	53	
TOTAL	68	

CHEMICAL PROPULSION DIVISION

	73	74
EXCEPTED	1	
GS-16	1	
GS-15	6	
GS-14	13	
OTHER GS	58	
TOTAL	79	

LEWIS RESEAR
Clevelan

STAFFING SUMMARY

	73	74
EXCEPTED	23	23
GS-16	21	21
GS-15	138	133
GS-14	314	265
OTHER GS	1752	1661
WB	1104	981
TOTAL PERMANENT	3362	3084

DIRECTOR'S O

EXCEPTED	
OTHER GS	
TOTAL	

DEPUTY DIRECTOR TECHNOLOGY

CHIEF SCIENTIST

	73	74
EXCEPTED	1	1
GS-15	1	1
OTHER GS	1	1
TOTAL	3	3

AEROSPACE SAFETY RESEARCH AND DATA INSTITUTE

	73	74
GS-15	4	4
GS-14	3	3
OTHER GS	5	5
TOTAL	12	12

RELIABILITY AND QUALITY ASSURANCE

	73	74
GS-16	1	1
GS-15	10	10
OTHER GS	11	11
TOTAL	22	22

DIRECTOR OF AERONAUTICS

	73	74
EXCEPTED	-	1
OTHER GS	-	1
TOTAL	-	2

AIRBREATHING ENGINES DIVISION

	73	74
GS-16	1	2
GS-15	10	10
GS-14	26	24
OTHER GS	85	88
TOTAL	122	124

WIND TUNNEL AND FLIGHT DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	9	9
GS-14	21	19
OTHER GS	67	74
TOTAL	100	105

V/STOL AND NOISE DIVISION

	73	74
EXCEPTED	1	1
GS-16	4	4
GS-15	11	11
GS-14	24	22
OTHER GS	52	58
TOTAL	92	96

FLUID SYSTEM COMPONENTS DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	13	13
GS-14	17	15
OTHER GS	63	65
TOTAL	96	96

DIRECTOR OF SPACE FLIGHT PROGRAMS

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

CTS PROJECT OFFICE

	73	74
EXCEPTED	1	1
GS-15	-	1
GS-14	5	4
OTHER GS	11	11
TOTAL	17	17

SPACECRAFT TECHNOLOGY

	73	74
EXCEPTED	1	1
GS-16	1	1
GS-15	5	5
GS-14	17	16
OTHER GS	93	94
TOTAL	117	117

ADVANCED COMMUNICATIONS SYSTEMS STUDY OFFICE

	73	74
GS-15	1	-
OTHER GS	1	-
TOTAL	2	-

DIRECTOR OF SPACE TECHNOLOGY AND MATERIALS

	73	74
EXCEPTED	1	1
OTHER GS	1	1
TOTAL	2	2

ENERGY CONVERSION AND MATERIALS SCIENCE DIVISION

	73	74
GS-16	1	1
GS-15	6	6
GS-14	11	10
OTHER GS	44	43
TOTAL	62	60

POWER SYSTEMS DIVISION

	73	74
GS-16	2	2
GS-15	5	5
GS-14	17	15
OTHER GS	40	40
TOTAL	64	62

PHYSICAL SCIENCE DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	21	21
GS-14	31	26
OTHER GS	47	56
TOTAL	102	106

MATERIALS AND STRUCTURES DIVISION

	73	74
EXCEPTED	1	1
GS-16	2	2
GS-15	9	9
GS-14	20	18
OTHER GS	85	95
TOTAL	117	125

DIRECTOR OF ENGINEERING SERVICES

	73	74
GS-16	1	1
OTHER GS	1	1
TOTAL	2	2

ENGINEERING DESIGN DIVISION

	73	74
GS-15	4	4
GS-14	10	9
OTHER GS	120	116
TOTAL	134	129

FACILITIES ENGINEERING DIVISION

	73	74
GS-15	5	5
GS-14	8	7
OTHER GS	70	69
TOTAL	83	81

CONSTRUCTION DIVISION

	73	74
GS-14	1	1
OTHER GS	14	14
TOTAL	15	15

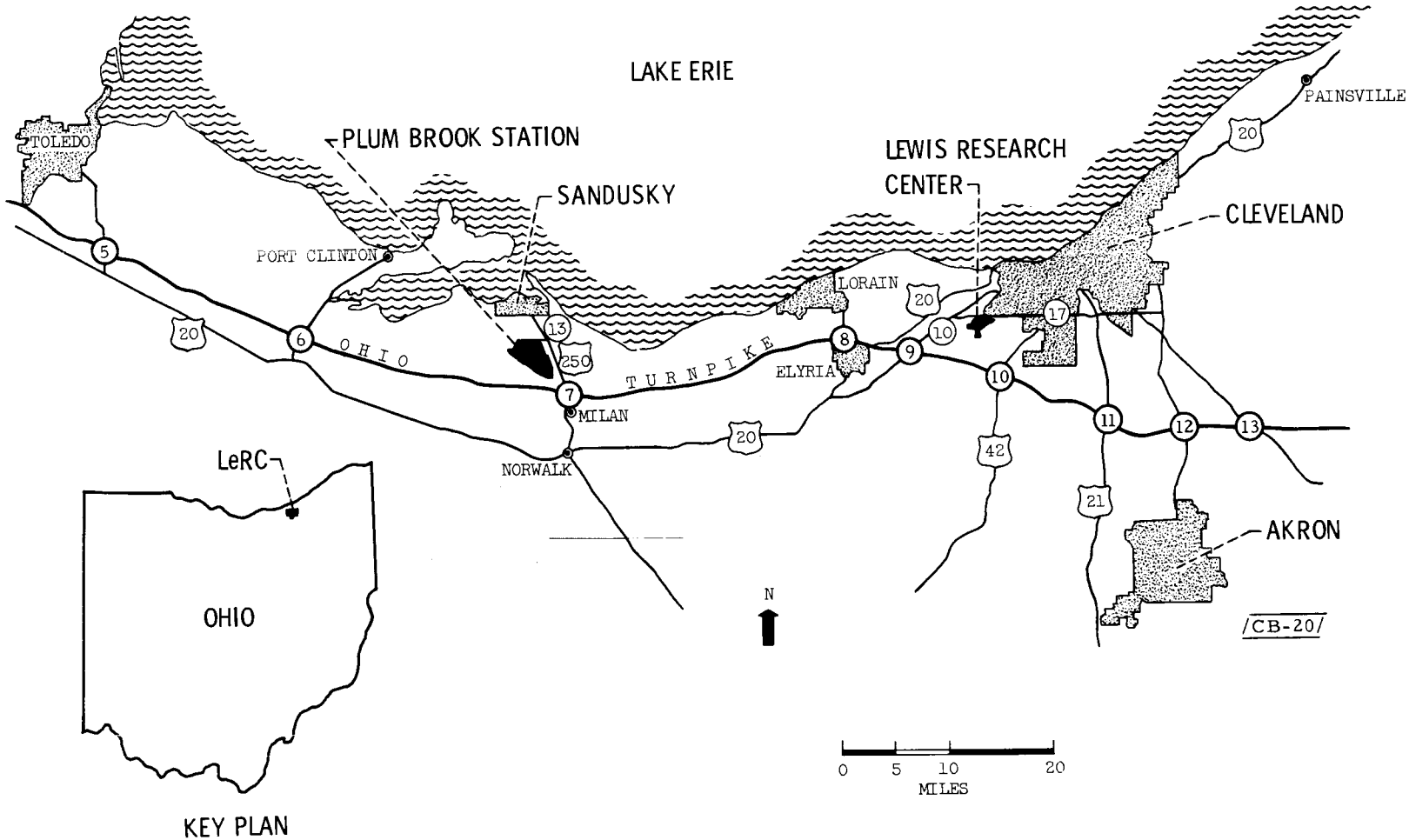
DIRECTOR CENTER DEVEL

EXCEPTED	
OTHER GS	
TOTAL	

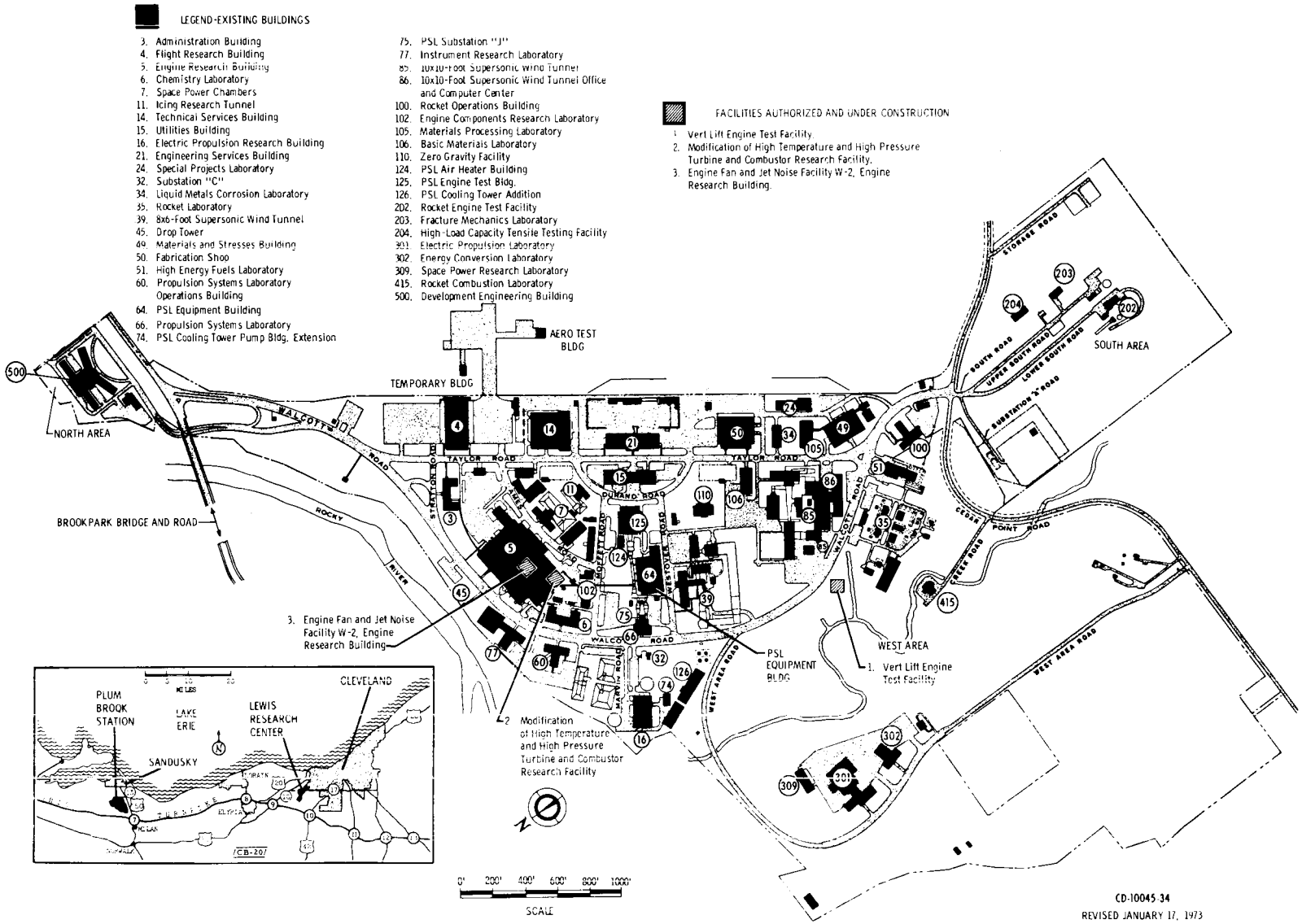
491-316 O - 73 (Follows RPM 204)

