

NASA

National Aeronautics and
Space Administration

Budget Estimates

FISCAL YEAR **1978**

Volume III

Research and Program Management
Special Analyses

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1978 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

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RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

GENERAL STATEMENT

The Research and Program Management appropriation provides for: (1) the civil service staff needed to perform in-house research, technology, and test activities; and to plan, manage, and support the Research and Development programs; and (2) the other elements of operational capability of the laboratories and facilities such as utilities; logistics support including travel and transportation, maintenance, and operation of facilities; and technical and administrative support. Over three-fourths of this appropriation is required to cover salaries and related costs of civil service employees. The balance, consisting of travel, facilities services, technical services, and administrative support of all NASA installations, provides the support and related goods and services which make possible the efficient accomplishment of NASA's approved missions.

The future of our aeronautics and space activities depends on the strength of our most important resource--the approximately 24,000 civil service personnel located at our various centers and installations. We intend to keep this resource viable and young in spirit, second to none in science, research, development, and technology. To assure overall effectiveness and economy in our field operations, the responsibility for planning and direction of NASA's field center operations is consolidated in one senior line official, the Associate Administrator for Center Operations.

NASA is proceeding with the implementation of the institutional assessment conducted last year to clarify the roles and missions of the NASA centers and the Jet Propulsion Laboratory. The assessment resulted in some consolidations and realignments, and implementation of changes will continue in FY 1978 and through FY 1979.

Each center has been assigned certain principal roles of fundamental importance in meeting the agency's overall program goals. These principal roles reflect the intrinsic character of the centers on the basis of demonstrated center capabilities that are clearly recognized throughout NASA and the nation.

Summary of Budget Plan by Function

	1976	Transition	1977		1978	
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>	
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	
		(Thousands of Dollars)				
Personnel and related costs.....	608,789	156,855	615,630	616,028	616,904	
Travel.....	17,312	4,772	17,143	17,704	17,846	
Facilities services.....	83,768	28,325	98,005	92,342	91,650	
Technical services.....	36,392	14,184	36,976	37,752	38,356	
Administrative support.....	<u>46,051</u>	<u>16,033</u>	<u>46,301</u>	<u>49,174</u>	<u>50,033</u>	
Subtotal.....	792,312	220,169	814,055	813,000	814,789	
October 1976 pay raise.....	<u>---</u>	<u>---</u>	<u>---</u>	<u>31,777</u>	<u>32,200</u>	
Total.....	<u>792,312</u>	<u>220,169</u>	<u>814,055</u>	<u>844,777</u>	<u>846,989</u>	

SUMMARY OF 1977 CURRENT ESTIMATE AND 1978 ESTIMATE
(Thousands of Dollars)

	<u>1977</u> <u>Current Estimate</u>	<u>1978</u> <u>Estimate</u>
Budget request.....	814,055	
Congressional action.....	<u>-1,055</u>	
Appropriation.....	<u>813,000</u>	
Plan prior to October 1976 pay raise.....	813,000	814,789
Effect of October 1976 salary rates.....	<u>31,777</u>	<u>32,200</u>
Plan based on October 1976 salary rates.....	<u>844,777</u>	<u>846,989</u>
Proposed supplemental appropriation to cover FY 1977 deficiency.....	<u>31,777</u>	

Summary of Changes - 1977 Budget to 1977 Current Estimate

The changes which have occurred in the 1977 plan since the submission of the budget are summarized as follows:

1. The effect of congressional action which reduced the request by \$1,055,000 to \$813,000,000 for R&PM. This reduction was taken in the Operation of Facilities area.

2. The internal adjustments to the budget estimates to accommodate unanticipated changes. These changes result in no overall increase to the plan. The following items represent the major changes which have occurred since the 1977 budget was submitted:
 - a. Increases in the Federal contribution for employee health benefits, partially offset by changes in the civil service employment plan..... +\$398
 - b. Increases in per diem and mileage rates approved by the GSA..... +\$561
 - c. Decreased utilities consumption and other economy measures, partially offset by unanticipated support contractor wage rate increases..... -\$959

3. The increase in cost related to the civil service pay raise effective in October 1976. The estimated cost of this increase, based on the current personnel plan, is \$31,777,000, for which no provision was made in the 1977 budget estimate; therefore, a supplemental appropriation is being requested.

The revised R&PM budget plan for 1977, including the requested supplemental appropriation, is \$844,777,000.

Summary of Changes - 1978 Compared to 1977

The budget for 1978 is \$846,989,000, an increase of \$2,212,000 over the revised plan for 1977. The 1978 estimate provides for the full year effect of increases in utility rates, contractor wage rates, and the cost of materials, which continue to rise more rapidly than conservation efforts can offset. Personnel compensation estimates include the net cost of the full year effect of the October 1976 pay raise, partially offset by the effect of the reduction of 79 civil service positions.

The Research and Program Management appropriation request is 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. This category also includes supporting personnel costs, such as moving expenses (excluding travel of personnel), recruiting and personnel investigation services provided by the Civil Service Commission, and personnel training.

The 1978 estimates provide for the full year cost of the October 1976 pay raise as well as the costs for within-grade advances and career development. These costs are partially offset by savings from a reduction of 79 civil service positions. The result is a personnel and related costs increase of \$1,299,000.

2. Travel includes the cost of transportation, per diem, and other associated 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; for travel to meetings and technical seminars; and for all local and relocation travel expenses. The 1978 estimates reflect the full year effect of programs to reduce travel costs instituted in 1977 to offset the cost of increased GSA rates and local transportation costs which result in a net increase of \$142,000.

3. Facilities Services includes rental of real property, the cost of maintenance and related services, custodial services, minor modifications, utilities and facility operations. The 1978 estimates provide for the full year effect of contractor wage increases, utility rate increases and the higher supply and material costs, more than offset by a decrease in the level of support service contractor man-years, which results in an overall reduction of \$692,000.

4. Technical Services includes the cost of general purpose automatic data processing, institutional engineering services, the dissemination of scientific and technical information derived from the various research and development programs, and educational/informational program activities. The 1978 estimates provide for the full year effect of 1977 contractor wage increases, partially offset by a reduction in service contractor support, which results in a net increase of \$604,000.

5. Administrative Support includes the cost of communications, administrative printing, administrative supplies, general purpose materials and equipment, transportation (excluding movement of personnel), and other support activities. The increases shown for 1978 reflect the full year costs of communications and support contractor wage increases and a reduction in contractor effort, which results in a net increase of \$859,000.

The content of these functions is explained in more detail in the following pages. The detailed requirements for each installation are covered in their respective sections of this presentation.

PERSONNEL AND RELATED COSTS

A. COMPENSATION AND BENEFITS:

1. Compensation:

a. Permanent Positions: This category of personnel costs covers the salaries of permanent civil service employees, and is the largest part of personnel and related costs. The funds shown will support the civil service complement of 23,737 at the end of 1978. The estimate for permanent compensation is based upon the position structure at the start of the year, as modified by the abolishment of positions, within grade advances, career development, and other changes occurring during the year.

b. Nonpermanent: The nonpermanent category covers the salaries of nonpermanent employees participating in the College Cooperative Training, Summer Employment, Youth Opportunity and Temporary Clerical programs.

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

The Summer Employment program employs high school and college students and faculty members in consonance with the Federal Government policies and objectives, and provides them an insight into Government operations, while providing the agency many benefits from the employment of these highly skilled and 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 Detailees: In accordance with existing agreements, NASA reimburses the parent Federal organization for the salaries and related costs of the persons detailed to NASA.

d. Overtime and Other Compensation: Overtime, holiday pay, post and night differential, and hazardous duty pay are included in this category.

2. Benefits:

In addition to compensation, NASA makes an employer's contribution to personnel benefits as authorized and required by law. These benefits include contributions to the Civil Service Retirement Fund, employees life and health insurance, and social security contributions for nonpermanent employees. The incentive awards provide cash awards for outstanding achievements by NASA employees, superior performance awards and for improvements of a center's operations. Payments for severance pay are made to former employees involuntarily separated through no fault of their own.

B. SUPPORTING COSTS:

1. Transfer of Personnel:

Relocation costs, such as the expenses of selling and buying a home, and the movement of household goods are provided under this category.

2. Civil Service Commission Services:

The Civil Service Commission is reimbursed for security investigations on new hires, for recruitment advertising, career-maturity surveys, and any requested investigation of formal discrimination complaints.

3. Personnel Training:

Training is provided within the framework of the Government Employees Training Act of 1958. Part of training consists of courses offered by other Government agencies, usually for a fee, and the remainder is provided through nongovernment sources.

TRAVEL

A. Program Travel:

The largest individual part of travel is for direction, coordination and management of program activities. Because of the geographical distribution of NASA centers and contractor and subcontractor effort throughout the entire United States, coordination and management of complex program activities require travel to permit necessary review by personnel with program responsibilities. As projects reach the flight stage, support is required for prelaunch and postlaunch activities, including overseas travel to launch and tracking sites. The amount of travel required for this purpose is directly related to both the number and complexity of the launches.

B. Meetings and Technical Seminars:

Travel to meetings and technical seminars permits employees engaged in program activities to participate at both government-sponsored and nongovernment-sponsored meetings and seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to technological 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 working panels convened to solve certain problems for the benefit of the government.

C. Administrative Travel:

Administrative travel includes travel for the direction and coordination of general management matters and travel by senior officials to review requirements and operations. 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; travel of unpaid members of research advisory committees; and initial duty station, permanent change of assignment, and other family travel expenses.

FACILITIES SERVICES

A. Rental of Real Property:

This category covers costs for rental of land and property to house personnel and provide storage and warehouse space for equipment, supplies, and materials where space is not available in government-owned facilities; and reimbursement to GSA for government-owned or leased space including office buildings in Washington, DC, under the control of and provided by GSA.

B. Maintenance and Related Services:

1. Maintenance, Repair and Alteration of Buildings and Grounds:

This category includes general building maintenance, painting of structures, general ground maintenance, and maintenance of utility systems. This activity also provides for minor alterations of facilities.

2. Custodial Services:

This category includes janitorial, laundry, guard and security, fire protection, and refuse handling services.

3. Maintenance of Equipment:

Maintenance of equipment consists of work necessary to keep mechanical, electrical, general purpose, and shop equipment operating.

C. Operation of Facilities:

1. Utilities:

This category reflects the cost of electricity, water, gas, heating oil, and other utilities.

2. Supplies and Equipment:

This category includes the supplies, materials, and equipment required for the maintenance and operation of facilities at each installation.

TECHNICAL SERVICES

A. Automatic Data Processing:

1. Equipment

This category provides for the lease, purchase, and maintenance of general purpose data processing equipment which supports institutional operations at each installation. Excluded is equipment dedicated to specific research or operational systems which is funded from the Research and Development appropriation.