LEWIS RESEARCH CENTER
FISCAL YEAR 1974 ESTIMATES

AREA MAP

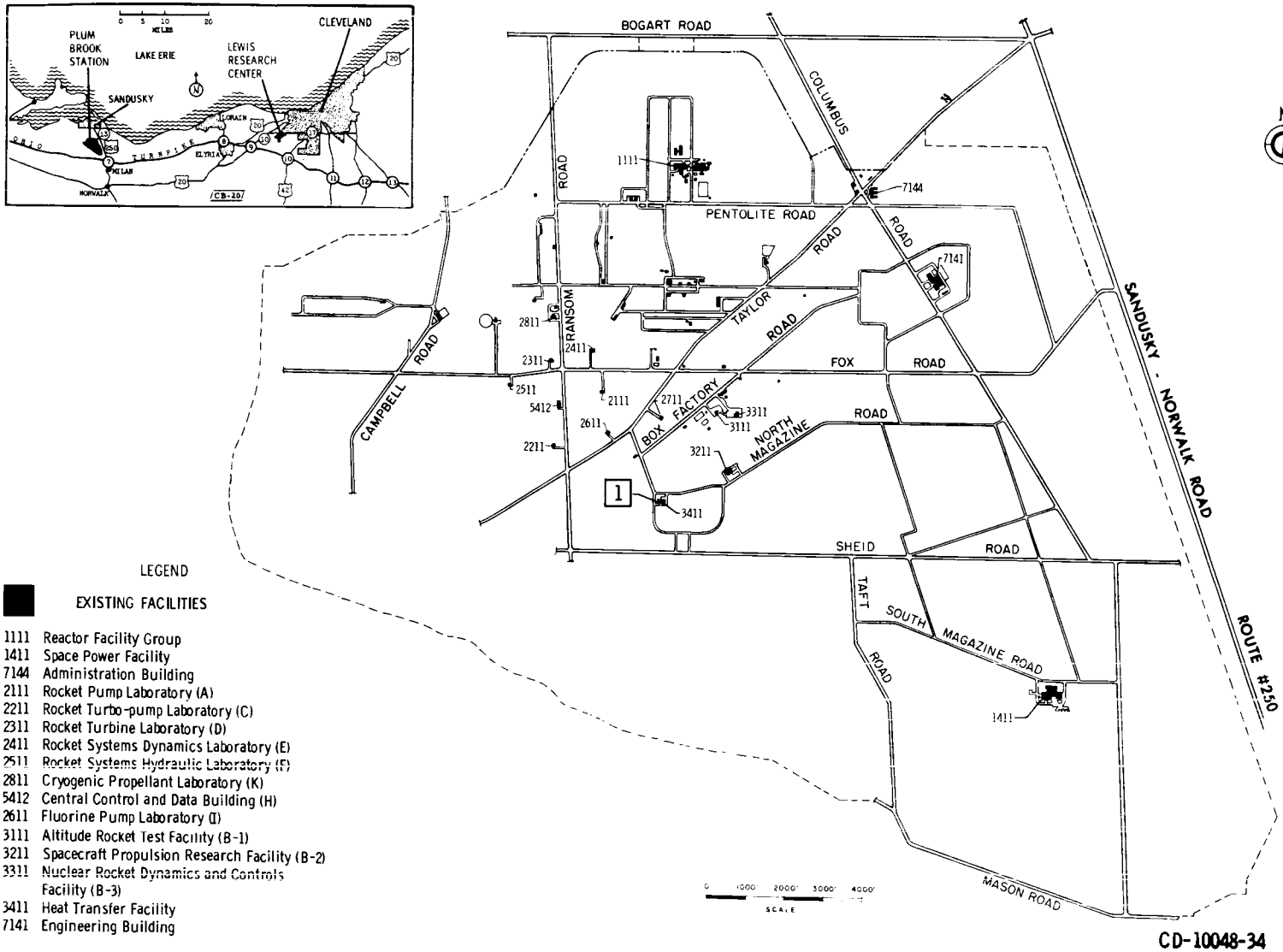


Lewis Research Center
FISCAL YEAR 1974 ESTIMATES



LEWIS RESEARCH CENTER
PLUM BROOK STATION
FISCAL YEAR 1974 ESTIMATES

LOCATION PLAN



LEGEND

EXISTING FACILITIES

1111 Reactor Facility Group
1411 Space Power Facility
7144 Administration Building
2111 Rocket Pump Laboratory (A)
2211 Rocket Turbo-pump Laboratory (C)
2311 Rocket Turbine Laboratory (D)
2411 Rocket Systems Dynamics Laboratory (E)
2511 Rocket Systems Hydraulic Laboratory (F)
2811 Cryogenic Propellant Laboratory (K)
5412 Central Control and Data Building (H)
2611 Fluorine Pump Laboratory (I)
3111 Altitude Rocket Test Facility (B-1)
3211 Spacecraft Propulsion Research Facility (B-2)
3311 Nuclear Rocket Dynamics and Controls Facility (B-3)
3411 Heat Transfer Facility
7141 Engineering Building

CD-10048-34

RPM 208

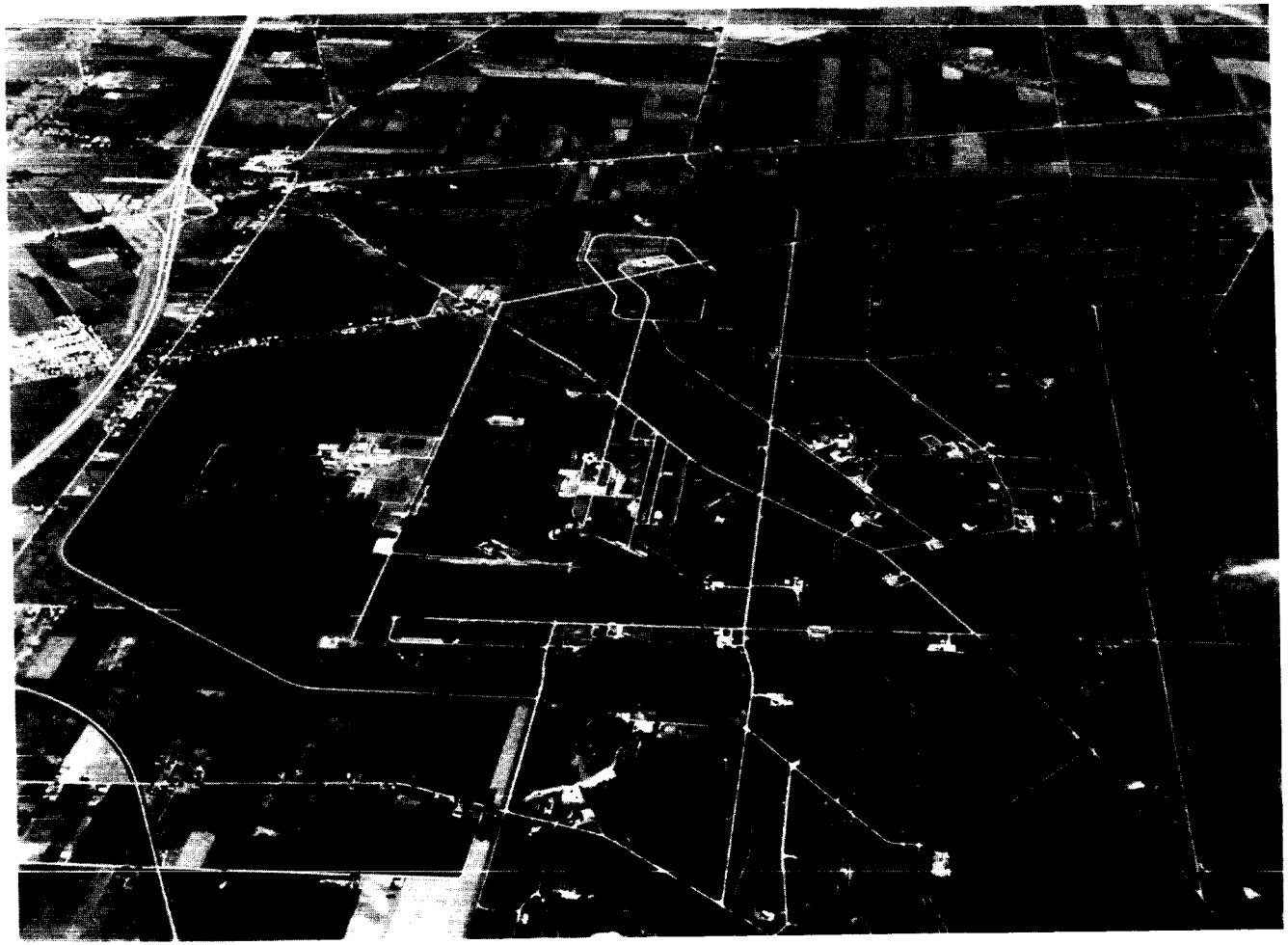
LEWIS RESEARCH CENTER
FISCAL YEAR 1974 ESTIMATES

CLEVELAND FACILITIES

C-71-3063

LEWIS RESEARCH CENTER
FISCAL YEAR 1974 ESTIMATES

PLUM BROOK FACILITIES



C-71-3057

RPM 210

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1974 ESTIMATES

NASA HEADQUARTERS

MISSION

The mission of the National Aeronautics and Space Administration Headquarters is to plan and provide executive direction for the programs authorized by the Congress, and to implement the national objectives stated in the National Aeronautics and Space Act of 1958, as amended. The principal statutory functions are:

1. To conduct research into, and for the solution of, problems of flight within and outside the earth's atmosphere and to develop, construct, test, and operate aeronautical and space vehicles for research purposes.

2. To conduct activities required for the exploration of space with manned and unmanned vehicles.

3. To arrange for participation by the scientific community in planning scientific measurements and observations to be made through the use of aeronautical and space vehicles, and conduct or arrange for the conduct of such measurements and observations.

4. To provide for the widest practicable and appropriate dissemination of information concerning its activities and their results.

The following offices at Headquarters assist management in carrying out the technical aspects of this mission:

Office of Manned Space Flight - Responsible for the research, development and operation of manned space flight programs including Skylab and the Apollo Soyuz Test Project; and also responsible for the development of a space transportation system which will replace almost all existing U.S. launch vehicles.

In performing its assigned functions the office has overall management responsibilities for the three installations primarily concerned with manned space flight programs are: the George C. Marshall Space Flight Center; the Manned Spacecraft Center; and the John F. Kennedy Space Center, which also supports unmanned launch activities at the Eastern and Western Test Ranges.

Office of Space Science - Responsible for the NASA automated space flight program directed toward scientific investigations of the solar system utilizing ground based, airborne, and space techniques including sounding rockets, earth satellites, and deep space probes; for scientific experiments to be conducted by man in space and for the scientific training of astronauts; and for the development, procurement and use of light and medium class launch vehicles.

The Office of Space Science has overall institutional responsibility for installations primarily involved in space science programs. These are the Goddard Space Flight Center, Wallops Station, the Jet Propulsion Laboratory (a Government-owned facility operated for NASA by the California Institute of Technology), and the NASA Pasadena Office, a component field activity of Headquarters.

Office of Applications - Responsible for research and development activities leading to programs providing beneficial applications of space systems, the space environment, and space related or derived technology. Programs involved include earth observation, meteorology, geodesy, and related disciplines; use of the space environment for materials, sciences and processing; and the application of space developed technology to domestic problems.

Office of Aeronautics and Space Technology - Responsible for the planning, direction, execution, evaluation, documentation, and dissemination of the results of all NASA research and technology programs that are conducted primarily to demonstrate the feasibility of a concept, structure, component, or system and which may have general application to the nation's aeronautical and space objectives. This office is also responsible for coordinating the agency's total program of supporting research and technology related to carrying out specific flight missions in order to avoid unnecessary duplication and to insure an integrated and balanced agency research program.

In addition, this office has overall institutional responsibility for the research centers primarily involved in carrying out the agency's advanced research programs. These installations are: the Ames Research Center, the Flight Research Center, the Langley Research Center, and the Lewis Research Center.

Office of Tracking and Data Acquisition - Responsible for the development, implementation, and operation of tracking, data acquisition, command, communications, and data processing facilities, systems and services required for NASA flight missions. This office is also responsible for agency-wide coordination of the management of automatic data processing systems and services. In addition, this office provides for centralized planning and systems management for the administrative communications at NASA installations.

The NASA Pasadena Office, Pasadena, California, is a component field activity of the Headquarters Office of Space Science. Its responsibilities are to negotiate and administer NASA contracts with the California Institute of Technology for the operation of the Jet Propulsion Laboratory; provide patent and technology utilization services as they relate to prime and subcontracts at the Jet Propulsion Laboratory; and perform such additional procurement, contract administration, communications, and other functions as may be assigned by the Associate Administrator for Space Science.

DESCRIPTION

The NASA Headquarters is located at 400 Maryland Avenue, S.W., Washington, D.C., and also occupies other buildings in the District of Columbia and nearby Virginia. Except for some office space leased in the District of Columbia and a storage area in Virginia, personnel occupy Government-owned buildings.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

Functions	1972	1973	1974
Personnel	$41,818,000	$41,332,000	$41,587,000
Travel	2,436,000	2,667,000	2,600,000
Facilities services	451,000	289,000	273,000
Technical services	10,492,000	9,574,000	10,029,000
Administrative support	6,439,000	6,202,000	5,798,000
Total, fund requirements	$61,636,000	$60,064,000	$60,287,000

PERSONNEL

	1972	1973	1974	Change in 1974
I. PERSONNEL	$41,818,000	$41,332,000	$41,587,000	$+255,000

491-316 O - 72 - 29

Basis of Fund Requirements

	1972	1973	1974
A. Compensation and Benefits:			
1. Compensation:			
a. Permanent positions...	$36,263,000	$35,330,000	$34,897,000
b. Nonpermanent positions	647,000	712,000	697,000
c. Reimbursable details..	387,000	425,000	425,000
d. Overtime and other compensation.....	169,000	232,000	230,000
Subtotal, Compensation	$37,466,000	$36,699,000	$36,249,000
2. Benefits.....	3,790,000	3,904,000	4,627,000
Subtotal, Compensation and Benefits.....	$41,256,000	$40,603,000	$40,876,000
B. Supporting Costs:			
1. Transfer of personnel.....	$ 104,000	$ 254,000	$ 241,000
2. Civil Service Commission services.....	81,000	97,000	97,000
3. Personnel training.....	377,000	378,000	373,000
Subtotal, Supporting Costs	$ 562,000	$ 729,000	$ 711,000
Total, Personnel and Related Costs.....	$41,818,000	$41,332,000	$41,587,000
1. Compensation			
a. Permanent Positions.....	$36,263,000	$35,330,000	$34,897,000

The cost for permanent positions is the largest part of the personnel and related costs. The funds shown above will support 1,731 permanent positions in 1973 and 1,581 for 1974. This represents a reduction of 191 permanent positions from 1972.

	1972	1973	1974
DISTRIBUTION OF PERMANENT POSITIONS BY PROGRAM			
Permanent Positions by Program:			
Manned Space Flight			
Space flight operations.....	113	107	93
Space shuttle.....	36	83	85
Advanced mission.....	48	46	41
Apollo.....	73	30	22
Space Science			
Lunar and planetary exploration...	65	68	62
Physics and astronomy.....	48	48	44
Launch vehicle procurement.....	25	25	24
Space Applications.....	67	91	84
Aeronautics and Space Technology			
Aeronautical research and technology	83	110	101
Space research and technology.....	60	46	45
Space nuclear systems.....	3	4	---
Tracking and Data Acquisition	53	54	50
Technology Utilization.....	19	19	18
Subtotal, positions by program....	693	731	669
Indirect Positions			
Administrator and staff.....	237	202	184
Agency-wide management	627	600	547
Headquarters administration.....	215	198	181
Subtotal, indirect positions....	1,079	1,000	912
Total, permanent positions	1,772	1,731	1,581
Other than permanent positions....	250	250	240
Total, positions.....	2,022	1,981	1,821

The above table illustrates the use to which these positions are put. The distribution by occupation of these positions illustrates a significant characteristic of the Headquarters work force. Due to the nature of the Headquarters mission, professional management positions in research and development administration in such activities as financial management, contracting, personnel, security, administration, and law, comprise approximately 40% of the Headquarters staff. Professional scientific and engineering positions make up another 27% of the complement.

The following table summarizes by occupational group the Headquarters work force.

Occupational Group	1972 Number	1972 Percent	1973 Number	1973 Percent	1974 Number	1974 Percent
Professional scientists and engineers.....	482	27.2	471	27.2	430	27.2
Wage Board.....	16	.9	13	.8	12	.8
Professional administrative.....	698	39.4	682	39.4	623	39.4
Clerical.....	576	32.5	565	32.6	516	32.6
Total.....	1,772	100.0	1,731	100.0	1,581	100.0

Basis of Cost for Permanent Positions

The estimate for permanent compensation is based upon the position structure at the start of the year, as modified by the addition of new positions and abolishment of existing positions, within grade advances, career development, etc. After these modifications, the year-end position structure is established and the cost effect for the year is calculated based on the estimated period that these modifications are in effect:

In 1974 the cost of permanent positions will be $34,897,000, a decrease of $433,000 from 1973. This decrease results as follows:

Cost of permanent positions in 1973.....		$35,330,000
Cost of increases in 1974.....		795,000
Within grade advances and career development:		
Full year effect of 1973 actions.....	$397,000	
Partial year effect of 1974 actions.....	398,000	
Cost decreases in 1974.....		-1,228,000
Abolished positions:		
Full year effect of 1973 actions.....	- 35,000	
Partial year effect of 1974 actions.....	-993,000	
Turnover savings.....	-200,000	
Cost of permanent positions in 1974		$34,897,000

Other Compensation Costs

	1972	1973	1974
b. Nonpermanent Personnel	$647,000	$712,000	$697,000

The 1973 and 1974 plans include 250 and 240 nonpermanent personnel respectively. These positions are required for a variety of programs, the

largest of which is summer employment. Headquarters hires college students and high school and college faculty members during the summer to give them exposure to NASA programs and government operations. The agency benefits from the employment of these highly skilled individuals, and the education and training they receive is an asset to themselves and to the nation.

A portion of the nonpermanent positions provides for Headquarters participation in the President's Youth Opportunity Programs, which enables disadvantaged youths to work at unskilled summer jobs. Some of these positions are used during the school year as part of the President's Youth Opportunity Back to School Drive. During this phase, the youth's workweek may not exceed 16 hours.

As in the past, the Headquarters continues to provide significant training opportunities for technically oriented college students participating in the cooperative training program throughout the year. The student employed under a cooperative training agreement works for a term at Headquarters and then spends a term in regular study at his college or university. This work-study program combines practical experience with theory and has been a significant recruitment source.

Distribution of Nonpermanent Positions by Program

	1972	1973	1974
Co-ops	6	8	8
Summer Program (Excluding Disadvang Youth)	140	138	128
Disadvantaged Youth Program	74	74	74
Other	30	30	30
Total	250	250	240

c. Reimbursable Details	$387,000	$425,000	$425,000

The services of a small group of military officers and civilian detailees from other government agencies are utilized by Headquarters where such assignments are of mutual benefit. The number actually varies from 18 to 20, all of whom are assigned to program offices with the exception of 2 or 3 assigned to the Office of Facilities. The estimate for 1974 is to cover the cost of approximately 19 manyears.

d. Overtime and Other Compensation	$169,000	$232,000	$230,000

The estimate for overtime compensation for 1974 is essentially the same as for 1973 which is considered to be consistent with Headquarters mission and legal requirements.

	1972	1973	1974
2. Benefits	$3,790,000	$3,904,000	$4,627,000

In addition to compensation, Headquarters makes an employer's contribution to personnel benefits as authorized and required by law. The following table indicates the costs of personnel benefits by the major categories:

Category of Cost			
Contribution to the Civil Service Retirement Fund	$2,519,000	$2,468,000	$2,441,000
Contribution for employee life insurance	134,000	131,000	130,000
Contribution to employee health insurance	276,000	280,000	277,000
FICA	27,000	35,000	37,000
Incentive awards	36,000	51,000	51,000
Workmen's compensation	742,000	939,000	1,266,000
Severance pay	56,000	-	425,000
Total	$3,790,000	$3,904,000	$4,627,000

A large part of personnel benefits and the only item showing a significant increase is Workmen's Compensation, for which Headquarters finances the amount required for the entire agency. The amount shown for 1974 represents the amount for which the agency has been billed by the Labor Department pursuant to Section 35 of the Federal Employees' Compensation Act as amended by Public Law 86-767, which provides among other things that:

(a) The Secretary of Labor shall, prior to August 15 of each year, furnish each executive department or agency, having employees who are or may be entitled to compensation benefits, a statement showing total cost of benefits and other payments made from the Employees' Compensation Fund during the preceding fiscal year on account of the injury or death of employees or persons under the jurisdiction of such agency occurring after December 1, 1960.

(b) Each agency shall include in its annual budget estimates for the next fiscal year a request for an appropriation in an amount equal to such costs. Sums appropriated pursuant to such request shall, within thirty days after they become available, be deposited in the Treasury to the credit of the Employees' Compensation Fund.

B. Supporting Costs	$562,000	$729,000	$711,000

Supporting personnel costs provide for the expenses of moving employees to their initial duty station or reassignment; for security investigations and

other recruitment costs; and for maintaining and expanding the skills of our employees. These costs are summarized as follows:

	1972	1973	1974
1. Transfer of personnel.....	$104,000	$254,000	$241,000

The 1966 legislation provided that the government would pay for certain relocation costs, such as the expenses of selling and buying a home, the cost of one trip to the new duty station to secure housing, and the cost of family relocation allowances. The estimated cost in 1974 is based on the number and historical average cost of relocations estimated at Headquarters.

2. Civil Service Commission services.....	$ 81,000	$ 97,000	$ 97,000

Headquarters reimburses the Civil Service Commission for security investigations on new hires for the entire agency. The cost of security investigations is a function of two variables, the number of investigations to be conducted and the unit charge made by the Civil Service Commission. There is also a payment to the Commission for recruitment advertising, career-maturity surveys, and any requested investigation of formal discrimination complaints. The estimated cost for 1974 is the same as for 1973.

3. Personnel training.....	$377,000	$378,000	$373,000

The maintenance and expansion of the skills of personnel is essential in carrying out the agency's many complex technical programs. Such training is provided within the framework of the Government Employees Training Act of 1958. Part of the training consists of courses offered by other government agencies, usually for a fee. The remainder of the training is provided through nongovernmental sources; the cost is for tuition, fees and related costs for training at colleges, universities, technical institutes and related institutions; and for the cost of seminars and workshops in which groups of Headquarters employees receive training in subjects of agency-wide interest. Such training is used to maintain and expand employee skills. The estimate is based on a continuation of current training programs and the growing requirements to reorient skills of employees into channels compatible with the direction of the space program in the 1970's. The estimate for training in 1974 is approximately the same as for the prior 2 years. The estimate provides for approximately 1,273 enrollments for training in the following categories: scientific, engineering and related professional training - 90; technical support and administrative skills training - 259; supervision, management and executive development - 565; secretarial, office support, safety and personal skills - 359.

TRAVEL

	1972	1973	1974	Change in 1974
II. TRAVEL	$2,436,000	$2,667,000	$2,600,000	$-67,000

Basis of Fund Requirements

Summary of Travel by Major Category

	1972	1973	1974
A. Program Related Travel			
1. Direction, coordination, and management of Research and Development and Construction of Facilities program activities.....	$764,000	$803,000	$803,000
2. Flight mission support.....	98,000	103,000	103,000
3. Overseas travel to launch and tracking sites.....	12,000	13,000	13,000
Subtotal.....	$874,000	$919,000	$919,000
B. Meetings and Technical Seminars			
1. Government-sponsored meetings..	$615,000	$644,000	$644,000
2. Other than government-sponsored meetings and technical seminars	266,000	279,000	279,000
Subtotal.....	$881,000	$923,000	$923,000
C. Administrative Travel.....	$681,000	$825,000	$758,000
Total, Travel.....	$2,436,000	$2,667,000	$2,600,000

	1972	1973	1974
A. Program Related Travel.....	$874,000	$919,000	$919,000

Program related travel is the travel most directly related to the NASA mission. It represents approximately 35% of the Headquarters travel requirements for 1974.

1. Direction, coordination, and management of programs.....	$764,000	$803,000	$803,000

The largest individual part of program related travel is for direction, coordination, and management of Research and Development and Construction of Facilities program activities. Because of the complexity of the programs and the distribution of contractor and subcontractor effort throughout the entire United States, coordination and management of activities require frequent examination by Headquarters personnel with program responsibility.

2. Flight mission support.....	$98,000	$103,000	$103,000

As projects reach the flight stage, support is required for prelaunch and postlaunch activities. The amount of travel required for this purpose is directly related to both the number and complexity of the launches. The estimate for 1974 is in consonance with the planned launch schedule for 1974.

3. Overseas travel to launch and tracking sites.....	$12,000	$13,000	$13,000

Overseas travel to launch and tracking sites includes travel required for instrumentation of the tracking sites, and inspection of the sites prior to launch.

B. Meetings and Technical Seminars.....	$881,000	$923,000	$923,000

Travel to meetings and technical seminars permits employees engaged in program activities to participate at both government-sponsored and non-government-sponsored meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to advances in the field which arise outside NASA, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the government-sponsored meetings are made up of working panels convened to solve certain problems for the benefit of the government. Authorization to attend meetings of the types described is granted only after assurance that attendance will be in the best interest of NASA.

C. Administrative Travel.....	$681,000	$825,000	$758,000

Administrative travel includes travel for the direction and coordination of general management matters and travel by senior officials to review center

491-316 O - 75 - 30

requirements and operations. It includes travel by functional managers in such areas as personnel, financial management, and procurement to assure that agency policies and procedures are being implemented properly throughout the agency. This category also includes the cost of local travel, including bus and taxi services and rental of motor vehicles, and travel of unpaid members of research advisory committees.

The detail of the 1974 estimate is as follows: Direction and Coordination of Administrative Management Programs $298,000; Charter or lease of aircraft $76,000; Local transportation $32,000; Rental of passenger vehicles $13,000; Travel performed in accordance with the provisions of 31 USC 22a (Congressional Travel) $30,000; and other non-employee travel such as that of unpaid members of research advisory committees $309,000.

The estimates shown for each of the above travel categories are required for the Headquarters to provide the necessary direction in carrying out the space program as authorized by Congress.

	1972	1973	1974	Change in 1974
III. FACILITIES SERVICES	$451,000	$289,000	$273,000	$-16,000

Basis of Fund Requirements

Summary of Facilities Services

	1972	1973	1974
A. Acquisition of Facilities			
1. Rental of real property.....	$46,000	$44,000	$44,000
B. Maintenance and Related Services			
1. Maintenance of buildings and grounds.....	$194,000	$ 30,000	$ 30,000
2. Maintenance of equipment.....	4,000	4,000	4,000
3. Custodial services.....	205,000	210,000	190,000
Subtotal.....	$403,000	$244,000	$224,000
C. Operation of Facilities			
1. Supplies and equipment.....	$ 2,000	$ 1,000	$ 5,000
Total, Facilities Services.....	$451,000	$289,000	$273,000

	1972	1973	1974
A. Acquisition of Facilities.....	$46,000	$44,000	$44,000
1. Rental of real property.....	$46,000	$44,000	$44,000

This estimate represents $39,000 for the lease of a parking area for JPL employees; $4,000 for lease of hangar and workshop space at Burbank Airport for NASA-7, a NASA-owned administrative aircraft; and $1,000 for Headquarters' share of rental of the relocation site.

B. Maintenance and Related Services...	$403,000	$244,000	$224,000
1. Maintenance of buildings and grounds.....	$194,000	$30,000	$30,000

This estimate includes alterations such as partition changes, telephone changes and general building maintenance. The requirement for 1974 is the same as for 1973.