2. Programming and Operation Services:

Programming and operation services include system analysis, programming, computer operation and related services. Business-type applications include payroll, personnel data, logistics, and procurement records and reports.

B. Scientific and Technical Information and Educational Programs:

1. Operation of Technical Libraries:

The technical libraries were established to provide information from books, periodicals, technical reports, and other documentation. The costs for these services are budgeted in this subfunction.

2. Educational/Information Programs:

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

3. Scientific and Technical Information:

Scientific and technical information activities include documentation, publication, photographic and translation services.

C. Engineering Services:

The engineering services provide for 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.

ADMINISTRATIVE SUPPORT

A. Communications:

Included in this category are costs of leased lines, long distance tolls, teletype services, local telephone service and other communications.

B. Administrative Printing:

Included in this category are costs for duplicating, blueprinting, microfilming, and other photographic reproductions. Also included in this category is contractual printing and the related composition and binding operations, whether performed by other agencies (chiefly the Government Printing Office), or by commercial firms.

C. Supplies, Materials and Equipment:

This category includes administrative supplies, materials, and equipment.

D. Transportation:

Transportation services include rental of vehicles utilized for transportation of cargo. The cost of aircraft operations and services, as well as the movement of all supplies, materials, equipment, and related items by common carrier is also included.

E. Administrative Support Services:

Administrative support services include those activities which support each installation such as: mail and distribution services; maintenance and repair of office equipment and vehicles; occupational medicine and environmental health; patent services; operation of photocopy equipment; claims of property damage; and chart and related art work.

DISTRIBUTION OF PERMANENT POSITIONS BY INSTALLATION

<u>Installation</u>	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978
			<u>Budget</u> Estimate	<u>Current</u> Estimate	<u>Budget</u> Estimate
Johnson Space Center.....	3,613	3,613	3,613	3,613	3,613
Kennedy Space Center.....	2,259	2,259	2,259	2,259	2,259
Marshall Space Flight Center.....	4,115	4,115	3,925	3,910	3,910
National Space Technology Laboratories.....	70	70	70	70	70
Goddard Space Flight Center.....	3,752	3,752	3,675	3,675	3,625
Wallops Flight Center.....	415	415	414	414	413
Ames Research Center.....	1,676	1,676	1,613	1,613	1,601
Dryden Flight Research Center.....	498	498	497	520	520
Langley Research Center.....	3,321	3,321	3,172	3,172	3,165
Lewis Research Center.....	3,025	3,025	3,025	3,025	3,025
Headquarters.....	<u>1,572</u>	<u>1,572</u>	<u>1,553</u>	<u>1,545</u>	<u>1,536</u>
Total, Permanent Positions.....	<u>24,316</u>	<u>24,316</u>	<u>23,816</u>	<u>23,816</u>	<u>23,737</u>

SUMMARY OF BUDGET PLAN BY INSTALLATION
(Thousands of Dollars)

Johnson Space Center.....	128,817	37,470	134,254	139,743	139,581
Kennedy Space Center.....	99,794	28,610	103,624	107,027	110,141
Marshall Space Flight Center.....	132,799	35,709	133,165	138,557	134,693
National Space Technology Laboratories.....	1,752	444	1,833	1,917	1,942
Goddard Space Flight Center.....	108,580	28,626	109,176	115,872	116,133
Wallops Flight Center.....	13,081	3,985	13,654	13,899	14,226
Ames Research Center.....	50,964	13,285	50,518	53,673	53,706
Dryden Flight Research Center.....	14,512	5,319	15,832	17,267	17,034
Langley Research Center.....	93,169	24,187	91,691	95,414	95,411
Lewis Research Center.....	80,677	22,214	85,739	87,538	88,706
Headquarters.....	<u>68,167</u>	<u>20,320</u>	<u>74,569</u>	<u>73,870</u>	<u>75,416</u>
Total.....	<u>792,312</u>	<u>220,169</u>	<u>814,055</u>	<u>844,777</u>	<u>846,989</u>

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1978 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

DISTRIBUTION OF PERMANENT POSITIONS BY PROGRAM

<u>Program Office and Program</u>	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
<u>SPACE FLIGHT</u>	<u>7,528</u>	<u>7,528</u>	<u>7,349</u>	<u>7,332</u>	<u>7,239</u>
Space shuttle.....	5,167	5,167	5,340	5,198	5,053
Space flight operations.....	1,704	1,704	1,332	1,489	1,597
Expendable launch vehicles.....	657	657	677	645	589
<u>SPACE SCIENCE</u>	<u>2,475</u>	<u>2,475</u>	<u>2,222</u>	<u>2,285</u>	<u>2,221</u>
Physics and astronomy.....	1,675	1,675	1,530	1,637	1,615
Lunar and planetary exploration.....	547	547	461	386	348
Life sciences.....	253	253	231	262	258
<u>SPACE APPLICATIONS</u>	<u>1,694</u>	<u>1,694</u>	<u>1,797</u>	<u>1,776</u>	<u>1,825</u>
<u>AERONAUTICS AND SPACE TECHNOLOGY</u>	<u>5,284</u>	<u>5,284</u>	<u>5,797</u>	<u>5,236</u>	<u>5,280</u>
Aeronautical research and technology.....	3,734	3,734	3,799	3,753	3,795
Space research and technology.....	1,550	1,550	1,998	1,483	1,485
<u>ENERGY TECHNOLOGY APPLICATION</u>	<u>426</u>	<u>426</u>	<u>---</u>	<u>493</u>	<u>550</u>
<u>TRACKING AND DATA ACQUISITION</u>	<u>869</u>	<u>869</u>	<u>878</u>	<u>855</u>	<u>845</u>
<u>TECHNOLOGY UTILIZATION</u>	<u>70</u>	<u>70</u>	<u>74</u>	<u>77</u>	<u>77</u>
Subtotal, Direct Positions.....	<u>18,346</u>	<u>18,346</u>	<u>18,117</u>	<u>18,054</u>	<u>18,037</u>
Indirect Positions.....	<u>5,970</u>	<u>5,970</u>	<u>5,699</u>	<u>5,762</u>	<u>5,700</u>
TOTAL, PERMANENT POSITIONS.....	<u>24,316</u>	<u>24,316</u>	<u>23,816</u>	<u>23,816</u>	<u>23,737</u>

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 FISCAL YEAR 1978 ESTIMATES
 RESEARCH AND PROGRAM MANAGEMENT
 DISTRIBUTION OF BUDGET PLAN BY FUNCTION BY INSTALLATION
 (Thousands of Dollars)

FUNCTION	Total NASA	Johnson Space Center	Kennedy Space Center	Marshall Space Flight Center	National Space Technology Laboratories	Goddard Space Flight Center	Wallops Flight Center	Ames Research Center	Dryden Flight Research Center	Langley Research Center	Lewis Research Center	Headquarters
<u>Personnel and Related Costs</u>												
1976.....	608,789	98,295	56,376	106,665	1,723	91,037	8,687	42,421	11,694	77,181	69,845	44,865
Transition Quarter.	156,855	25,213	14,788	27,337	437	23,425	2,271	10,850	3,136	19,599	18,257	11,542
1977 Budget.....	615,630	99,359	57,977	106,273	1,802	89,679	9,104	41,409	11,821	76,283	73,324	48,599
1977 Current.....	647,805	106,012	61,303	109,788	1,885	97,675	9,531	44,460	13,432	80,423	74,670	48,626
1978 Estimate.....	649,104	106,021	61,817	108,187	1,910	97,696	9,913	44,197	13,477	79,986	76,745	49,155
<u>Travel</u>												
1976.....	17,312	3,232	2,047	2,206	29	2,293	251	1,227	301	2,218	1,079	2,429
Transition Quarter.	4,772	877	648	526	7	613	131	346	86	600	333	605
1977 Budget.....	17,143	3,558	2,430	1,905	31	2,288	274	1,080	262	1,952	905	2,458
1977 Current.....	17,704	3,574	2,380	2,307	32	2,234	271	1,060	372	2,040	1,046	2,388
1978 Estimate.....	17,846	3,541	2,418	2,291	32	2,251	283	1,071	399	2,066	1,105	2,389
<u>Facilities Services</u>												
1976.....	83,768	12,717	23,385	10,989	---	8,358	3,148	4,751	1,871	6,919	7,493	4,137
Transition Quarter.	28,325	6,046	6,198	3,703	---	2,637	1,137	1,296	1,782	2,031	2,501	994
1977 Budget.....	98,005	16,696	25,264	12,116	---	10,523	3,234	5,489	2,735	7,960	9,609	4,379
1977 Current.....	92,342	14,784	25,093	12,564	---	8,596	3,071	5,362	2,435	7,031	9,026	4,380
1978 Estimate.....	91,650	14,172	26,447	11,219	---	8,880	2,968	5,573	2,166	6,553	8,424	5,248
<u>Technical Services</u>												
1976.....	36,392	6,838	6,565	6,659	---	2,083	213	593	76	1,794	612	10,959
Transition Quarter.	14,184	3,142	2,382	1,893	---	492	85	165	14	429	185	5,397
1977 Budget.....	36,976	7,348	6,231	6,876	---	1,864	235	569	78	1,635	458	11,682
1977 Current.....	37,752	6,888	6,282	7,153	---	1,973	219	595	78	1,488	702	12,374
1978 Estimate.....	38,356	7,138	6,897	6,755	---	1,959	229	565	82	1,615	496	12,620
<u>Administrative Support</u>												
1976.....	46,051	7,735	11,421	6,280	---	4,809	782	1,972	570	5,057	1,648	5,777
Transition Quarter.	16,033	2,192	4,594	2,250	---	1,459	361	628	301	1,528	938	1,782
1977 Budget.....	46,301	7,293	11,722	5,995	---	4,822	807	1,971	936	3,861	1,443	7,451
1977 Current.....	49,174	8,485	11,969	6,745	---	5,394	807	2,196	950	4,432	2,094	6,102
1978 Estimate.....	50,033	8,709	12,562	6,241	---	5,347	833	2,300	910	5,191	1,936	6,004
<u>TOTAL</u>												
1976.....	792,312	128,817	99,794	132,799	1,752	108,580	13,081	50,964	14,512	93,169	80,677	68,167
Transition Quarter.	220,169	37,470	28,610	35,709	444	28,626	3,985	13,285	5,319	24,187	22,214	20,320
1977 Budget.....	814,055	134,254	103,624	133,165	1,833	109,176	13,654	50,518	15,832	91,691	85,739	74,569
1977 Current.....	844,777	139,743	107,027	138,557	1,917	115,872	13,899	53,673	17,267	95,414	87,538	73,870
1978 Estimate.....	846,989	139,581	110,141	134,693	1,942	116,133	14,226	53,706	17,034	95,411	88,706	75,416