2. Maintenance of equipment.....	$4,000	$4,000	$4,000

This estimate covers the maintenance and repair of the security alarm systems and equipment in the Headquarters buildings.

3. Custodial services.....	$205,000	$210,000	$190,000

This estimate covers security guard service in the various Headquarters buildings. The decrease in 1974 is attributable to an anticipated reimbursement from HEW to cover their portion of guard services for the Reporters Building.

C. Operation of Facilities.....	$2,000	$1,000	$5,000
1. Supplies and equipment.....	$2,000	$1,000	$5,000

Supplies and equipment required for the operation of the Headquarters Occupational Medicine and Environmental Health Unit.

	1972	1973	1974	Change in 1974
IV. TECHNICAL SERVICES	$10,492,000	$ 9,574,000	$10,029,000	$+455,000

Basis of Fund Requirements

Summary of Technical Services

	1972	1973	1974
A. Automatic Data Processing			
1. Lease of equipment.....	$643,000	$ 982,000	$1,040,000
2. Purchase of equipment.....	143,000	70,000	65,000
3. Maintenance of equipment.....	80,000	113,000	92,000
Subtotal, equipment.....	$866,000	$1,165,000	$1,197,000
4. Programming and operation services.....	$1,297,000	$1,119,000	$1,710,000
Subtotal.....	$2,163,000	$2,284,000	$2,907,000
B. Engineering Services.....	$ 147,000	$ 44,000	$ 46,000
C. Scientific and Technical Information and Educational Programs			
1. Operation of NASA technical libraries.....	$ 40,000	$ 41,000	$ 42,000
2. Educational/informational programs.....	2,220,000	1,962,000	1,962,000
3. Scientific and technical information.....	5,922,000	5,243,000	5,072,000
Subtotal.....	$8,182,000	$7,246,000	$7,076,000
Total, Technical Services.....	$10,492,000	$9,574,000	$10,029,000
A. Automatic Data Processing.....	$2,163,000	$2,284,000	$2,907,000

This estimate provides for the lease, purchase, maintenance, and programming and operations services of ADP equipment other than equipment dedicated to specific research or operational systems which is funded from the Research and Development appropriation.

The major portion of the estimate for lease of equipment is to cover the rental of an IBM 360/50 computer system and equipment peripheial to a NASA-owned IBM 1410 which provides data processing services for Headquarters. In addition, this estimate provides for equipment peripheial to a NASA-owned IBM 360/50 computer which supports the NASA Scientific and Technical Information Facility at College Park, Maryland. The increase in 1974 is attributable to a new requirement for lease of terminal equipment and related costs for NASA Pasadena Office participation in the NASA Procurement Information Computer System (PICS).

The basic ADP systems for carrying out the functions of the Scientific and Technical Information Facility currently consists of one government-owned IBM 360/50 with one large-scale data storage unit plus three leased storage units. These direct-access storage units take advantage of the multi-programming capability of the 360/50 to accommodate a NASA-wide time-shared, on-line remote retrieval system for scientific and technical information. As the number of files, the amount of data in the files, and the varieties of users grow, additional storage capability and additional programs for manipulating the data are required. The estimate for purchase of equipment anticipates advances in data storage technology whereby larger quantities of data can be stored with faster retrieval time than at present.

The decrease in maintenance costs is attributable to the increased use of competition for maintenance contracts.

The major portion of the estimate for ADP programming and operations services is to cover systems analysis, programming, computer operation and related services associated with the Headquarters data processing requirements. The 1974 estimate shows an increase of $591,000. This increase is the result of management action to realign the obligations with the year in which the services are performed.

On the basis of accrued costs the increase is only approximately $47,000. This increase is to cover the design of an interagency data collection network which will provide for direct exchange between NASA and several government agencies of computer-stored scientific and technical information. It is anticipated that this will result in considerable reduction in duplicate storage of technical data.

	1972	1973	1974
B. Engineering Services.....	$147,000	$44,000	$46,000

This estimate provides for the occupational stress studies, programmed health testing in a working population. The occupational stress studies is for the development of methods for the early identification of heart disease and related job stress. These factors are vital factors in preventive occupational medicine. The programmed health testing in a working population is to develop a working model for the implementation of general concepts for

programmed medicine and multiphasic health testing. The objective is to provide a significant improvement in screening procedures prescribed for each individual and a maximization of NASA's investment in the performance of health screening tests.

	1972	1973	1974
C. Scientific and Technical Information and Educational Programs	$8,182,000	$7,246,000	$7,076,000

Included in these programs are the costs of the technical libraries, educational/informational programs, and the scientific and technical information services. The funding required to finance these programs is $7,076,000 which is a decrease of $170,000. The costs are summarized as follows:

1. Operation of technical libraries	$40,000	$41,000	$42,000

The cost of the operation of technical libraries is essentially the same as the 1973 level.

2. Educational/informational programs.....	$2,220,000	$1,962,000	$1,962,000

The educational/informational programs provide for the gathering and dissemination of information about the agency's programs to the mass communications media, the general public, and to the educational community at the elementary and secondary levels. Assistance to the mass communications media includes the gathering and exposition of news worthy materials in support of their requests, and takes such forms as press kits, news releases, television and radio information tapes and clips, and feature material.

Research, development, and operational missions in aeronautics and space provide substantive knowledge and serve as an educational stimulus to students and teachers. NASA responds to expressed needs of students and teachers by developing curriculum supplements in space related areas such as physics, biology, chemistry, and math; assistance to over 1,000 teacher workshops and professional education meetings (with over 30,000 teachers participating); sponsorship of the Youth Science Congresses; and participation in science fairs. The largest single program is the Spacemobile, a touring space-science education lecture demonstration unit.

The cost for these programs in 1974 is estimated to be $1,962,000 which is essentially the same as for 1973.

3. Scientific and technical information.....	$5,922,000	$5,243,000	$5,072,000

The scientific and technical information activity includes the cost of the NASA Scientific and Technical Information Facility, documentation and

publication services, systems development, and translation services. The largest requirement is the NASA Scientific and Technical Information Facility, which will cost $3.1 million in 1974. The level of cost for all other information services is estimated at $2.0 million. These costs are for the documentation of worldwide aerospace journal and report literature; monographs and technical reviews; analyzing, evaluating, and testing new methods and systems in the field of scientific communications to increase the effectiveness of the technical information program; and translating foreign language technical books, reports, and journal articles required to meet the needs of NASA and its contractor scientific personnel to keep abreast of world developments in the space sciences and related fields. The cost of scientific and technical information activities is estimated to be $171,000 below the 1973 level.

	1972	1973	1974	Change in 1974
V. ADMINISTRATIVE SUPPORT.....	$6,439,000	$6,202,000	$5,798,000	$-404,000

Basis of Fund Requirements

Summary of Administrative Support

	1972	1973	1974
A. Communications			
1. Leased lines and long distance tolls.....	$ 581,000	$ 586,000	$ 586,000
2. Local telephone services.....	374,000	395,000	395,000
3. Other communications.....	2,121,000	2,349,000	2,349,000
Subtotal.....	$3,076,000	$3,330,000	$3,330,000
B. Administrative Printing.....	$ 357,000	$ 255,000	$ 260,000
C. Supplies, Materials, and Equipment.....	$ 843,000	$ 317,000	$ 260,000
D. Transportation			
Center operations.....	$ 262,000	$ 369,000	$ 242,000
Common carrier.....	15,000	18,000	18,000
Subtotal.....	$ 277,000	$ 387,000	$ 260,000

	1972	1973	1974
E. Administrative Support Services			
Installation support services....	$1,716,000	$1,736,000	$1,500,000
Medical services.....	170,000	177,000	188,000
Subtotal.....	$1,886,000	$1,913,000	$1,688,000
Total Administrative Support.....	$6,439,000	$6,202,000	$5,798,000
A. Communications.....	$3,076,000	$3,330,000	$3,330,000

Included in this estimate are the costs of leased lines, long distance tolls, telephone exchange services, and other communications, such as TWX and postage (Headquarters pays for the agency's postage). The estimate for communications remains the same as for 1973.

B. Administrative Printing.....	$357,000	$255,000	$260,000

Estimates for administrative printing include funds for contractual printing and the related composition and binding operations. This includes services performed by other agencies, chiefly the Government Printing Office, or by commercial printing firms. All common processes of duplicating, including photostating, blueprinting, microfilming, and other photographic reproductions, are included. The estimate for printing shows an increase of $5,000 for 1974 based on an escalation factor of approximately 2%.

C. Supplies, Materials and Equipment...	$843,000	$317,000	$260,000

Administrative supplies, materials, and equipment include those items of a general nature which service the entire Headquarters. Of the amount estimated for 1974 $178,000 is for supplies and materials, and $82,000 for purchased and rented equipment. The estimate for 1974 is $57,000 below the 1973 requirement.

D. Transportation.....	$277,000	$387,000	$260,000

Transportation services include rental of trucks, as well as the movement of supplies, materials, equipment and related items by common carrier. It also includes the maintenance and operation of the JPL-operated NASA-owned administrative aircraft. Overhaul and maintenance requirements vary from year to year depending on the maximum allowable flight hours on components before safety standards require replacement. For 1973 it includes $132,000 for the renovation and fireproofing of the NASA-1 administrative aircraft.

E. Administrative Support Services...	$1,886,000	$1,913,000	$1,688,000

Administrative support services include those services which support the Headquarters generally such as: chart and related art work, operation of

photocopy equipment, maintenance and repair of office equipment and vehicles, motion picture services, and trucking and laboring services $532,000; medical services $188,000; patent services, international support services, contractor incentive awards, administrator representation allowance, various improvement and feasibility studies and related services $968,000. The requirement for 1974 is reduced by $225,000.

491-316 O - 73 - 3

	FY 73	FY 74
Excepted	-	-
GS-16	66	66
GS-15	384	384
GS-14	275	275
All Other GS	824	824
Wage Board	13	13
Total Perm.	1,731	1,731
		-150
		* 1,581

	FY 73	FY 74
GS-16	-	-
GS-15	1	1
GS-14	2	2
All Other GS	13	13
Wage Board	-	-
Total Perm.	23	23

GENERAL COUNSEL

	FY 73	FY 74
Excepted	6	6
GS-16	-	-
GS-15	14	14
GS-14	5	5
All Other GS	20	20
Wage Board	-	-
Total Perm.	45	45

COMPTROLLER

	FY 73	FY 74
Excepted	9	9
GS-16	1	1
GS-15	26	26
GS-14	45	45
All Other GS	86	86
Wage Board	-	-
Total Perm.	167	167

POLICY & UNIVERSITY AFFAIRS

	FY 73	FY 74
Excepted	5	5
GS-16	1	1
GS-15	4	4
GS-14	3	3
All Other GS	8	8
Wage Board	-	-
Total Perm.	21	21

EXECUTIVE SECRETARY

	FY 73	FY 74
Excepted	1	1
GS-16	-	-
GS-15	3	3
GS-14	2	2
All Other GS	26	26
Wage Board	3	3
Total Perm.	35	35

(AD HOC)

AEROSPACE SAFETY ADVISORY PANEL

	FY 73	FY 74
Excepted	-	-
GS-16	-	-
GS-15	-	-
GS-14	-	-
All Other GS	-	-
Wage Board	-	-
Total Perm.	-	-

(AD HOC)

PERSONNEL MANAGEMENT REVIEW COMMITTEE

	FY 73	FY 74
Excepted	-	-
GS-16	-	-
GS-15	-	-
GS-14	-	-
All Other GS	-	-
Wage Board	-	-
Total Perm.	-	-

ORGANIZATION & MANAGEMENT

	FY 73	FY 74
Excepted	12	12
GS-16	1	1
GS-15	30	30
GS-14	38	38
All Other GS	183	183
Wage Board	9	9
Total Perm.	273	273

DOD AND INTERAGENCY AFFAIRS

	FY 73	FY 74
Excepted	5	5
GS-16	-	-
GS-15	4	4
GS-14	1	1
All Other GS	4	4
Wage Board	-	-
Total Perm.	14	14

INTERNATIONAL AFFAIRS

	FY 73	FY 74
Excepted	3	3
GS-16	-	-
GS-15	4	4
GS-14	3	3
All Other GS	16	16
Wage Board	-	-
Total Perm.	26	26

LEGISLATIVE AFFAIRS

	FY 73	FY 74
Excepted	3	3
GS-16	3	3
GS-15	3	3
GS-14	1	1
All Other GS	17	17
Wage Board	1	1
Total Perm.	28	28

PUBLIC AFFAIRS

	FY 73	FY 74
Excepted	4	4
GS-16	-	-
GS-15	15	15
GS-14	16	16
All Other GS	46	46
Wage Board	-	-
Total Perm.	81	81

INSTITUTIONAL MANAGEMENT

	FY 73	FY 74
Excepted	4	4
GS-16	-	-
GS-15	10	10
GS-14	12	12
All Other GS	58	58
Wage Board	-	-
Total Perm.	84	84

INDUSTRY AFFAIRS AND TECHNOLOGY UTILIZATION

	FY 73	FY 74
Excepted	9	9
GS-16	-	-
GS-15	46	46
GS-14	53	53
All Other GS	87	87
Wage Board	-	-
Total Perm.	195	195

MANNED SPACE FLIGHT

	FY 73	FY 74
Excepted	34	34
GS-16	13	13
GS-15	85	85
GS-14	51	51
All Other GS	81	81
Wage Board	-	-
Total Perm.	264	264

SPACE SCIENCE

	FY 73	FY 74
Excepted	21	21
GS-16	18	18
GS-15	43	43
GS-14	20	20
All Other GS	70	70
Wage Board	-	-
Total Perm.	172	172

APPLICATIONS

	FY 73	FY 74
Excepted	12	12
GS-16	8	8
GS-15	27	27
GS-14	9	9
All Other GS	35	35
Wage Board	-	-
Total Perm.	91	91

TRACKING & DATA ACQUISITION

	FY 73	FY 74
Excepted	8	8
GS-16	8	8
GS-15	18	18
GS-14	5	5
All Other GS	15	15
Wage Board	-	-
Total Perm.	54	54

AERONAUTICS & SPACE TECHNOLOGY

	FY 73	FY 74
Excepted	26	26
GS-16	13	13
GS-15	51	51
GS-14	9	9
All Other GS	59	59
Wage Board	-	-
Total Perm.	158	158

* The total number of permanent positions will be reduced by 150 in 1974.

RPM 230

491-316 O - 73 (Follows p. RPM 229) No. 10

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING
NASA HEADQUARTERS

STAFFING SUMMARY

	FY 73	FY 74
Excepted	169	169
GS-16	66	66
GS-15	384	384
GS-14	275	275
All Other GS	824	824
Wage Board	13	13
Total Perm.	1,731	1,731
		-150
		* 1,581

ADMINISTRATOR

	FY 73	FY 74
Excepted	7	7
GS-16	-	-
GS-15	1	1
GS-14	2	2
All Other GS	13	13
Wage Board	-	-
Total Perm.	23	23

GENERAL COUNSEL

	FY 73	FY 74
Excepted	6	6
GS-16	-	-
GS-15	14	14
GS-14	5	5
All Other GS	20	20
Wage Board	-	-
Total Perm.	45	45

COMPTROLLER

	FY 73	FY 74
Excepted	9	9
GS-16	1	1
GS-15	26	26
GS-14	45	45
All Other GS	86	86
Wage Board	-	-
Total Perm.	167	167

POLICY & UNIVERSITY AFFAIRS

	FY 73	FY 74
Excepted	5	5
GS-16	1	1
GS-15	4	4
GS-14	3	3
All Other GS	8	8
Wage Board	-	-
Total Perm.	21	21

EXECUTIVE SECRETARY

	FY 73	FY 74
Excepted	1	1
GS-16	-	-
GS-15	3	3
GS-14	2	2
All Other GS	26	26
Wage Board	3	3
Total Perm.	35	35

(AD HOC)

AEROSPACE SAFETY ADVISORY PANEL

	FY 73	FY 74
Excepted	-	-
GS-16	-	-
GS-15	-	-
GS-14	-	-
All Other GS	-	-
Wage Board	-	-
Total Perm.	-	-

(AD HOC)

PERSONNEL MANAGEMENT REVIEW COMMITTEE

	FY 73	FY 74
Excepted	-	-
GS-16	-	-
GS-15	-	-
GS-14	-	-
All Other GS	-	-
Wage Board	-	-
Total Perm.	-	-

ORGANIZATION & MANAGEMENT

	FY 73	FY 74
Excepted	12	12
GS-16	1	1
GS-15	30	30
GS-14	38	38
All Other GS	183	183
Wage Board	9	9
Total Perm.	273	273

INSTITUTIONAL MANAGEMENT

	FY 73	FY 74
Excepted	4	4
GS-16	-	-
GS-15	10	10
GS-14	12	12
All Other GS	58	58
Wage Board	-	-
Total Perm.	84	84

INDUSTRY AFFAIRS AND TECHNOLOGY UTILIZATION

	FY 73	FY 74
Excepted	9	9
GS-16	-	-
GS-15	46	46
GS-14	53	53
All Other GS	87	87
Wage Board	-	-
Total Perm.	195	195

DOD AND INTERAGENCY AFFAIRS

	FY 73	FY 74
Excepted	5	5
GS-16	-	-
GS-15	4	4
GS-14	1	1
All Other GS	4	4
Wage Board	-	-
Total Perm.	14	14

INTERNATIONAL AFFAIRS

	FY 73	FY 74
Excepted	3	3
GS-16	-	-
GS-15	4	4
GS-14	3	3
All Other GS	16	16
Wage Board	-	-
Total Perm.	26	26

LEGISLATIVE AFFAIRS

	FY 73	FY 74
Excepted	3	3
GS-16	3	3
GS-15	3	3
GS-14	1	1
All Other GS	17	17
Wage Board	1	1
Total Perm.	28	28

PUBLIC AFFAIRS

	FY 73	FY 74
Excepted	4	4
GS-16	-	-
GS-15	15	15
GS-14	16	16
All Other GS	46	46
Wage Board	-	-
Total Perm.	81	81

MANNED SPACE FLIGHT

	FY 73	FY 74
Excepted	34	34
GS-16	13	13
GS-15	85	85
GS-14	51	51
All Other GS	81	81
Wage Board	-	-
Total Perm.	264	264

SPACE SCIENCE

	FY 73	FY 74
Excepted	21	21
GS-16	18	18
GS-15	43	43
GS-14	20	20
All Other GS	70	70
Wage Board	-	-
Total Perm.	172	172

APPLICATIONS

	FY 73	FY 74
Excepted	12	12
GS-16	8	8
GS-15	27	27
GS-14	9	9
All Other GS	35	35
Wage Board	-	-
Total Perm.	91	91

TRACKING & DATA ACQUISITION

	FY 73	FY 74
Excepted	8	8
GS-16	8	8
GS-15	18	18
GS-14	5	5
All Other GS	15	15
Wage Board	-	-
Total Perm.	54	54

AERONAUTICS & SPACE TECHNOLOGY

	FY 73	FY 74
Excepted	26	26
GS-16	13	13
GS-15	51	51
GS-14	9	9
All Other GS	59	59
Wage Board	-	-
Total Perm.	158	158

RESEARCH AND PROGRAM MANAGMENT

FISCAL YEAR 1974 ESTIMATES

JET PROPULSION LABORATORY

MISSION

The Jet Propulsion Laboratory (JPL) is a Government-owned facility managed, staffed, and operated by the California Institute of Technology under a contract with NASA. The cost of operating the Laboratory is funded from the Research and Development appropriation, except for the lease or purchase of administrative aircraft and the purchase of passenger motor vehicles which are funded from the Research and Program Management appropriation and are included in the NASA Headquarters budget presentation. The Research and Program Management type costs are presented for the purpose of comparison only and are not a part of the NASA Research and Program Management budget.

The Jet Propulsion Laboratory performs a variety of engineering, scientific, and management missions including:

1. Project management of complete automated spacecraft systems for planetary exploration.

2. Operation of the Deep Space Network including tracking and data acquisition activities required by planetary flights, as well as back-up to the Space Flight Tracking and Data Network.

3. A continuing program of supporting research and technology.

Specific examples of the Jet Propulsion Laboratory's activity in these areas are:

Planetary Exploration - The Mariner series of automated spacecraft was designed at the Jet Propulsion Laboratory. The Laboratory has been responsible for the project management of all Mariner missions including the integration, assembly, and testing of the spacecraft. Five of these spacecraft have been flown on successful flyby missions since 1962--two to Venus and three to Mars--providing a wealth of scientific information on these planets. In addition, the Mariner 9 spacecraft launched in May 1971, was placed in orbit about Mars on November 13, 1971. The Mariner 9 operations in orbit were highly successful, continuing for nearly a year and resulting in the return of a great quantity of detailed scientific information, including photographs of the entire planetary surface.

An additional Mariner mission in this series, involving a single launch in 1973, is in the fabrication and assembly phase. The gravity-assist technique will be employed in this mission to perform flybys of both Venus and Mercury with one spacecraft. This mission will obtain photographic and other

scientific data on the environments, atmospheres, surfaces, and body characteristics of the planets, and it will be the first exploratory flight to the planet Mercury.

In 1975, the Viking mission consisting of two launches to Mars is planned. Each spacecraft will consist of an orbiter and a lander. The Langley Research Center has responsibility for the overall Viking project management and development of the lander, while JPL has responsibility for development of the orbiter, spacecraft navigation, and tracking and data acquisition. The spacecraft will orbit Mars and separate a lander capsule which will enter the Martian atmosphere and soft land on the surface of the planet. Orbital, entry, and landed science data will be collected and transmitted to earth. The primary functions of the orbiter are to provide site surveillance data for use in selecting the exact landing site for the lander capsule, and to serve as a relay station to record and transmit to earth data received from the lander. At other times, the orbiter will conduct its own science experiments, including the transmission of pictures of the Martian surface back to earth, infrared radiometry to determine surface temperatures, infrared spectrometry to detect water vapor, and radio experiments to obtain data to improve planetary navigation capabilities and provide measurements of radio propagation properties and Mars atmospheric data.

The Jet Propulsion Laboratory also has management responsibility for the Mariner Jupiter/Saturn 1977 mission which involves two launches in 1977, At that time the relative positions of Jupiter and Saturn are uniquely favorable for the utilization of gravity-assist techniques which will permit the spacecraft in passing near Jupiter to be accelerated to reach Saturn in the relatively short time of 3.5-4 years. Scientific data will be gathered on the interplanetary medium, the planets themselves, several of the large satellites of the planets, and the rings of Saturn. These missions and objectives have been endorsed by the Space Science Board of the National Academy of Sciences as an appropriate next step in planetary exploration. The spacecraft design for these missions will make maximum use of previous Mariner and Viking Orbiter designs and technology, consistent with the requirements of long-range communications, solar independent power, and flight times of 3.5 to 4 years.

Supporting Research and Technology - The Jet Propulsion Laboratory maintains a strong program of supporting research and technology and advanced development. Much of the knowledge gained from active research in such areas as fluid physics, electrophysics, materials, applied mathematics, and guidance and control will continue to be applied to problems in space exploration.

Another activity of considerable importance is the development and fabrication of scientific experiments to be flown on vehicles other than Jet Propulsion Laboratory spacecraft. These include high altitude balloons, Aerobee rockets, NASA aircraft, and space flight vehicles. The scientific teams involved in these experiments frequently include faculty members of various universities and staff members from NASA field installations.

Tracking and Data Acquisition - The Jet Propulsion Laboratory is responsible for the design and operation of NASA's worldwide Deep Space Network. The Deep Space Network is comprised of the Space Flight Operations Facility in Pasadena--the nerve center of the network--and tracking and data acquisition stations located in California, Spain, South Africa, and Australia. The Deep Space Network provides support to Jet Propulsion Laboratory managed flight missions and to projects such as Pioneer and Helios which are managed by other NASA installations. The Network also provides backup and support for manned flights in appropriate instances.

DESCRIPTION

The Jet Propulsion Laboratory is located in Pasadena, California, approximately 20 miles north of downtown Los Angeles. Subsidiary facilities are located at Goldstone, California (tracking and data acquisition), Edwards Air Force Base, California (propellant formulation and testing), and Table Mountain, California (open air testing and astronomy).

At Pasadena, the Laboratory occupies 176.8 acres of land of which 145.9 acres are owned by NASA and 30.9 acres are leased. At Goldstone, facilities are located on land occupied under permit from the Army. At Edwards Air Force Base, facilities are located on land occupied under permit from the Air Force. Facilities at Table Mountain are located on land occupied under permit from the Forest Service of the Department of Agriculture. The capital investment of the Jet Propulsion Laboratory, including the Deep Space Network, fixed assets in progress and contractor-held facilities, as of June 30, 1972, was $324,278,352,000.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

Functions	1972	1973	1974
Personnel	$77,150,000	$77,049,000	$76,971,000
Travel	2,762,000	2,626,000	2,515,000
Facilities services	6,342,000	5,518,000	5,552,000
Technical services	1,660,000	1,614,000	1,651,000
Administrative support	2,802,000	2,618,000	2,576,000
Total, fund requirements	$90,716,000	$89,425,000	$89,265,000

	1972	1973	1974
1. Permanent Positions by Program:			
Manned Space Flight			
Space Flight Operations.....	22	12	1
Apollo.....	14	24	25
Space Science			
Physics and Astronomy.....	17	16	17
Lunar and Planetary Exploration...	1,017	1,063	994
Launch Vehicle Procurement.....	9	8	9
Space Applications.....	34	29	30
Aeronautics and Space Technology			
Aeronautical Research and Technology.....	26	21	26
Space Research and Technology.....	262	238	269
Nuclear Power and Propulsion.....	61	30	---
Tracking and Data Acquisition.....	445	356	341
Subtotal, positions by program....	1,907	1,797	1,712
Direct Support.....	820	751	711
2. Indirect Positions.....	1,345	1,241	1,183
Total, permanent positions.....	4,072	3,789	3,606

Basis of Fund Requirements

Function	1972	1973	1974	Change in 1974
I. Personnel.....	$77,150,000	$77,049,000	$76,971,000	$-78,000
Personnel Compensation.	68,758,000	67,997,000	67,368,000	-629,000
Personnel Benefits.....	8,009,000	8,702,000	9,300,000	+598,000
Supporting Personnel Costs.....	383,000	350,000	303,000	-47,000

The decrease in personnel costs is directly related to the planned reduction of 283 positions in FY 1973 and 183 positions in FY 1974 as well as reduced costs for movement of new hires and personnel training associated with the lower manpower levels. The decreases are partially offset by additional costs of benefits due to health insurance rates and unemployment insurance.