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; hire, maintenance and operation of administrative aircraft; purchase (not to exceed **[nineteen]** *twenty-seven* for replacement only) and hire of passenger motor vehicles; and maintenance and repair of real and personal property and not in excess of \$25,000 per project for construction of new facilities and additions to existing facilities, and not in excess of \$50,000 per project for rehabilitation and modification of facilities; **[\$813,000,000]** *\$847,200,000*: *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 and 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—Independent Agencies Appropriation Act, 1977: additional authorizing legislation to be proposed.*)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

RESEARCH AND PROGRAM MANAGEMENT

Program and Financing (in thousands of dollars)

Identification code 80-0103-0-1-999	Budget plan				Costs and obligations			
	1976 actual	TQ actual	1977 estimate	1978 estimate	1976 actual	TQ actual	1977 estimate	1978 estimate
Program by activities:								
Direct program:								
1. Space flight	348,840	99,635	366,860	362,359	351,591	92,453	366,860	362,359
2. Scientific investigations in space	104,504	29,633	110,900	106,920	105,781	29,265	110,900	106,920
3. Space applications	76,889	20,510	84,200	89,500	76,162	19,812	84,200	89,500
4. Space research and technology	52,389	16,122	59,270	59,830	52,685	15,424	59,270	59,830
5. Aeronautical research and technology	144,915	38,722	153,737	153,970	145,392	36,261	153,737	153,970
6. Energy technology applications	17,038	3,565	19,800	21,400	17,258	3,323	19,800	21,400
7. Supporting activities	47,737	11,982	50,010	53,010	47,522	11,700	50,010	53,010
Total direct program costs, funded	792,312	220,169	844,777	846,989	796,391	208,238	844,777	846,989
Reimbursable program:								
1. Space flight	62		41	41	62		41	41
2. Scientific investigations in space	295	55	470	419	295	40	470	419
3. Space applications	9,890	777	9,878	9,378	9,538	565	9,878	9,378
4. Space research and technology	10		21	21	10		21	21
5. Aeronautical research and technology	93	50	137	137	93	36	137	137
6. Energy technology applications	3,573	540	5,187	6,221	3,446	392	5,187	6,221
7. Supporting activities	8,141	3,194	9,490	9,574	7,835	2,323	9,490	9,574
Total reimbursable program costs	22,064	4,616	25,224	25,791	21,279	3,356	25,224	25,791
Total program costs, funded	814,376	224,785	870,001	872,780	817,670	211,594	870,001	872,780
Change in selected resources (undelivered orders)					-5,594	15,491		
10.00 Total	814,376	224,785	870,001	872,780	812,076	227,085	870,001	872,780
Financing:								
Offsetting collections from:								
11.00 Federal funds					-14,323	-3,462	-17,163	-18,618
14.00 Non-Federal sources					-7,741	-1,154	-8,061	-7,173
21.00 Unobligated balance available, start of period						-2,300		
24.00 Unobligated balance available, end of period					2,300			
25.00 Unobligated balance lapsing						626		
Budget authority					792,312	220,795	844,777	846,989
Budget authority:								
40.00 Appropriation					792,312	220,795	813,000	846,989
44.20 Supplemental now requested for civilian pay raises							31,777	
Relation of obligations to outlays:								
71.00 Obligations incurred, net					790,012	222,469	844,777	846,989
72.00 Obligated balance, start of period					56,382	45,082	74,442	75,469
74.00 Obligated balance, end of period					-46,082	-74,442	-75,469	-75,469
77.00 Adjustments in expired accounts					-1,016	844		
90.00 Outlays, excluding pay raise supplemental					799,236	194,953	813,100	845,862
91.20 Outlays from civilian pay raise supplemental							30,650	1,127

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

LYNDON B. JOHNSON SPACE CENTER

DESCRIPTION

The Lyndon B. Johnson Space Center is located approximately 20 miles southeast of downtown Houston, Texas. Total NASA-owned land at the Houston site consists of 1,620 acres. The Center also utilizes an additional 54,080 acres at the White Sands Test facility, Las Cruces, New Mexico. The Center's mission also includes the functions of the Earth Resources Laboratory located at the Slidell Computer Complex, Slidell, Louisiana. The total capital investment of the Lyndon B. Johnson Space Center, including fixed assets in progress and contractor-held facilities at various locations and the White Sands Test Facility, as of September 30, 1976, was \$705,009,000.

MISSION

The Lyndon B. Johnson Space Center (JSC) was established in November 1961 (initially as the Manned Spacecraft Center) with the responsibility for program management of manned spacecraft development, flight crew selection and training, manned space flight operations and related medical research, and life sciences. The Center has also been assigned project responsibility in space sciences and applications. The Center currently has major management responsibilities for the Space Shuttle Program and the Earth Resources Program.

With the completion of the lunar landing missions in December 1972, JSC continued its responsibilities and functions in modifying the Apollo spacecraft to support the requirements of both the Skylab Program and the Apollo Soyuz Test Project (ASTP). ASTP, the first manned space mission with joint participation by the USA and USSR, was completed in July 1975. The joint mission successfully demonstrated rendezvous in space of two international vehicles, docking of those vehicles utilizing the new universal docking systems, and the transfer of crew members between the two vehicles.

For the Shuttle Program, JSC has been assigned the lead center role with responsibility for overall planning, direction, and integration of the development, test, evaluation and production of the total Shuttle system. The Shuttle is a versatile space transportation system keyed to the capability of the reusable orbiter system which will carry payloads to orbit and return to earth landing like an airplane. The Shuttle will provide

the capability for placing large payloads in orbit, retrieving payloads from orbit, and repairing payloads in orbit. A small number of reusable orbiters, e.g. five, are capable of supporting over 60 flights per year and thus will replace the current expendable launch vehicles with significant savings. In addition to the Orbiter, the Shuttle system includes external tanks, solid rocket boosters, main engines, launch and landing facilities and operations, and mission control facilities and operations. In addition to its lead center role, JSC is responsible for design, development, test and production of the critical orbiter system; the design, development, and implementation of hardware, software, and procedures required for flight operations; and the provision of trained flight personnel.

A major effort at JSC in the applications area involves remote sensing from aircraft, and the demonstration and documentation of the applications of spacecraft and aircraft remote sensing systems on a simulated operational basis. The Large Area Crop Inventory Experiment (LACIE) being undertaken with the Department of Agriculture and the National Oceanographic and Atmospheric Administration to assess the use of space sensors to improve agricultural production forecasts is a promising experiment in this area.

JSC engineering and test capabilities are employed in support of these major programs and in support of applied research and technology development efforts and advanced studies for future manned spacecraft systems payloads. Space science efforts are devoted to the evaluation of results from continuing research on returned lunar materials, and space environment studies. Life sciences capabilities include in-flight experiment development, 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 agencies and with state and local governments.

JSC's White Sands Test Facility is used in the development and testing of spacecraft engines, and performs other functions that support the overall JSC mission which are best carried out in an isolated area.

SUMMARY OF RESOURCES REQUIREMENTS

	<u>FUNDS</u>				
	<u>1976</u> <u>Actual</u>	<u>Transition</u> <u>Quarter</u> <u>Actual</u>	<u>1977</u>		<u>1978</u> <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
	(Thousands of Dollars)				
I. Personnel and Related Costs.....	98,295	25,213	99,359	106,012	106,021
II. Travel.....	3,232	877	3,558	3,574	3,541
III. Facilities Services.....	12,717	6,046	16,696	14,784	14,172
IV. Technical Services.....	6,838	3,142	7,348	6,888	7,138
V. Administrative Support.....	<u>7,735</u>	<u>2,192</u>	<u>7,293</u>	<u>8,485</u>	<u>8,709</u>
Total, fund requirements.....	<u>128,817</u>	<u>37,470</u>	<u>134,254</u>	<u>139,743</u>	<u>139,581</u>

Distribution of Permanent Positions by Program

Direct Positions

<u>Space Flight</u>	<u>2,602</u>	<u>2,602</u>	<u>2,543</u>	<u>2,594</u>	<u>2,616</u>
Space Shuttle.....	2,344	2,344	2,353	2,398	2,382
Space flight operations.....	258	258	190	196	234
<u>Space Science</u>	<u>168</u>	<u>168</u>	<u>203</u>	<u>167</u>	<u>152</u>
Physics and astronomy.....	25	25	40	22	11
Lunar and planetary exploration.....	56	56	60	51	51
Life sciences.....	87	87	103	94	90
<u>Space Applications</u>	<u>283</u>	<u>283</u>	<u>296</u>	<u>274</u>	<u>254</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
<u>Aeronautics and Space Technology</u>	<u>16</u>	<u>16</u>	<u>21</u>	<u>10</u>	<u>13</u>
Aeronautical research and technology.....	2	2	3	5	5
Space research and technology.....	14	14	18	5	8
<u>Energy Technology Applications</u>	<u>5</u>	<u>5</u>	<u>---</u>	<u>32</u>	<u>41</u>
<u>Technology Utilization</u>	<u>4</u>	<u>4</u>	<u>10</u>	<u>4</u>	<u>4</u>
Subtotal, direct positions.....	3,078	3,078	3,073	3,081	3,080
<u>Indirect Positions</u>	<u>535</u>	<u>535</u>	<u>540</u>	<u>532</u>	<u>533</u>
Total, permanent positions.....	<u>3,613</u>	<u>3,613</u>	<u>3,613</u>	<u>3,613</u>	<u>3,613</u>

PERSONNEL AND RELATED COSTS

(Thousands of Dollars)

I. <u>PERSONNEL AND RELATED COSTS</u>	<u>98,295</u>	<u>25,213</u>	<u>99,359</u>	<u>106,012</u>	<u>106,021</u>
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Basis of Fund Requirements

A. Compensation and Benefits

1. Compensation

a. Permanent positions.....	86,381	21,973	87,540	92,866	92,752
b. Nonpermanent.....	1,279	438	1,303	1,605	1,476
c. Reimbursable detailees.....	1,088	259	1,294	1,082	1,114
d. Overtime and other compensation.....	<u>647</u>	<u>116</u>	<u>872</u>	<u>714</u>	<u>746</u>
Subtotal, Compensation.....	<u>89,395</u>	<u>22,786</u>	<u>91,009</u>	<u>96,267</u>	<u>96,088</u>

	1976	Transition Quarter	1977		1978
	<u>Actual</u>	<u>Actual</u>	<u>Budget Estimate</u>	<u>Current Estimate</u>	<u>Budget Estimate</u>
	(Thousands of Dollars)				
2. <u>Benefits</u>	<u>8,532</u>	<u>2,203</u>	<u>8,005</u>	<u>9,248</u>	<u>9,462</u>
Subtotal, Compensation and Benefits.....	<u>97,927</u>	<u>24,989</u>	<u>99,014</u>	<u>105,515</u>	<u>105,550</u>
 B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	80	39	110	90	90
2. Personnel training.....	<u>288</u>	<u>185</u>	<u>235</u>	<u>407</u>	<u>381</u>
Subtotal, Supporting Costs.....	<u>368</u>	<u>224</u>	<u>345</u>	<u>497</u>	<u>471</u>
Total, Personnel and Related Costs.....	<u>98,295</u>	<u>25,213</u>	<u>99,359</u>	<u>106,012</u>	<u>106,021</u>
 A. <u>Compensation and Benefits</u>					
1. <u>Compensation</u>	<u>97,927</u>	<u>24,989</u>	<u>99,014</u>	<u>105,515</u>	<u>105,550</u>
a. Permanent positions.....	89,395	<u>22,786</u>	<u>91,009</u>	<u>96,267</u>	<u>96,088</u>
Permanent positions.....	86,381	21,973	87,540	92,866	92,752

The funds shown above will support 3,613 permanent positions in 1978. The increase in 1977 from the budget estimate to the current estimate is due to the October 1976 pay raise.

Basis of Cost for Permanent Positions

In 1978 the cost of permanent positions will be \$92,752,000. This is a decrease from 1977 resulting from the following actions:

Cost of permanent positions in 1977.....	92,866
Cost increases in 1978.....	+1,607

Within grade advances and career development:	
Full year effect of 1977 actions.....	+755
Partial year effect of 1978 actions.....	+717
Full year effect of October 1976 pay raise.....	+135
Cost decreases in 1978.....	-1,721
Turnover savings and abolished positions:	
Full year effect of 1977 actions.....	-377
Partial year effect of 1978 actions.....	-989
One less paid day in 1978.....	-355
Cost of permanent positions in 1978.....	<u>92,752</u>

1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
		Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)				

b. Nonpermanent

1. Cost.....	\$1,279	\$438	\$1,303	\$1,605	\$1,476
2. Manyears.....	152	62	185	185	185

The 1978 plan includes 185 manyears which is the same as 1977. This effort will support the following programs:

Distribution of Nonpermanent Manyears by Program

<u>Programs</u>	<u>Manyears</u>
Cooperative training programs.....	73
Summer programs.....	21
Youth opportunity programs.....	71
Other temporaries.....	<u>20</u>
Total.....	<u>185</u>

The increase in 1977 from the budget estimate to the current estimate is due to the effect of the October 1976 pay raise, a longer summer program, and Public Law 94-397 which increases the cost of reemployed annuitants to NASA.

The decrease in 1978 is due to a change back in the mix of the opportunity and summer nonpermanent programs, and to more people entering the programs at the entrance level.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
c. Reimbursable detailees.....	1,088	259	1,294	1,082	1,114

The military personnel detailed to the Johnson Space Center on a reimbursable basis are individuals experienced in manned flight and related fields. Each individual performs an essential and critical function to the current and future programs. The individuals most readily available within the government ranks are in the military. One civilian employee, experienced in the field of medicine, is also detailed on a reimbursable basis.

The decrease in 1977 from the budget estimate to the current estimate is due to a reduction of thirteen manyears. This reduction of effort more than offsets the effect of the October 1976 pay raise. The increase in 1978 is due to the full year's effect of the pay raise.

d. Overtime and other compensation.....	647	116	872	714	746
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Overtime in FY 1978 will be used primarily for the Shuttle approach and landing tests, e.g., crew training, trajectory optimization, data reduction, avionics integration laboratory activities, and related support activities. In addition, there are numerous source selection boards, LACIE program activities, and other time critical activities that necessitate some extension of the normal work day or week.

The reduction from the 1977 budget to the current estimate is due to the reduction of overtime requirements by rescheduling tours of duty. This more than offsets the effect of the October 1976 pay raise. The increase in 1978 is partially due to the full year's cost of the pay raise together with the phasing of program critical activities.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
2. <u>Benefits</u>	<u>8,532</u>	<u>2,203</u>	<u>8,005</u>	<u>9,248</u>	<u>9,462</u>

The current estimate for 1977 is increased from the 1977 budget estimate to account for the October 1976 pay raise, the inclusion of workman s compensation which was budgeted in Headquarters, and the increased cost of employee health insurance. The increase in 1978 is due to the full year effect of the pay raise, the higher rates for employee health insurance, and the increased cost of workman's compensation.

Following are the amounts of contribution by category:

Category of Costs

Contribution to the Civil Service					
Retirement Fund.....	6,049	1,588	6,161	6,562	6,548
Contribution for employees life					
insurance.....	372	101	375	391	393
Contribution for employees health					
insurance.....	1,518	361	1,354	1,686	1,793
Contribution to FICA.....	38	16	50	36	36
Incentive awards.....	147	26	65	125	123
Other benefits.....	7	---	---	6	5
Severance pay.....	24	---	---	---	---
Workman's compensation.....	<u>377</u>	<u>111</u>	<u>---</u>	<u>442</u>	<u>564</u>
Total.....	<u>8,532</u>	<u>2,203</u>	<u>8,005</u>	<u>9,248</u>	<u>9,462</u>
B. <u>Supporting Costs</u>	<u>368</u>	<u>224</u>	<u>345</u>	<u>497</u>	<u>471</u>
1. Transfer of personnel.....	80	39	110	90	90

Legislation enacted in 1966 provided that the Government would pay for certain moving costs which are budgeted for in this category, such as the expenses of selling and buying a home and the cost of family re-location.

The decrease in the 1977 current estimate from the budget estimate is due to fewer permanent change of station moves in support of the Shuttle Approach and Landing Test than planned. 1978 is planned at the 1977 level.

2. Personnel training.....	288	185	235	407	381
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Training of Center personnel result in a more highly motivated and experienced staff not readily available in the labor market. Training necessary to keep those employees with technological expertise abreast of the latest state-of-the-art in their respective fields, and training of unskilled minorities is provided under this category.

The increase in 1977 from the budget estimate to the current estimate will permit a return to the normal annual training level. Due to unexpected 1976 funding constraints, many training requirements were deferred to the Transition Quarter rather than being funded in 1976 as originally planned. The 1977 and 1978 estimates represent an effort by JSC to make the training plans consistent with changing skill and program requirements.

<u>TRAVEL</u>					
	1976	Transition	<u>1977</u>		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
	(Thousands of Dollars)				
II. <u>TRAVEL</u>	3,232	877	3,558	3,574	3,541

Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Travel.....	2,760	736	2,913	2,990	3,021
B. Meetings and Technical Seminars.....	140	72	166	134	134
C. Administrative Travel.....	<u>332</u>	<u>69</u>	<u>479</u>	<u>450</u>	<u>386</u>
Total, Travel.....	<u>3,232</u>	<u>877</u>	<u>3,558</u>	<u>3,574</u>	<u>3,541</u>
 A. <u>Program Travel</u>	<u>2,760</u>	<u>736</u>	<u>2,913</u>	<u>2,990</u>	<u>3,021</u>

Approximately 85% of the total JSC travel estimate in 1978 is required for program travel. Because of the complexity of the research and development programs and the distribution of contractor effort throughout the United States, coordination and management of activities and contract monitoring require extensive travel by personnel responsible for the program. The Space Shuttle Program travel requirements predominate, comprising approximately 70% of the total program travel. The increase from the 1977 budget to the current estimate is due to increased per diem rates. The 1978 increase is caused by scheduled test requirements in preparation for the first manned orbital flight of the Space Shuttle.

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Current <u>Estimate</u> <u>Estimate</u>		<u>1978</u> Budget <u>Estimate</u>
			(Thousands of Dollars)		
B. <u>Meetings and Technical Seminars</u>	<u>140</u>	<u>72</u>	<u>166</u>	<u>134</u>	<u>134</u>

Symposia and technical seminars related to the European Spacelab activities, earth observation programs, and lunar samples, constitute the majority of requirements in the meeting and technical seminar category. The dissemination of space technology information to the scientific sector also contributes to these requirements. The decrease from the 1977 budget estimate to the current estimate was a result of the number of trips being reduced, partially offset by the increased per diem costs.

C. <u>Administrative Travel</u>	<u>332</u>	<u>69</u>	<u>479</u>	<u>450</u>	<u>386</u>
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The decrease in administrative travel from 1977 to 1978 reflects the one time cost of the astronaut recruitment program in 1977.

FACILITIES SERVICES

III. <u>FACILITIES SERVICES</u>	<u>12,717</u>	<u>6,046</u>	<u>16,696</u>	<u>14,784</u>	<u>14,172</u>
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Basis of Fund Requirements

Summary of Facilities Services

A. Maintenance and Related Services

1. Maintenance, repair and alterations of buildings and grounds.....	4,691	2,451	5,932	5,696	4,772
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	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
(Thousands of Dollars)					
2. Custodial services.....	3,177	2,040	3,353	2,680	2,913
3. Maintenance of equipment.....	<u>318</u>	<u>43</u>	<u>369</u>	<u>755</u>	<u>366</u>
Subtotal.....	<u>8,186</u>	<u>4,534</u>	<u>9,654</u>	<u>9,131</u>	<u>8,051</u>
B. <u>Operation of Facilities</u>					
1. Utilities.....	3,693	1,285	6,037	4,770	5,204
2. Supplies and equipment.....	<u>838</u>	<u>227</u>	<u>1,005</u>	<u>883</u>	<u>917</u>
Subtotal.....	<u>4,531</u>	<u>1,512</u>	<u>7,042</u>	<u>5,653</u>	<u>6,121</u>
Total, Facilities Services.....	<u>12,717</u>	<u>6,046</u>	<u>16,696</u>	<u>14,784</u>	<u>14,172</u>
A. <u>Maintenance and Related Services</u>					
1. Maintenance, repair and alteration of buildings and grounds.....	4,691	2,451	5,932	5,696	4,772

This activity provides for maintenance, repair, and alteration of buildings, grounds and utility systems at the Johnson Space Center and the White Sands Test Facility. This service provides only cyclic maintenance and minor breakdown repair requiring approximately 249 manyears of effort. At JSC this includes 52 buildings that have an average age of 13 years, containing 914,828 square feet of space; 868 acres of improved ground and 216 acres of surfaced areas; 179,751 linear feet of water line, 238,998 linear feet of sewage and drainage lines; 196,780 linear feet of electrical distribution lines, 18,720 linear feet of utility tunnels; 17,246 linear feet of utility air distribution lines and 42,224 linear feet of natural gas lines.

The reduction in 1977 from the budget estimate to the current estimate reflects a reduction of three manyears in one support contract, plus a reduction in minor construction and repair projects at JSC.