	1972	1973	1974	Change in 1974
II. Travel.....	$2,762,000	$2,626,000	$2,515,000	$-111,000
Program Travel.....	2,430,000	2,311,000	2,213,000	-98,000
Administrative Travel	332,000	315,000	302,000	-13,000

The lower travel estimates are due to the reduced manpower levels.

III. Facilities Services..	$6,342,000	$5,518,000	$5,552,000	$+34,000
Acquisition of Facilities.....	1,336,000	529,000	517,000	-12,000
Maintenance and Related Services...	2,151,000	2,096,000	2,166,000	+70,000
Operation of Facilities.....	2,855,000	2,893,000	2,869,000	-24,000

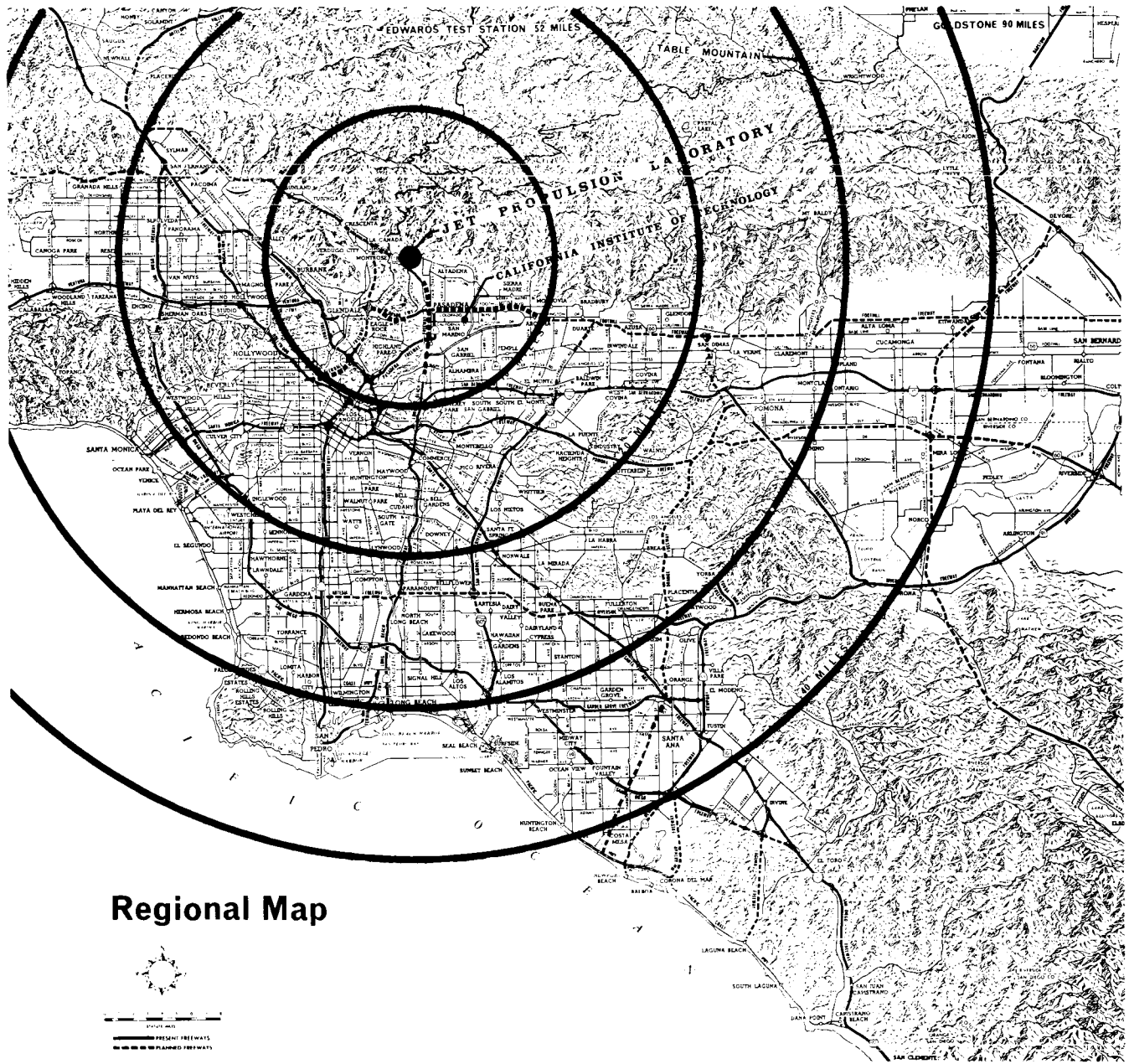
The increase is due to higher contractural labor rates for maintenance and janitorial services.

IV. Technical Services....	$1,660,000	$1,614,000	$1,651,000	$+37,000
ADP.....	900,000	890,000	914,000	+24,000
Other.....	760,000	724,000	737,000	+13,000

The ADP function represents the Administrative Computing Section only. The small increase in ADP costs is due to the lease of a keytape system to support administrative management operations. The small increase in Other functions are due primarily to higher contractural labor costs for technical documentation and library services.

V. Administrative Support.	$2,802,000	$2,618,000	$2,576,000	$-42,000
Communications.....	1,361,000	1,260,000	1,229,000	-31,000
Supplies and Equipment.....	860,000	794,000	787,000	-7,000
Other.....	581,000	564,000	560,000	-4,000

The reduction in this function is due to the lower level of administrative activities required to support the reduced manpower levels.

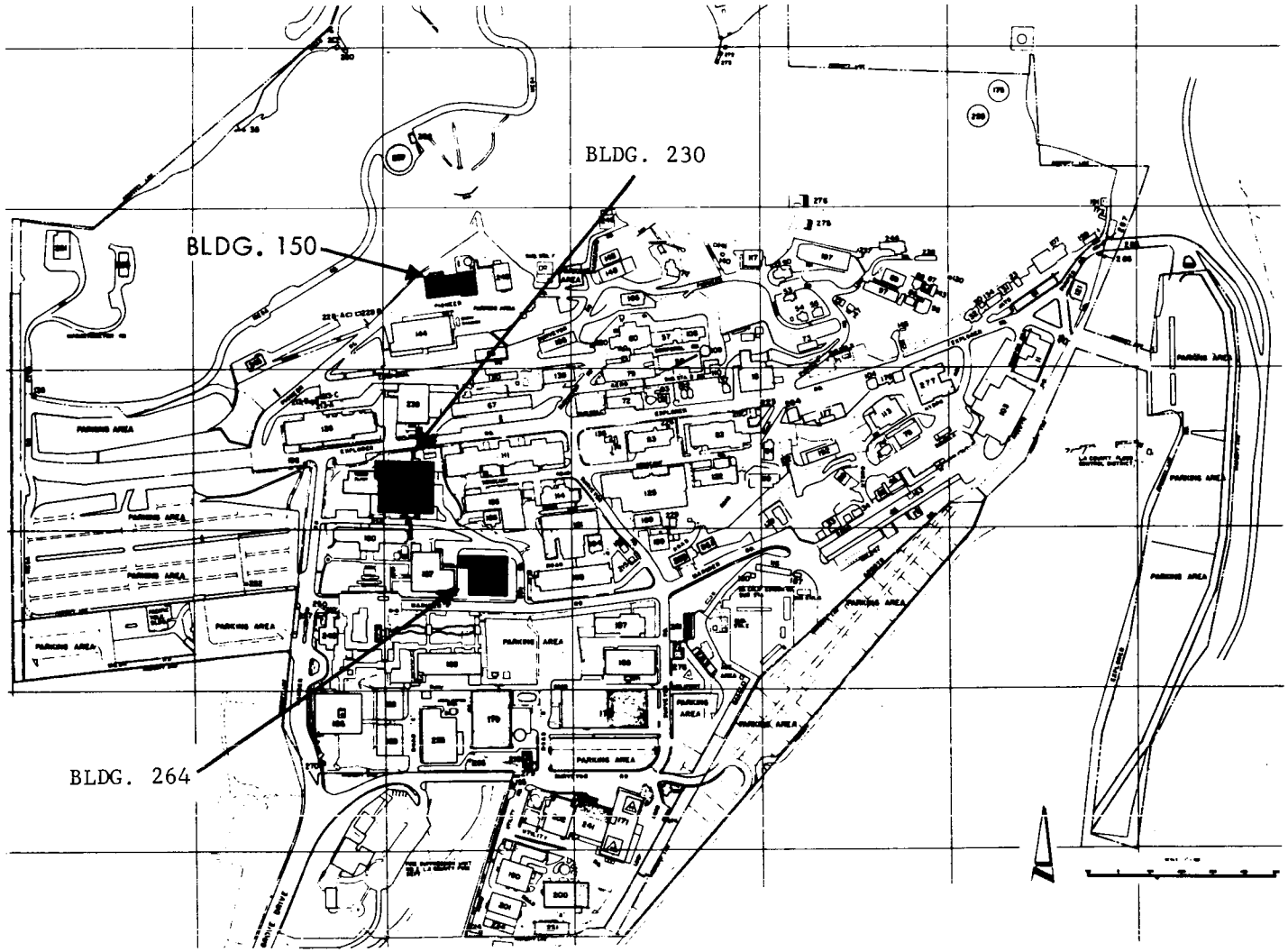


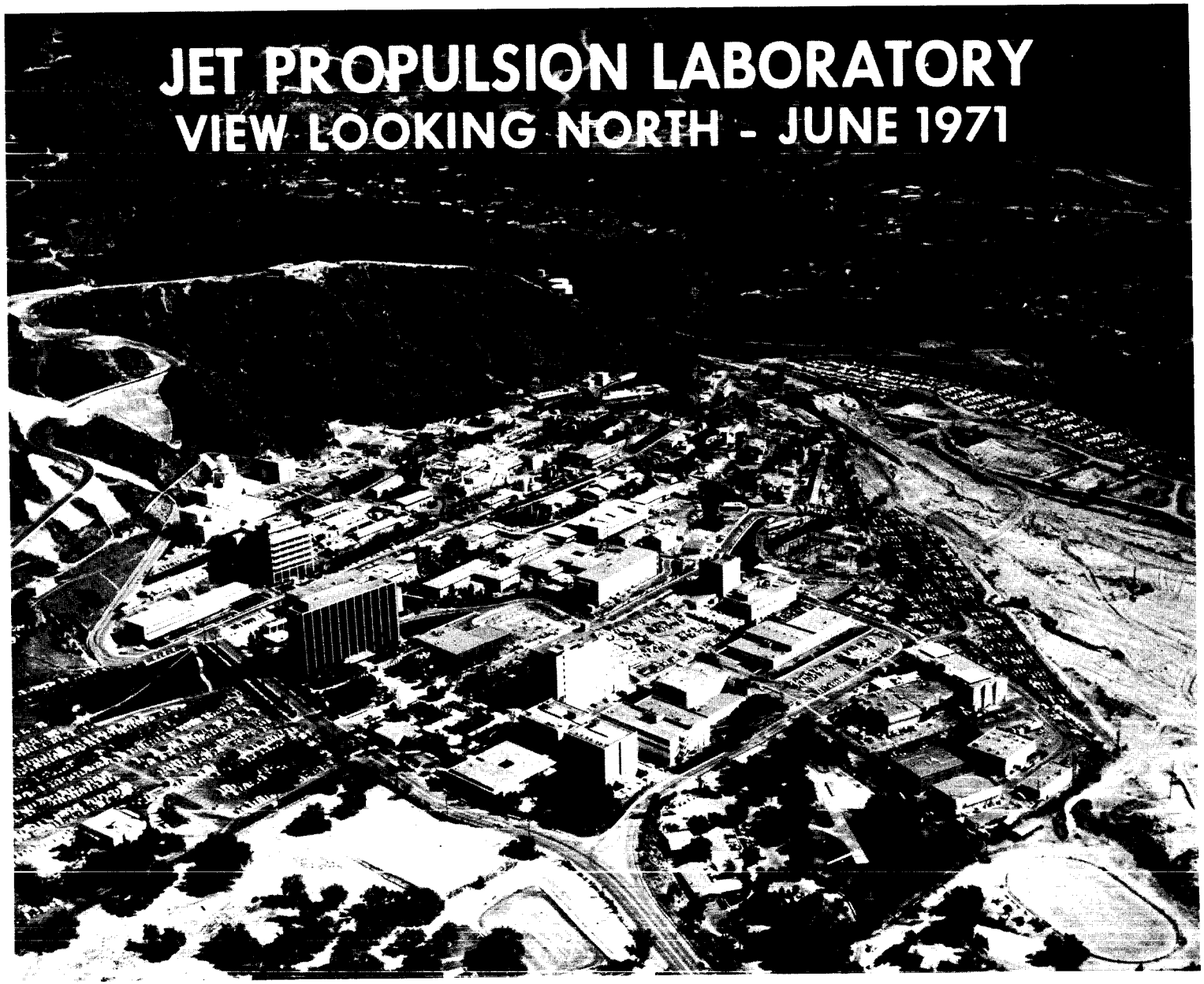
Regional Map

JET PROPULSION LABORATORY

FISCAL YEAR 1974 ESTIMATES

LOCATION PLAN





901-311 O - 73 - 12

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1974 ESTIMATES

SUMMARY OF AERONAUTICAL RESEARCH AND TECHNOLOGY
OFFICE OF AERONAUTICS AND SPACE TECHNOLOGY

Appropriation	(Millions of Dollars) 1972	1973	1974
Research and Development	$109.3	$150.6	$171.0
Construction of Facilities	7.4	12.9	2.4
Research and Program Management	119.1	122.0	132.4
Total	$235.8	$285.5	$305.8
Number of direct positions (end year) associated with Aeronautical Research and Technology	3,631	3,599	3,626

The FY 1974 aeronautical research and technology effort will continue to be directed toward the goal of maintaining the nation's international leadership in civil and military aviation technology. The FY 1974 budget request provides for the continuation of experimental programs begun in FY 1973. Work on the experimental rotor test and tilt rotor aircraft will be in the design and fabrication phase. Work will also be in progress on clean, quiet propulsion applicable to Short Take-Off and Landing and Conventional Take-Off and Landing aircraft. This includes work on engine fans and nacelles applicable to current narrow-body civil jet transports, with the objective of substantially quieter operation without an adverse effect on operational characteristics. The 1974 program also provides for continuation of activities to provide a technology base for advanced supersonic aircraft involving work in the disciplines of propulsion, structures and materials, aerodynamics, and stability and control. Experimental programs will be supplemented by a strong technology program encompassing materials, structures, avionics, propulsion, aerodynamics, vehicle configurations, operating procedures, and aeronautical life sciences.