The further decrease in 1978 reflects the minimum obligational authority required so that the funding may be provided to areas with mandatory price increases. There is no change in the level of support provided.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
	(Thousands of Dollars)				
2. Custodial services.....	3,177	2,040	3,353	2,680	2,913

The security service, provided by support service contract, includes badging of personnel and visitors, and policing of traffic involving approximately 13,000 vehicles daily. The contractor also provides 24-hour fire fighting and ambulance service to JSC, maintains approximately 2,555,465 square feet of area, periodically replaces 10,000 lights, and provides pickup daily of 144 cubic yards of trash.

The reduction in 1977 from the budget estimate to the current estimate is a result of the new fiscal year which changes the phasing of the contract funding and of a reduction of one manyear in support contract effort.

The 1978 budget provides the same level of support as 1977, the increase is due entirely to support contractor wage rate increases.

3. Maintenance of equipment.....	318	43	369	755	366
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The increase from the 1977 budget to the 1977 current estimate is due to a special one time requirement in support of the Approach and Landing Test at the Dryden Flight Research Center.

The decrease in 1978 represents a return to the normal level of effort.

B. <u>Operation of Facilities</u>	<u>4,531</u>	<u>1,512</u>	<u>7,042</u>	<u>5,653</u>	<u>6,121</u>
1. Utilities.....	3,693	1,285	6,037	4,770	5,204

The cost of natural gas per thousand cubic feet has increased from 30 cents in January 1973, to \$2.35 in August 1976, for a cost escalation of 683 percent. Electricity rates, although not as great as natural gas, have also continued to increase at a fast pace. The decrease in 1977 from the budget estimate to the current

estimate is due to a 26 percent decrease in natural gas consumption. This is in keeping with the agency plan of reducing utility consumption. The increase in 1978 is due primarily to continued rate increases.

	1976	Transition	<u>1977</u>		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
2. Supplies and equipment.....	838	227	1,005	883	917

The decrease in supplies in 1977 from the budget to the current estimate is caused by a higher inventory level at the end of the Transition Quarter than anticipated, which allows a reduction in the current year funding.

The small increase in 1978 is due to higher prices for some items.

TECHNICAL SERVICES

IV. <u>TECHNICAL SERVICES</u>	<u>6,838</u>	<u>3,142</u>	<u>7,348</u>	<u>6,888</u>	<u>7,138</u>
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Basis of Fund Requirements

Summary of Technical Services

A. Automatic Data Processing

1. Equipment.....	2,422	1,721	2,034	1,706	1,708
2. Programming and operation.....	<u>2,136</u>	<u>693</u>	<u>2,920</u>	<u>2,787</u>	<u>2,968</u>
Subtotal.....	<u>4,558</u>	<u>2,414</u>	<u>4,954</u>	<u>4,493</u>	<u>4,676</u>

B. <u>Engineering Services</u>	<u>386</u>	<u>75</u>	<u>390</u>	<u>455</u>	<u>485</u>
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C. Scientific and Technical Information and Educational Programs

1. Operation of NASA technical library.....	78	25	77	69	73
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	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
2. Educational/informational programs.....	438	208	487	524	565
3. Scientific and technical information.....	<u>1,378</u>	<u>420</u>	<u>1,440</u>	1,347	<u>1,339</u>
Subtotal.....	<u>1,894</u>	<u>653</u>	<u>2,004</u>	<u>1,940</u>	<u>1,977</u>
Total, Technical Services.....	<u>6,838</u>	<u>3,142</u>	<u>7,348</u>	<u>6,888</u>	<u>7,138</u>

A. Automatic Data Processing..... 4,558 2,414 4,954 4,493 4,676

This activity is accomplished by a support service contractor who performs programming, keypunch, data storage and listings for managerial, financial, and other administrative requirements.

The decrease in 1977 from the budget estimate to the current estimate reflects a reduction of one manyear and a decrease in equipment lease cost due to ADP equipment procurements made during the Transition Quarter.

Support in 1978 is provided at the same level as in 1977. The increase is due to support contractor wage rate increases.

B. Engineering Services..... 386 75 390 455 485

This activity includes drafting and design work for all minor construction projects. The increase from the budget estimate to the 1977 current estimate reflects the restoration of a five manyear reduction in the 1977 budget which the Center could not accomplish due to the continued level of office and space reassignments related to the relinquishment of facilities at Ellington Air Force Base. This is not a net increase in manpower in that offsetting decreases occur elsewhere. The increase in 1978 is due to increased support contractor wage rates.

C. Scientific and Technical Information and Educational Programs..... 1,894 653 2,004 1,940 1,977

 1. Technical library..... 78 25 77 69 73

The technical library acquires approximately 14,000 books and periodicals a year. The decrease in 1977 from the budget estimate to the current estimate is due to a reduction of one support contractor manyear offset by support contractor wage rate increases. The estimate in 1978 reflects the same level of effort at a slightly higher wage rate.

	<u>1976 Actual</u>	<u>Transition Quarter Actual</u>	<u>1977</u>		<u>1978</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	<u>Budget Estimate</u>
(Thousands of Dollars)					
2. Educational/informational programs.....	438	208	487	524	565

Included in this activity are the maintenance of exhibits, press conferences, news coverage of flights, distribution of exhibits, and film and press releases. These activities accounted for 23,127 inquiries from news media, 1,066,075 publications furnished, and accommodated 732,000 visitors who toured the Center in 1976.

The increase from the 1977 budget estimate to current estimate reflects an increase in activity related to the Shuttle Program. The funds for 1978 provide for services at the 1977 level plus support contractor wage rate increases.

3. Scientific and technical information.....	1,378	420	1,440	1,347	1,339
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This activity includes graphics services, photographic laboratory support, and audio-visual operations, all provided by support service contractors.

The decrease in 1977 from the budget estimate to the current estimate is due to a decrease of two support contractor manyears.

The 1978 estimate reflects support contractor costs at approximately the same level as 1977.

ADMINISTRATIVE SUPPORT

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
	(Thousands of Dollars)				
V. <u>ADMINISTRATIVE SUPPORT</u>	7,735	2,192	1,293	8,485	8,709

Basis of Fund Requirements

Summary of Administrative Support

A. <u>Communications</u>					
1. Leased lines and long distance.....	805	177	772	750	739
2. Local telephone service.....	1,067	276	1,105	1,185	1,185
3. Other communications.....	<u>495</u>	<u>125</u>	<u>127</u>	<u>528</u>	<u>565</u>
Subtotal, Communications.....	<u>2,367</u>	<u>578</u>	<u>2,004</u>	<u>2,463</u>	<u>2,489</u>
B. <u>Administrative Printing</u>					
	<u>450</u>	<u>193</u>	<u>600</u>	<u>500</u>	<u>500</u>
C. <u>Supplies, Materials and Equipment</u>					
	<u>1,576</u>	<u>448</u>	<u>1,300</u>	<u>1,830</u>	<u>1,660</u>
D. <u>Transportation</u>					
1. Center operations.....	<u>687</u>	<u>209</u>	<u>670</u>	<u>701</u>	<u>831</u>
E. <u>Administrative Support Services</u>					
1. Installation support services.....	1,652	484	1,720	1,977	2,144
2. Occupational medicine and environmental health.....	<u>1,003</u>	<u>280</u>	<u>999</u>	<u>1,014</u>	<u>1,085</u>
Subtotal, Administrative Support Services.....	<u>2,655</u>	<u>764</u>	<u>2,719</u>	<u>2,991</u>	<u>3,229</u>
Total, Administrative Support.....	<u>7,735</u>	<u>2,192</u>	<u>7,293</u>	<u>8,485</u>	<u>8,709</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
A. <u>Communications</u>	<u>2,367</u>	<u>578</u>	<u>2,004</u>	<u>2,463</u>	<u>2,489</u>

The increase from the 1977 budget estimate to the 1977 current estimate is due to unanticipated rate increases during 1976. The 1978 estimate provides for services at the 1977 level.

B. <u>Administrative Printing</u>	<u>450</u>	<u>193</u>	<u>600</u>	<u>500</u>	<u>500</u>
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There were 40,405,706 units of off-site printing in 1976.

The decrease in 1977 from the budget estimate to the current estimate is due to the increased efficiency of new on-site equipment which will reduce the requirements for printing to be done off-site.

C. <u>Supplies, Materials and Equipment</u>	<u>1,576</u>	<u>448</u>	<u>1,300</u>	<u>1,830</u>	<u>1,660</u>
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This category includes procurement of administrative equipment supplies, materials, and equipment rentals. The increase in 1977 from the budget estimate to the current estimate is to provide the same level of stock as experienced in FY 1976 and the Transition Quarter at the current price levels.

The reduction in 1978 is in order to provide funding for higher priority activities in other functions.

D. <u>Transportation</u>	<u>687</u>	<u>209</u>	<u>670</u>	<u>701</u>	<u>831</u>
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Transportation services are provided at JSC; WSTF; Bethpage, New York; and Downey, California. The small increase in 1977 from the budget estimate to the current estimate is due to mandatory price increases.

In 1978 the increase is due to an engine overhaul on the administrative aircraft, and support contractor wage increases.

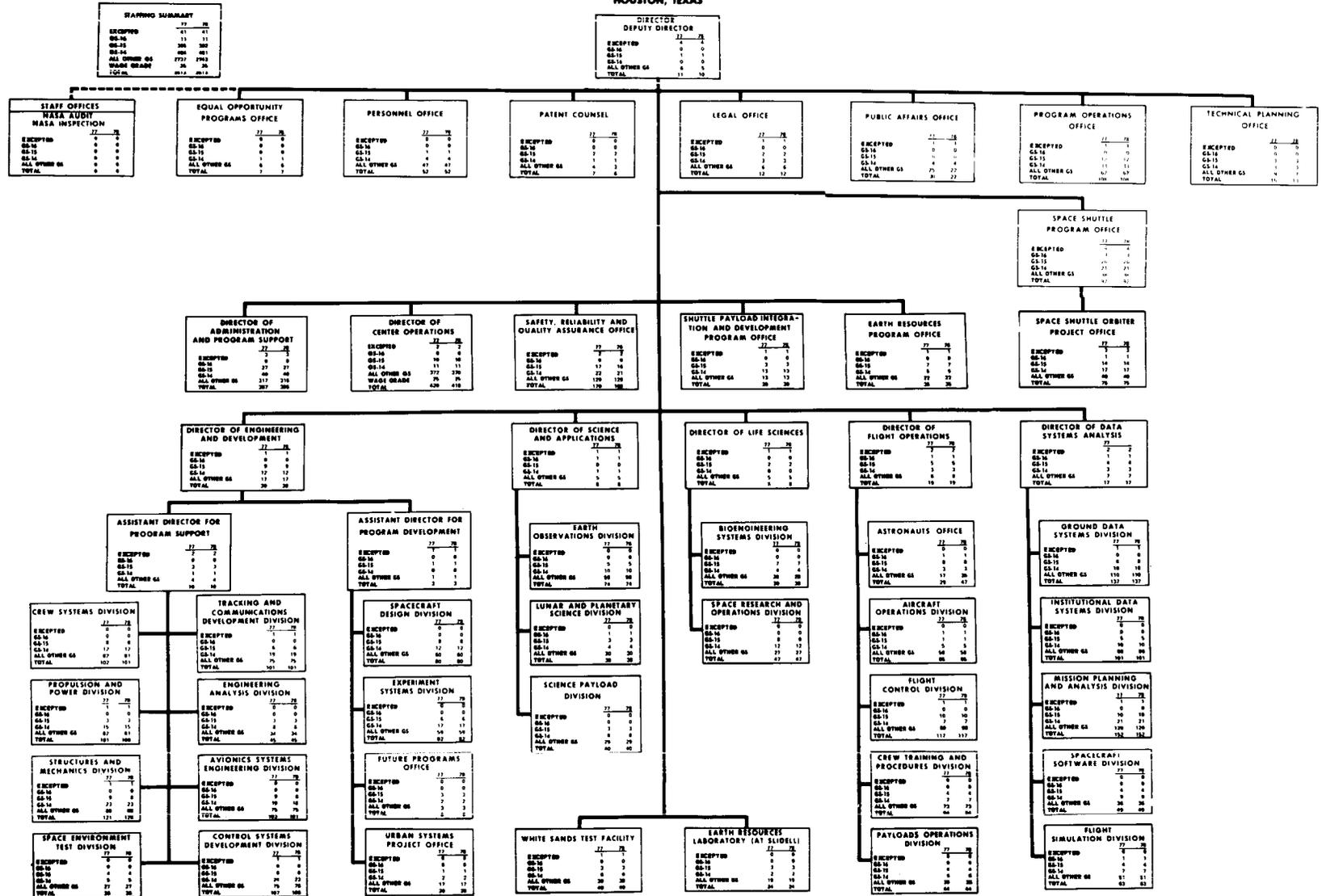
E. <u>Administrative Support Services</u>	<u>2,655</u>	<u>764</u>	<u>2,719</u>	<u>2,991</u>	<u>3,229</u>
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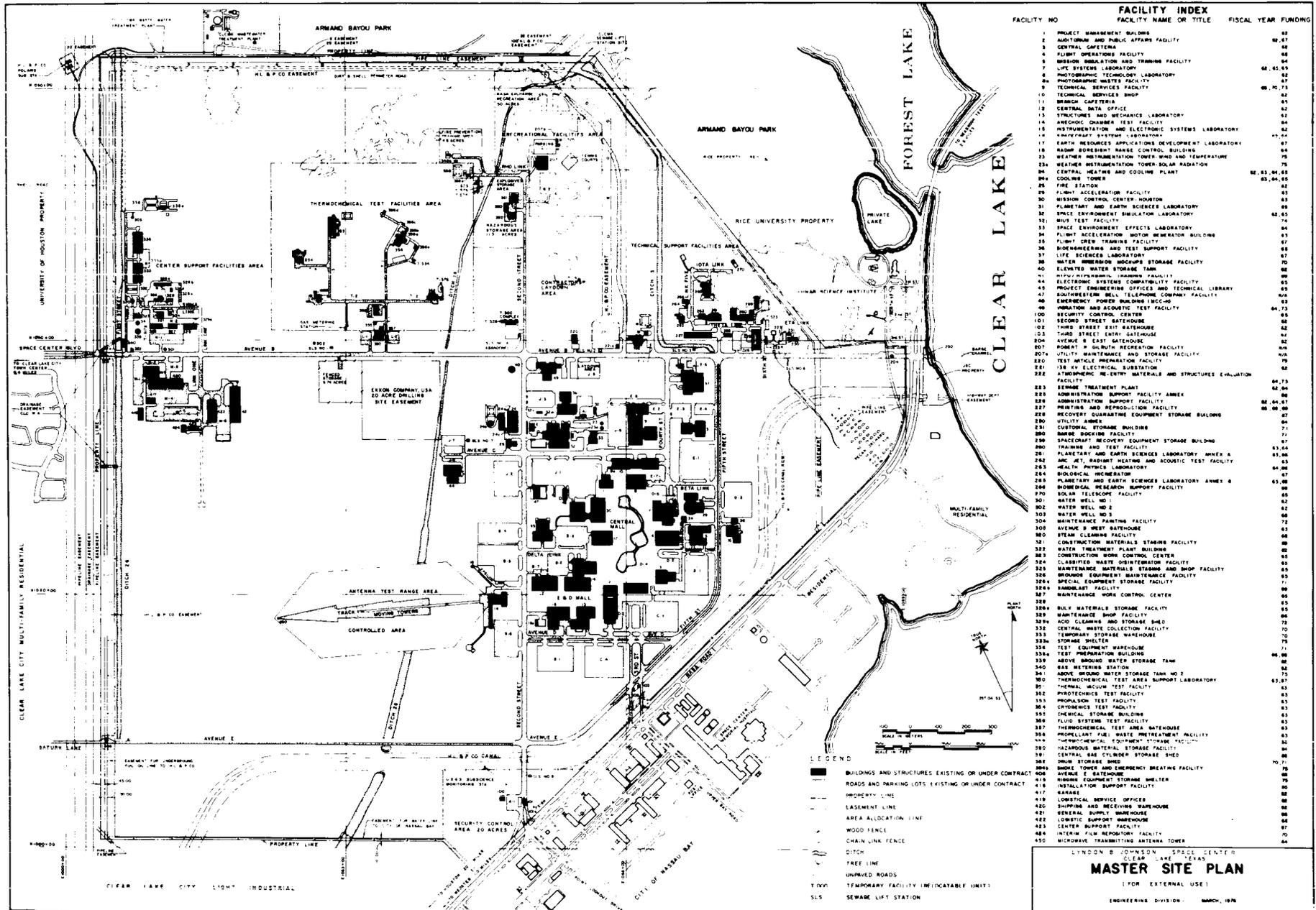
The major services in this category provide support of the installation generally. This includes supplies and equipment storage and issue functions handling approximately 149,000 units in FY 1976; forms and publications that necessitate the processing of approximately 600,000 items annually; moving and hauling; and support

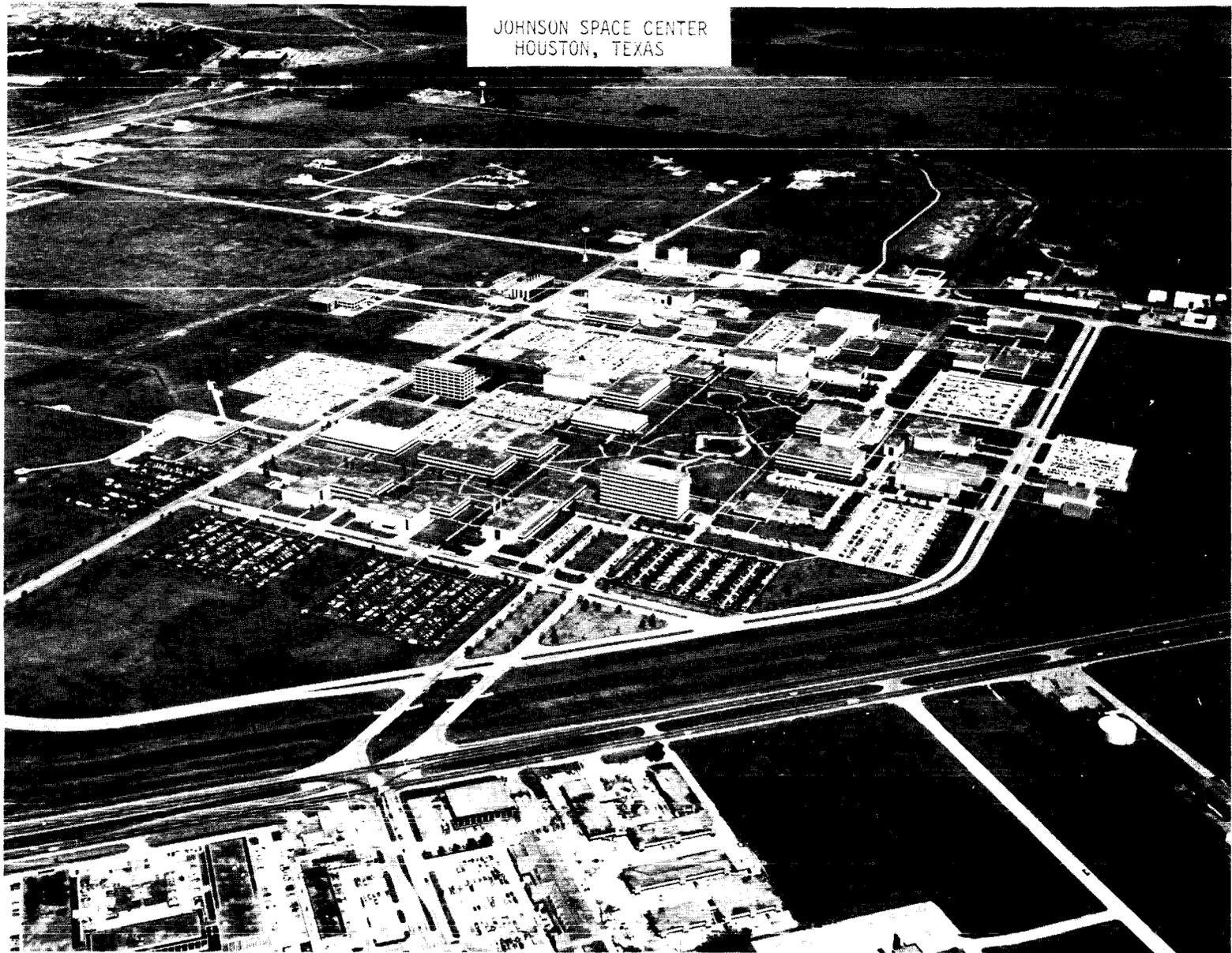
for the Center's activities at Ellington Air Force Base. In addition, a contractor provides occupational medicine, industrial hygiene and environmental health services; operation of the dispensary for emergency medical treatment and employee physicals, handling approximately 22,000 patient visits a year; and recognition, measurement and control of hazardous working and environmental conditions.