The Construction of Facilities request includes funding for rehabilitation and modification of the 600 p.s.i. air supply at Langley Research Center.

The Research and Program Management funding provides for the civil service salaries, travel, electric power for wind tunnel operations, and other general installation costs necessary to support the aeronautics program.

RESEARCH AND DEVELOPMENT

ESTIMATED FY 1974 OBLIGATIONS FOR
EQUIPMENT TO BE PLACED AT NASA INSTALLATIONS

Program Budget Line Item	(Thousands of Dollars) 1974
Manned Space Flight	38,431
Space Flight Operations	(12,543)
Space Shuttle	(25,888)
Space Science	10,791
Physics and Astronomy	(1,567)
Lunar and Planetary Exploration	(6,390)
Launch Vehicle Procurement	(2,834)
Space Applications	3,863
Aeronautics and Space Technology	19,025
Aeronautical Research and Technology	(14,319)
Space Research and Technology	(4,523)
Nuclear Power and Propulsion	(183)
Tracking and Data Acquisition	11,221
Technology Utilization	63
GRAND TOTAL	83,394

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1974 R&D BUDGET

PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION AND BUILDING LOCATION	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1974 OBLIGATIONS ($ in Thous.)	RELATED FACILITY PROJECT
Manned Space Flight, Space Flight Operations Mission Systems and Integration	Marshall Space Flight Center (Bldg. 4373)	Modifications for Concept Verification Testing (CVT); remote display and control equipment; remote data acquisition units and bus terminals; central processors, input-output processors.	Provides for integrated testing and verification of low cost payloads and associated software through simulation activities.	796	FY 1973 Modifications for CVT, Bldg. 4373.
Manned Space Flight, Space Flight Operations Mission Systems and Integration	Marshall Space Flight Center (Bldg. 4619)	Modifications for Concept Verification Testing (CVT); power module; general purpose laboratory; experiments; ground support equipment.	Provides for integrated testing and verification of low cost payloads and associated software through simulation activities.	541	FY 1974 Modifications to Bldg. 4619 for Payload Carrier Simulator.
Manned Space Flight, Space Flight Operations Development, Test, and Mission Operations	Manned Spacecraft Center (Bldg. 17)	Laser Scanner Film Converter Equipment Modifications	Support of Earth Observations. Convert scanner data into color film and film to digital data for use by a computer.	485	NONE
Manned Space Flight, Space Flight Operations Development, Test, and Mission Operations	Manned Spacecraft Center (Bldg. 17)	Full Color Interactive Processing Equipment, Earth Resources Image Processing System, (ERIPS II)	Support of Earth Observations. Present scanner data in 128 hues to facilitate recognizing physical features on earth.	350	NONE
Manned Space Flight Space Flight Operations Development, Test, and Mission Operations	Manned Spacecraft Center (Bldg. 17)	High Resolution Hard Copy Equipment	Support of Earth Observations. Permits copying total resolution (4,096 x 4,096 picture elements) available in scanner data.	400	NONE
Manned Space Flight, Space Flight Operations Development, Test, and Mission Operations	Manned Spacecraft Center (Bldg. 30)	Array Processor Computer	Support of Earth Observations. Performs matrix operations and pattern classifications on earth resources data arrays. Speeds up processing and reduces load on central processing unit.	400	NONE
Manned Space Flight, Space Flight Operations Development, Test, and Mission Operations	Manned Spacecraft Center (Bldg. 30)	Data Correlator Computer	Support of Earth Observations. Registers one set of ground imagery with another set, or with ground coordinator.	250	NONE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1974 R&D BUDGET

PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION AND BUILDING LOCATION	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1974 OBLIGATIONS ($ in Thous.)	RELATED FACILITY PROJECT
Space Shuttle	Michoud Assembly Facility Mnfg. Bldg. 103	Manufacturing and Assembly Equipment	Design of tooling, structural and plant equipment for the fabrication and assembly of external tanks.	7,000	FY 1974 Modification of Manufacturing and Final Assembly Facilities for External Tanks, MAF
Space Shuttle	Mississippi Test Facility Position B2 of S1C Test Stand	Engine Handling and Interface Equipment Sensitive to Test Article	Equipment for Connecting Test Instrumentation to Test Stand and for Conduct of Tests	1,150	FY 1974 Modifications for the Orbiter Propulsion Sys. Test Facility, MTF.
Space Shuttle	Manned Spacecraft Center (Bldg. 5)	Horizontal Flight Test Simulator	Required to Train Flight Crews and Ground Controllers	2,000	NONE
Space Shuttle	Manned Spacecraft Center (Bldg. 35)	Shuttle Procedures Simulator System (Modifications to Apollo LM Procedures Simulator)	Develop and Validate Crew Procedures	2,500	NONE
Space Shuttle	Manned Spacecraft Center (Bldg. 16)	Scene Generation Equipment	Evaluation of Guidance and Control System	1,225	NONE
Space Shuttle	Manned Spacecraft Center (Bldg. 276 at Ellington AFB)	Shuttle Training Aircraft (Purchase) and Modifications of a Conventional Turbojet Airplane)	In-flight Training to Orbiter Pilots	7,500	NONE
Physics and Astronomy	Ames Research Center C141 Starlifter Flight and Guidance Simulation Bldg. N-243.	Two General Purpose Computers and Mass Storage Facility for C141 and One Ground-Based Computer	Perform Data Acquisition Function and Quick Look Data Analysis for Astronomical Observatory Use	274	NONE
Lunar and Planetary Exploration	Jet Propulsion Laboratory (Bldg. 179)	Support Equipment Cabling	Provides for interconnect of all Viking equipment for systems checks during test and launch operations.	255	NONE
Lunar and Planetary Exploration	Jet Propulsion Laboratory (Bldg. 198)	Attitude Control System and Articulation Control Checkout Equipment.	Equipment for the Checkout of Viking Equipment.	685	NONE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1974 R&D BUDGET

PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION AND BUILDING LOCATION	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1974 OBLIGATIONS ($ in Thous.)	RELATED FACILITY PROJECT
Lunar and Planetary Exploration	Jet Propulsion Laboratory (Bldg. 198)	Power Checkout System	Equipment for the Checkout of Viking Power Equipment	538	NONE
Lunar and Planetary Exploration	Jet Propulsion Laboratory (Bldg. 230)	Data Display System Equipment	Additional real time display equipment for general use of flight projects to meet operational requirements.	1,100	NONE
Lunar and Planetary Exploration	Jet Propulsion Laboratory (Bldg. 230)	Telemetry Processing Computer System	Test Computer System for Viking Orbiter Telemetry Operations	2,409	NONE
Aeronautical Research and Technology	Ames Research Center Flight and Guidance Simulation Bld. N-243	Graphic Display Unit for Cockpit of Flight Simulator Second Unit for Operational Area.	Graphic Display to Present Critical Flight Parameters for Research in Avionics and Man-machine Interaction.	379	NONE
Multi-program usage. Also supported under:					
Space Research and Technology				121	
TOTAL				(500)	
Aeronautical Research and Technology	Ames Research Center Flight and Guidance Simulation Laboratory Bldg. N-243.	Sigma 8 Computer System	Conversion of Lease to Purchase of Existing Sigma 8 Computer System	455	NONE
Aeronautical Research and Technology	Ames Research Center Flight and Guidance Simulation Laboratory Bldg. N-243.	Visual Display System	Provides Visual Cues for Such Maneuvers as Cross-Wind Landings and Circular Approaches	482	NONE
Aeronautical Research and Technology	Ames Research Center Flight and Guidance Simulation Laboratory Bldg. N-243.	Display Graphics Equipment	To Provide Visual Cues of Computer-Generated Images to Pilots in Various Simulators	350	NONE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1974 R&D BUDGET

PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION AND BUILDING LOCATION	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1974 OBLIGATIONS ($ in Thous.)	RELATED FACILITY PROJECTS
Aeronautical Research and Technology	Langley Research Center Analysis and Computation Bldg. 1268-A.	Star Computer.	Final increment of an $8M multi-year procurement of a fourth generation computer. Capability will be gained for Integrated Design Programs (IPAD), Complex Optimization Problems, and Real Time Simulation.	1,014	FY 1973 Rehab. Projects: (a) Cooling Tower Bldg. 1268; (b) Utilities Bldg. 1268.
Multi-program usage. Also funded under:					
Physics and Astronomy				62	
Lunar and Planetary Exploration				187	
Launch Vehicle Procurement				15	
Space Research and Technology				546	
Nuclear Power and Propulsion				21	
Tracking and Data Acquisition				12	
TOTAL				(1,857)	
Aeronautical Research and Technology	Langley Research Center V/STOL Tunnel, Bldg. 1212	Hi-Lift Model Support System	To accommodate Testing of high lift models	300	NONE
Aeronautical Research and Technology	Langley Research Center 8 Foot Transonic Dynamics Tunnel, Bldg. 640	Model Support System	To provide efficient use of new Data Acquisition System	300	NONE
Aeronautical Research and Technology	Langley Research Center Differential Maneuvering Simulator, Bldg. 1268-A.	Ground Growth Model	Provide the simulator with a realistic picture of the earth's ground growth as a function of altitude.	300	NONE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1974 R&D BUDGET

PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION AND BUILDING LOCATION	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1974 OBLIGATIONS ($ in Thous.)	RELATED FACILITY PROJECT
Aeronautical Research and Technology	Langley Research Center	B-737, Data System, and Simulation Cockpit Display Equipment	Procurement of RSFS B-737 Aircraft for use in terminal configured vehicle operating experiments.	3,100	NONE
Aeronautical Research and Technology	Langley Research Center 16 Foot Transonic Wind Tunnel, Bldg. 1146	Data Acquisition System Sigma 3 Type	Upgrade existing Data Acquisition System for Aero Research and Test program	265	NONE
Aeronautical Research and Technology	Lewis Research Center Computer Center Bldg. 86	Random Access Disk Storage	Purchase an IBM 3330 now being rented for ERTS program to support new Center projects.	117	NONE
Multi-program usage. Also supported under:					
Launch Vehicle Procurement				136	
Space Applications				18	
Space Research and Technology				44	
Nuclear Power and Propulsion				7	
Total				(322)	
Tracking and Data Acquisition	GSFC, Data Interpretation Laboratory Bldg. 23	Telemetry On-Line Processing System (TELOPS). Completes basic input processor and mass storage system to handle and process telemetry data in near-realtime.	Required to provide sufficient processing and storage capability to handle the increase in data volume requirements of NASA scientific spacecraft; to eliminate large number of tape handling operations; to reduce time delay in data availability to experimenters; and to increase interaction between experimenters and spacecraft to optimize mission operations and results.	2,900	Mods to Data Processing Facility. Proposed FY 75 CoF (Rehabilitation and Modifications)

491-316 O - 73 - 33

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1974 R&D BUDGET

PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION AND BUILDING LOCATION	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1974 OBLIGATIONS ($ in Thous.)	RELATED FACILITY PROJECT
Tracking and Data Acquisition	GSFC, Spacecraft Operations Facility Bldg. 14	Flight maneuver operations control and display subsystem. Augments basic subsystem with additional required display terminals.	Required for realtime determination and control of attitude and orbit during the critical phases of missions such as Radio Astronomy Explorer, Atmospheric Explorers, and Synchronous Meteorological Satellites.	300	NONE
Tracking and Data Acquisition	GSFC, Spacecraft Operations Facility, Bldg. 14	Communication circuit switching and drive logic components to be added to the NASA Communications (NASCOM) circuit matrix switch.	Augmentation of the NASCOM circuit matrix switch is required to enable effective sharing of existing data sets to handle increase in total communications requirements imposed by higher data rate satellites and planetary missions in the 1974 period.	320	NONE
Tracking and Data Acquisition	GSFC Central Flight Control and Range Operations Bldg 3	Leased support processor. Provides small front-end computer and disc storage units attached to existing large scale computer.	This front-end processor, by performing routine functions such as data editing and routing, will allow for more effective use of existing large scale computers by preserving capacity for high speed computations.	325	NONE
Tracking and Data Acquisition	Jet Propulsion Laboratory Bldg. 264	Peripherals for Deep Space Network control support processor subsystem Completes required augmentation of network control support processor subsystem.	Required to provide add'l. data processing channels for real-time network monitoring and control of multi-data channels of Viking spacecraft and other planetary missions.	274	NONE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Automatic Data Processing Equipment

General Statement

NASA requirements for ADP services are continuing high even in this period of lower budgets and fewer flight programs. The data flow volume resulting from our flight programs both past and present is increasing due to the complexity of our newer satellites, the increasing use of video techniques, the necessity for timely decisions for closer control, and the increasing sophistication in developing useful theories and models by our scientists and engineers. In addition, data from some of our satellites is now assuming a volatile nature in that it must be collected, reduced, and analyzed in a short period to be of use for its primary purpose. In particular, the ERTS data will require processing in a very short time cycle for its use in controlling in ecology and other physical relations. NASA also continues to automate, as technology permits, all of its expensive test facilities in order to make better use of these facilities. This automation will inevitably result in an increase in use of ADP resources both for the automation and, because of the increased data flow, additional resources for analyzing the data.