The funds in 1977 and 1978 provide for services continuing at the FY 1976 level, adjusted for the effect of negotiated wage and price increases.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS**







JOHNSON SPACE CENTER
HOUSTON, TEXAS

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

JOHN F. KENNEDY SPACE CENTER

DESCRIPTION

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

1. At the Kennedy Space Center, which is situated approximately 50 miles east of Orlando, Florida, in northeast Brevard County. The total land and water area of the installation is 139,305 acres. Breakdown of this acreage is as follows:

NASA-owned.....	82,943
Easement, Banana River Causeway.....	271
Easement, Indian River Causeway.....	296
Deed of Dedication, Florida-owned, submerged lands.....	<u>55,795</u>
Total.....	<u>139,305</u>

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

2. At the Vandenberg Air Force Base, which is located in Santa Barbara County, six miles west of Lompoc, California, and 160 miles north of Los Angeles, California, expendable vehicle operations are accomplished through a host-tenant agreement with the Air Force.

The total NASA capital investment at the Kennedy Space Center and the Vandenberg Air Force Base, including fixed assets in progress and contractor-held facilities at various locations as of September 30, 1976, was \$1,537,358,000.

MISSION

The Kennedy Space Center was established at Cape Canaveral, Florida, as a separate Center within NASA in July 1962. It serves as the primary Center for the test, checkout, and launch of space vehicles. This includes launch of manned systems at the Kennedy Space Center, and unmanned systems at the Air Force Eastern Test Range, and Vandenberg Air Force Base.

KSC has basic responsibility for the design and development of launch, landing and vehicle refurbishment facilities and ground support equipment for the Space Shuttle. This activity includes modification to existing facilities and support equipment such as the Vehicle Assembly Building and Apollo launch pads, as well as design and construction of new facilities such as the Orbiter Processing Facility.

In addition to mission responsibilities for the Shuttle vehicle, checkout, launch and refurbishment, KSC is preparing to accommodate and support the hardware to be flown on the Space Shuttle. These include: the Spacelab, being developed by the European Space Agency (ESA), the interim upper stage, and various scientific, communications, navigational, and earth observing spacecraft.

KSC is responsible for launch support activities for unmanned civil missions launched from the Air Force Eastern Test Range at Cape Canaveral Air Force Station, Florida (located adjacent to KSC), and at Vandenberg Air Force Base, California.

In summary, the Kennedy Space Center is the major NASA Center responsible for:

1. Launch facility design, construction, maintenance, and operations, including advanced planning and studies leading to development of new launch operation concepts and techniques.
2. Launch vehicle preparation and checkout.
3. Spacecraft and payload preparation and checkout.
4. Final integration and integrated checkout of vehicle, spacecraft and launch facilities, and the conduct of actual launch operations.
5. Operation and coordination of support facilities, ground support equipment, and tracking and data acquisition and logistics support required for operation of all NASA activities at the Eastern Test Range and Vandenberg Air Force Base, California.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

	1976	Transition	1977		1978	
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>	
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	
		(Thousands of Dollars)				
I. Personnel and Related Costs.....	56,376	14,788	57,977	61,303	61,817	
II. Travel.....	2,047	648	2,430	2,380	2,418	
III. Facilities Services.....	23,385	6,198	25,264	25,093	26,447	
IV. Technical Services.....	6,565	2,382	6,231	6,282	6,897	
V. Administrative Support.....	<u>11,421</u>	<u>4,594</u>	<u>11,722</u>	<u>11,969</u>	<u>12,562</u>	
Total, fund requirement.....	<u>99,794</u>	<u>28,610</u>	<u>103,624</u>	<u>107,027</u>	<u>110,141</u>	

Distribution of Permanent Positions by Program

Direct Positions

<u>Space Flight</u>	<u>1,674</u>	<u>1,674</u>	<u>1,655</u>	<u>1,674</u>	<u>1,680</u>
Space shuttle.....	1,120	1,120	1,256	1,094	1,091
Space flight operations.....	270	270	115	296	327
Expendable launch vehicles.....	284	284	284	284	262
<u>Space Science</u>	<u>4</u>	<u>4</u>	<u>3</u>	<u>4</u>	<u>4</u>
Life sciences.....	4	4	3	4	4

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
<u>Space Applications</u>	<u>21</u>	<u>21</u>	<u>40</u>	<u>21</u>	<u>21</u>
<u>Aeronautics and Space Technology</u>	<u>---</u>	<u>---</u>	<u>2</u>	<u>---</u>	<u>---</u>
Aeronautical research and technology.....	---	---	2	---	---
<u>Technology Utilization</u>	<u>1</u>	<u>1</u>	<u>---</u>	<u>1</u>	<u>1</u>
Subtotal, direct positions.....	1,700	1,700	1,700	1,700	1,706
<u>Indirect Positions</u>	<u>559</u>	<u>559</u>	<u>559</u>	<u>559</u>	<u>553</u>
Total, permanent positions.....	<u>2,259</u>	<u>2,259</u>	<u>2,259</u>	<u>2,259</u>	<u>2,259</u>

PERSONNEL AND RELATED COSTS

	(Thousands of Dollars)				
I. <u>PERSONNEL AND RELATED COSTS</u>	<u>56,376</u>	<u>14,788</u>	<u>57,977</u>	<u>61,303</u>	<u>61,817</u>

Basis of Fund Requirements

A. Compensation and Benefits

1. Compensation

a. Permanent positions.....	49,992	13,014	51,722	54,436	54,770
b. Nonpermanent.....	786	300	734	785	785

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977 <u>Budget</u> <u>Current</u> <u>Estimate</u> <u>Estimate</u>		1978 <u>Budget</u> <u>Estimate</u>
			(Thousands of Dollars)		
c. Reimbursable detailees.....	123	28	105	139	139
d. Overtime and other compensation.....	<u>334</u>	<u>57</u>	<u>325</u>	<u>355</u>	<u>355</u>
Subtotal, Compensation.....	51,235	13,399	52,886	55,715	56,049
2. <u>Benefits</u>	<u>4,812</u>	<u>1,257</u>	<u>4,735</u>	<u>5,247</u>	<u>5,427</u>
Subtotal, Compensation and Benefits.....	<u>56,047</u>	<u>14,656</u>	<u>57,621</u>	<u>60,962</u>	<u>61,476</u>
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	103	77	70	116	116
2. Personnel training.....	<u>226</u>	<u>55</u>	<u>286</u>	<u>225</u>	<u>225</u>
Subtotal, Supporting Costs.....	<u>329</u>	<u>132</u>	<u>356</u>	<u>341</u>	<u>341</u>
Total, Personnel and Related Costs.....	<u>56,376</u>	<u>14,788</u>	<u>57,977</u>	<u>61,303</u>	<u>61,817</u>
A. <u>Compensation and Benefits</u>	<u>56,047</u>	<u>14,656</u>	<u>57,621</u>	<u>60,962</u>	<u>61,476</u>
1. <u>Compensation</u>	<u>51,235</u>	<u>13,399</u>	<u>52,886</u>	<u>55,715</u>	<u>56,049</u>
a. Permanent positions.....	49,992	13,014	51,722	54,436	54,770

The estimates for permanent positions provide for the salaries of 2,259 civil service personnel.

Basis of Cost for Permanent Positions

In 1978 the cost of permanent positions will be \$54,770, an increase of \$334 from 1977. The increase is as follows:

Cost of permanent positions in 1977.....	54,436
Cost of increases in 1978.....	+1,099
Within grade advances and career development:	
Full year effect of 1977 actions.....	+507

Partial year effect of 1978 actions.....	+517	
Full year effect of October 1976 pay raise.....	+75	
Cost of decreases in 1978.....		-765
Turnover savings:		
Full year effect of 1977 actions.....	-142	
Partial year effect of 1978 actions.....	-209	
Effect of increase in reimbursable activity.....	-199	
One less paid day in FY 1978.....	-215	
Cost of permanent positions in FY 1978.....		<u>54,770</u>

	1976	Transition	1977		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>

(Thousands of Dollars)

b. Nonpermanent

1. Cost.....	\$786	\$300	\$734	\$785	\$785
2. Manyears.....	109	45	100	103	103

The increase from the 1977 budget estimate to the 1977 current estimate is due to the October 1976 pay raise and an increase in manyears for the summer program.

The 1978 plan includes 103 manyears. They will be used to support the following programs at approximately the levels indicated:

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>
Cooperative training program.....	45
Summer program (excluding disadvantaged youth).....	11
Disadvantaged youth program.....	27
Other temporaries.....	<u>20</u>
Total.....	<u>103</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
c. Reimbursable detailees.....	123	28	105	139	139

The 1978 estimate for military personnel includes funding for services of five engineers and one logistician, who will participate in Shuttle development (i.e., maintainability and flight test support). The increase from the 1977 budget estimate to the current estimate is due to a schedule change in bringing one of the detailees on-board and the October 1976 pay raise.

d. Overtime and other compensation.....	334	57	325	355	355
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The most significant portion of the Center's overtime is in direct support of test, integration and checkout of launch vehicle systems and preparation of the vehicle for launch; and launch facility design, construction, maintenance and operation, including advanced planning and studies. The remaining portion of overtime and holiday pay is used for peak workloads, e.g., Source Evaluation Boards and fiscal year-end closing. The increase in 1977 from the budget estimate to the current estimate is due to the October 1976 pay raise.

2. <u>Benefits</u>	<u>4,812</u>	<u>1,257</u>	<u>4,735</u>	<u>5,247</u>	<u>5,427</u>
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The increase in 1977 from the budget estimate to the current estimate is due to the increased health benefits premiums and the October 1976 pay raise. The increase in 1978 is due to the January 1977 increase in health benefits premiums, 60% of which are paid by the Government, and higher cost of workman's compensation.

In the FY 1977 budget, the entire cost of workman's compensation was included in Headquarters. The FY 1978 budget reflects the Center's cost for this item.

Category of Costs:

Contribution to the Civil Service Retirement Fund	3,528	915	3,649	3,837	3,862
Contribution for employee life insurance.....	230	54	208	254	261
Contribution to employee health insurance.....	894	228	853	971	1,073
Contribution to FICA.....	22	14	15	23	27
Incentive Awards.....	12	9	10	13	13
Workman's Compensation.....	<u>126</u>	<u>37</u>	<u>---</u>	<u>149</u>	<u>191</u>
Total.....	<u>4,812</u>	<u>1,257</u>	<u>4,735</u>	<u>5,247</u>	<u>5,427</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
B. <u>Supporting Costs</u>	<u>329</u>	<u>132</u>	<u>356</u>	<u>341</u>	<u>341</u>
1. Transfer of Personnel.....	103	77	70	116	116

The increase in 1977 from the budget estimate to the current estimate reflects revised plans for relocation of personnel for the Shuttle Approach and Landing Test. Estimates are based on the anticipated number of moves and historical average cost for the movement of household goods.