NASA continues its policy of purchasing its computational facilities. At present, the majority of our equipment are government-owned and as such, our primary attention is given to increasing efficiencies of these owned systems to meet our requirements both now and in the future. Exceptions to this are additions for control in near real-time of the newer satellites and replacement of older second generation facilities that become uneconomical.

In last years submission, NASA made note of the change in nomenclature for computers. NASA now utilizes a computer system as the base unit of ADP rather than the central processing unit. Our computer systems range from single processors to systems with many individual processors for performing a variety of functions, some intimately and physically connected together and others in a loose management relationship that depends entirely on similar functions. It has become increasingly difficult to define a central processing unit so that the use of overall systems designations makes the inventory more meaningful. As electronic technology develops, processors are decreasing radically in cost and increasing in power and versatility and a combination of these smaller units put together into a system may now be accomplishing many of the tasks formerly assigned to older computers at a much lower overall cost with increased flexibility and efficiency. This technology trend is expected to continue with the possibility of combining

processors with our sensors and terminals to further automate and streamline the tremendous data flows that will be encountered in future systems. We have indicated the total number of digital computers actually involved in our systems for reference purposes.

NASA uses of computers are divided into two categories: Category A - general purpose use and Category B - special purpose use. The Category A use is increasing at a steady rate and the primary areas that reflect this increase are the increasing uses of computers by the scientists and engineers, the increasing quantity of data from satellites and laboratory facilities, and the trend toward real-time control of most satellites. In the Category B area, the trend to more automation of our laboratory facilities, our tracking networks, and automatic check-out of our spacecraft vehicle is increasing.

Figure 1 indicates the inventory of computer hardware systems as discussed above. For reference purposes the number of central processing units (CPU's) included within the hardware systems is shown as a one-line entry at the bottom. Figure 2 indicates the capital value of the ADP equipment which was installed as of June 30, 1972, indicating both the cost of NASA-owned and leased equipment. Figure 3 reflects the average employment of ADP personnel, both Civil Service and contractor, at each installation.

Lease, maintenance, and purchase costs of ADP equipment by installation are shown in Figure 4. A brief narrative explanation of funding highlights at the installations follows.

481-316 O - 73 - 34

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Automatic Data Processing Equipment Funding Highlights

Manned Spacecraft Center

A large remote terminal control system is being installed at the Houston Mission Control Center to provide principal investigators with a real-time data analysis capability during the Skylab missions. A large system will be installed for handling the volumes of multi-spectral data returned by the Skylab Earth Resources Experiment Package. Only minor configuration modifications are planned during FY 1974 at MSC.

Marshall Space Flight Center

A large vibration and structured test facility orignially built for Apollo is being re-designed for Space Shuttle development which will require new computer systems during FY 1973. Additional modifications to the central computer complex will be necessary as workload shifts from Skylab to the Shuttle.

Kennedy Space Center

The only changes planned during FY 1973 and FY 1974 are minor replacements of electro-mechanical components which have worn out as a result of many years of heavy utilization.

Headquarters

The only expenditures planned at the Headquarters are for minor configuration modifications in response to changing data processing requirements.

Goddard Space Flight Center

A large scale computer is being installed to provide a dedicated data handling facility for near real-time and on-line processing of data telemetered from atmosphere explorer satellites. To support the Global Atmospheric Research Program, the computing facility at the Goddard Institute for Space Studies has been augmented by the addition of a large scale processor and is very successful. Plans are continuing for the procurement of the hardware for implementing the TELOPS mass storage satellite telemetry data handling concept, which will provide improved processing response and minimize the need for the multitude of telemetry data tapes now required. To accommodate the more advanced satellites, augmentation of the tracking

network and control centers is continuing.

Wallops Station

During FY 1973 and 1974, the central computer facility will be augmented to provide a remote batch and time sharing capability. Minor additions are planned in the Category B area for support of meteorological data collection and to interface existing range control displays with the central facility.

Jet Propulsion Laboratory

Funds sought for FY 1973 and 1974 are for expansions to the Scientific Computer Facility and continued operation of the Space Flight Operations Facility. New display equipment for the Viking mission is necessary and additional peripherals on the real-time computer facility are planned. A network control center for the Deep Space Network will utilize a number of computers to perform network monitoring and control and error analysis.

Ames Research Center

Funds are primarily for augmenting the central computation facility to meet increased requirements for research data processing, general scientific computing, and support processing for the ILLIAC. Additional funding requirements are for augmenting their digital simulation facilities for aircraft safety research and to support their Flight Simulator for Advanced Aircraft.

Flight Research Center

During mid FY 1973, the center installed a large scale computer facility to replace their general purpose system. Additional funds are for interconnection of their central computing facility with their simulation systems and flight range data system, and for improvements to the Flight Range Telemetry Data Collection System.

Langley Research Center

Funds will be used for the planned expansion of their digital simulation and general purpose central computing facility. Incremental funding is included for a STAR computer to meet the Digital Simulation requirement. They plan to install additional small computers for Wind Tunnel data collection and control, for equipment testing, and for automatic checkout for the Viking Project.

Lewis Research Center

Funds are primarily for maintaining the present operational capability in the Central Computer Complex and increasing operational capability in the Business Data Systems area. Plans are to install additional mini-computers in various Test Laboratories within the Center and thus allow for more efficient and complete test programs to be conducted by selecting the most efficient set of parameters possible during the operation of the tests.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

End of Fiscal Year
Inventory of Computer Hardware Systems
(General Purpose and Special Purpose)

	FY 1972	FY 1973	FY 1974
Office of Manned Space Flight	257	253	253
Kennedy Space Center	18	18	18
Manned Spacecraft Center	89	90	90
Marshall Space Flight Center	150	145	145
Office of Space Science	101	112	116
Goddard Space Flight Center	43	44	43
Jet Propulsion Laboratory	52	58	63
Wallops Station	6	10	10
Office of Aeronautics and Space Technology	59	68	74
Ames Research Center	15	16	16
Flight Research Center	5	5	5
Langley Research Center	9	10	10
Lewis Research Center	30	37	43
Headquarters	3	2	2
Total No. of Hardware Systems	420	435	445
Breakdown of Hardware Systems by Category:			
Category A (General Purpose) Systems	67	67	66
Category B (Special Purpose) Systems	353	368	379
Number of Computers (CPU) included within the Hardware Systems	916	1051	1133

Figure 1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Capital Value of Owned and Leased ADP Equipment
on Hand June 30, 1972
(In Thousands of Dollars)

	NASA-Owned Equipment	Leased Equipment	Total Capital Value
Office of Manned Space Flight	$155,847	$ 6,027	$161,874
Kennedy Space Center	16,641	180	16,821
Manned Spacecraft Center	76,861	5,394	82,255
Marshall Space Flight Center	62,345	453	62,798
Office of Space Science	$156,644	$ 10,468	$167,112
Goddard Space Flight Center	114,500	5,025	119,525
Jet Propulsion Laboratory	38,749	5,443	44,192
Wallops Station	3,395	--	3,395
Office of Aeronautics and Space Technology	$ 56,749	$ 4,447	$ 61,196
Ames Research Center	14,724	2,951	17,675
Flight Research Center	2,988	991	3,979
Langley Research Center	20,845	404	21,249
Lewis Research Center	18,192	101	18,293
Headquarters	$ 2,790	$ 2,308	$ 5,098
Total	$372,030	$ 23,250	$395,280

Figure 2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Automatic Data Processing Personnel
(Average Employment for the Fiscal Year)

	FY 1972		FY 1973		FY 1974	
	Civil Service	Contractor	Civil Service	Contractor	Civil Service	Contractor
Office of Manned Space Flight	377	2205	374	2216	376	2120
Kennedy Space Center	68	320	68	325	68	301
Manned Spacecraft Center	188	1289	185	1274	187	1191
Marshall Space Flight Center	121	596	121	617	121	628
Office of Space Science	1028	1835	1047	2099	1052	2219
Goddard Space Flight Center	662	1518	662	1760	663	1870
Jet Propulsion Laboratory	341[a]	265	361[a]	284	365[a]	289
Wallops Station	25	52	24	55	24	60
Office of Aeronautics and Space Technology	384	374	398	416	412	408
Ames Research Center	84	148	85	179	87	165
Flight Research Center	17	5	20	5	20	5
Langley Research Center	162	195	172	205	184	221
Lewis Research Center	121	26	121	27	121	17
Headquarters	15	178	15	154	15	156
Total	1804	4592	1834	4885	1855	4903

a Employees of JPL (not Civil Service)

Figure 3

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Summary of Automatic Data Processing Equipment Funding
(In Thousands of Dollars)

	FY 1972				FY 1973				FY 1974			
	Lease	Maint.	Purch.	Total	Lease	Maint.	Purch.	Total	Lease	Maint.	Purch.	Total
Office of Manned Space Flight	$4,408	$5,052	$7,834	$17,294	$6,261	$5,507	$4,497	$16,265	$7,384	$5,805	$3,077	$16,266
Kennedy Space Center	77	782	554	1,413	39	904	213	1,156	39	904	231	1,174
Manned Spacecraft Center	3,861	2,744	5,222	11,827	5,399	2,860	2,685	10,944	6,535	2,959	339	9,833
Marshall Space Flight Center	470	1,526	2,058	4,054	823	1,743	1,599	4,165	810	1,942	2,507	5,259
Office of Space Science	$4,469	$5,742	$12,141	$22,352	$6,314	$6,266	$9,642	$22,222	$7,846	$6,346	$13,811	$28,003
Goddard Space Flight Center	2,644	4,193	6,938	13,775	4,828	4,569	5,922	15,319	6,077	4,570	9,150	19,797
Jet Propulsion Laboratory	1,824	1,364	4,966	8,154	1,464	1,492	3,567	6,523	1,670	1,554	4,591	7,815
Wallops Station	1	185	237	423	22	205	153	380	99	222	70	391
Office of Aeronautics and Space Technology	$2,457	$2,561	$12,871	$17,889	$2,113	$2,495	$11,050	$15,658	$2,635	$3,377	$5,283	$11,295
Ames Research Center	1,279	714	2,447	4,440	1,198	831	3,045	5,074	1,324	900	907	3,131
Flight Research Center	279	225	3,361	3,865	--	90	218	308	--	215	---	215
Langley Research Center	389	1,282	5,594	7,265	355	1,153	4,804	6,312	726	1,787	3,876	6,389
Lewis Research Center	510	340	1,469	2,319	560	421	2,983	3,964	585	475	500	1,560
Headquarters	$ 643	$ 80	$ 143	$ 866	$ 982	$ 113	$ 70	$ 1,165	$1,040	$ 92	$ 65	$ 1,197
Total	$11,977	$13,435	$32,989	$58,401	$15,670	$14,381	$25,259	$55,310	$18,905	$15,620	$22,236	$56,761
Breakdown by Appropriation:												
Research and Development	7,215	12,141	29,055	48,411	11,230	12,998	22,197	46,425	14,387	14,232	22,109	50,728
Research and Program Mgt.	4,762	1,294	3,934	9,990	4,440	1,383	1,542	7,365	4,518	1,388	127	6,033
Construction of Facilities	--	--	--	--	--	--	1,520	1,520	--	--	--	--
Breakdown by Category of Equip.												
Category A	10,014	9,019	19,553	38,586	13,845	9,470	12,900	36,215	16,892	10,589	10,499	37,980
Category B	1,963	4,416	13,436	19,815	1,825	4,911	12,359	19,095	2,013	5,031	11,737	18,781

Figure 4

U. S. GOVERNMENT PRINTING OFFICE : 1973 O - 491-316