2. Personnel Training.....	226	55	286	225	225
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Personnel training costs are based on employee development programs which include supervision and management, technical and engineering updating, administrative, communicative, and clerical skills, and the Affirmative Action Plan. Training provides special mission orientation, i.e., flight and ground operations and facility buildup for Shuttle operations. The decrease in 1977 from the budget estimates to the current estimates reflects a refinement of estimates based on current planning schedules.

TRAVEL

II. <u>TRAVEL</u>	<u>2,047</u>	<u>648</u>	<u>2,430</u>	<u>2,380</u>	<u>2,418</u>
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Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Travel.....	1,079	399	1,396	1,460	1,317
B. Meetings and Technical Seminars.....	22	8	24	11	17
C. Administrative Travel.....	<u>946</u>	<u>241</u>	<u>1,010</u>	<u>909</u>	<u>1,084</u>
Total, Travel.....	<u>2,047</u>	<u>648</u>	<u>2,430</u>	<u>2,380</u>	<u>2,418</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
(Thousands of Dollars)					
A. <u>Program Travel</u>	<u>1,079</u>	<u>399</u>	<u>1,396</u>	<u>1,460</u>	<u>1,317</u>

Program travel is directly related to accomplishment of the KSC mission. It is the largest part of the travel function and accounts for 60% of travel for 1978.

Travel for program purposes reflects the continuing growth in Space Shuttle activities at the Center as outlined below.

The design and manufacturing of Shuttle ground system equipment, design and construction of Shuttle facilities, and the activation of subsystems manufactured at off-site locations requires travel to many locations throughout the United States.

Prior to the activation and acceptance of new systems and subsystems, extensive direct support is required. The number and the complexity of these systems are contributing significantly to the amount of travel required.

The increasing availability of Shuttle prototype hardware at other locations and the complexity of this hardware require travel for evaluation and coordination.

The Center's responsibilities associated with the initial acceptance testing of Shuttle flight hardware and contractor supplied equipment, and the development testing of flight hardware manufactured at off-site locations, will require extensive travel during the development period.

The increase from the 1977 budget estimate to the current estimate is the impact of increased per diem rates offset by decreased requirements for extended TDY. The reduction from 1977 to 1978 reflects the completion of the Shuttle Approach and Landing Test at the Dryden Flight Research Center.

B. <u>Meetings and Seminars Travel</u>	<u>22</u>	<u>8</u>	<u>24</u>	<u>11</u>	<u>17</u>
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Travel to meetings and technical seminars permits employees to participate in meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to technological advances outside KSC, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the meetings are working panels convened to solve certain problems for the benefit of the Government. The decrease in 1977 from the budget estimates is to provide for higher priority program travel.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget</u> Estimate	<u>Current</u> Estimate	
(Thousands of Dollars)					
C. <u>Administrative Travel</u>	<u>946</u>	<u>241</u>	<u>1,010</u>	<u>909</u>	<u>1,084</u>

Administrative travel is 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 and travel of the Center's top management to NASA Headquarters, other NASA Centers, and contractor plants. This category also includes motor pool transportation services provided by GSA. The decrease from the 1977 budget estimate to the current estimate provides funds for higher priority program travel. The increase in 1978 is related to the increase in GSA rates.

FACILITIES SERVICES

III. <u>FACILITIES SERVICES</u>	<u>23,385</u>	<u>6,198</u>	<u>25,264</u>	<u>25,093</u>	<u>26,447</u>
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Basis of Fund Requirements

Summary of Facilities Services

A. <u>Rental of Real Property</u>	<u>10</u>	<u>---</u>	<u>18</u>	<u>3</u>	<u>2</u>
B. <u>Maintenance and Related Services</u>					
1. Maintenance, repair and alterations of buildings and grounds.....	7,909	1,852	8,604	8,164	8,622
2. Custodial services.....	7,524	2,359	7,891	8,305	8,794
3. Maintenance of equipment.....	<u>790</u>	<u>217</u>	<u>753</u>	<u>844</u>	<u>910</u>
Subtotal.....	<u>16,223</u>	<u>4,428</u>	<u>17,248</u>	<u>17,313</u>	<u>18,326</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
<u>C. Operation of Facilities</u>					
1. Utilities.....	6,108	1,468	5,736	6,604	6,946
2. Supplies and equipment.....	<u>1,044</u>	<u>302</u>	<u>2,262</u>	<u>1,173</u>	<u>1,173</u>
Subtotal.....	<u>7,152</u>	<u>1,770</u>	<u>7,998</u>	<u>7,777</u>	<u>8,119</u>
Total, Facilities Services.....	<u>23,385</u>	<u>6,198</u>	<u>25,264</u>	<u>25,093</u>	<u>26,447</u>
A. <u>Rental of Real Property</u>	<u>10</u>	<u>---</u>	<u>18</u>	<u>3</u>	<u>2</u>

KSC provides temporary offsite news and guest centers for launch activity. The decrease from the 1977 budget estimate reflects a reduced usage of the facilities. It is anticipated that news centers will not be required in 1977 and 1978.

B. <u>Maintenance and Related Services</u>	<u>16,223</u>	<u>4,428</u>	<u>17,248</u>	<u>17,313</u>	<u>18,326</u>
1. Maintenance of buildings and grounds.....	7,909	1,852	8,604	8,164	8,622

This category covers the cost of operating and maintaining the institutional facilities on Kennedy Space Center and NASA facilities on the Air Force Eastern Test Range, Cape Canaveral Air Force Station, Florida, and Vandenberg Air Force Base, California. The dry land area exceeds 130 square miles. The size and the wide geographical distribution of facilities within KSC generate extremely heavy demand for facility services. Three hundred thirteen (313) structural facilities contain 4.7 million square feet of space and require 26,000 tons of air conditioning; 19 heating plants, 212 linear miles of electrical lines and 207 unit substations; 24,000 linear feet of sewer lines, 26 sewage treatment plants, and 24 sewage lift stations; 18 elevators; 4 water storage tanks with a total capacity of 2.5 million gallons; and 231,000 linear feet of water lines. The roadway system includes 225 miles of highways and roads and 3 bridges (2 over the Intra-coastal Waterway). The Center is also responsible for 18 miles of navigable canals and channels and 87 square miles of submerged lands.

For economy reasons, KSC provides common base support to contractor employees as well as civil service employees. Costs are significantly affected by the on-site contractor population which is about two times larger than the civil service population.

Operation and maintenance services are provided by a support contractor for about 90% of this category, and the balance is minor contracts for one-time services beyond the capability of the contractor. The decrease from the 1977 budget reflects the minimum obligation required in 1977 in order to provide for mandatory cost increases in other areas. Manpower is level for 1978, with the increase being primarily negotiated support contractor wage rate increases.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978
			<u>Budget Estimate</u>	<u>Current Estimate</u>	<u>Budget Estimate</u>
(Thousands of Dollars)					
2. Custodial services.....	7,524	2,359	7,891	8,305	8,794

Services in this category include security at KSC and Cape Canaveral Air Force Station, fire protection at KSC, janitorial services for KSC and NASA facilities at CCAFS and WTR, and minor contracts for refuse handling and laundry services. Security and fire protection services are provided by support contractors, with staffing required to meet security and safety standards in all areas, both institutional and operational. Janitorial services, also provided by a support contractor, are based on the 4.7 million square feet serviced. The increase from the 1977 budget is due to mandatory support contract wage increases and higher cost for Eastern Test Range services partially offset by a 4-manyear reduction. The increase in 1978 is due to negotiated support contract wage rate increases.

3. Maintenance of equipment.....	790	217	753	844	910
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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 a wide variety of office equipment utilized by civil service and contractor personnel are also included. The increase from the 1977 budget to the current estimate results from mandatory increases experienced in the maintenance contract. The 1978 increase is due to negotiated support contractor wage rate increases.

C. <u>Operation of Facilities</u>	<u>7,152</u>	<u>1,770</u>	<u>7,998</u>	<u>7,777</u>	<u>8,119</u>
1. Utilities.....	6,108	1,468	5,736	6,604	6,946

Funding requirements in this category cover the cost of electricity, water, heat/steam, heating fuel oil, and other utilities at KSC and Vandenberg, including locally generated electricity at Cape Canaveral Air Force Station. The increase from the 1977 budget estimate is the result of realigning the cost for heating fuel oil from the supplies and equipment function to this function, and electricity rate increases. The increase in 1978 is primarily due to electricity rate increases.

The 1977 current estimate and the 1978 estimate reflect a leveling in the planned usage of electrical power and heating fuel oil in order to conform with the agency plan of reducing utility consumption.

	1976	Transition	1977		1978
	Actual	Quarter	Budget	Current	Budget
		Actual	Estimate	Estimate	Estimate
		(Thousands of Dollars)			
2. Supplies and equipment.....	1,044	302	2,262	1,173	1,173

This category covers the cost of supplies, materials, and equipment used in the maintenance and operation of the facilities at KSC and Vandenberg. This includes those consumed by the support contractors in performance of their maintenance/operations responsibilities. The decrease from the 1977 budget essentially reflects the realigning of cost for heating fuel oil into the Utilities category.

TECHNICAL SERVICES

IV. <u>TECHNICAL SERVICES</u>	<u>6,565</u>	<u>2,382</u>	<u>6,231</u>	<u>6,282</u>	<u>6,897</u>
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Basis of Fund Requirements

Summary of Technical Services

A. Automatic Data Processing

1. Equipment.....	237	97	152	192	261
2. Programming and operation.....	<u>2,471</u>	<u>834</u>	<u>2,558</u>	<u>2,491</u>	<u>2,760</u>
Subtotal.....	<u>2,708</u>	<u>931</u>	<u>2,710</u>	<u>2,683</u>	<u>3,021</u>

B. Scientific and Technical Information and Educational Programs

1. Operation of NASA technical library.....	121	184	376	301	323
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	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
			(Thousands of Dollars)		
2. Educational/informational programs.....	322	27	134	153	161
3. Scientific and technical information.....	<u>3,414</u>	<u>1,240</u>	<u>3,011</u>	<u>3,145</u>	<u>3,392</u>
Subtotal.....	<u>3,857</u>	<u>1,451</u>	<u>3,521</u>	<u>3,599</u>	<u>3,876</u>
Total, Technical Services.....	<u>6,565</u>	<u>2,382</u>	<u>6,231</u>	<u>6,282</u>	<u>6,897</u>
A. <u>Automatic Data Processing</u>	<u>2,708</u>	<u>931</u>	<u>2,710</u>	<u>2,683</u>	<u>3,021</u>

This category includes the costs for the lease, purchase, maintenance, and programming and operations services of general purpose data equipment. The decrease from the 1977 budget to the current estimate results from reducing the estimate in order to provide funding for mandatory cost increases in other areas. The increase in 1978 is because of previously negotiated support contractor wage rate increases.

B. Scientific and Technical Information and Educational Programs.....

1. Operation of NASA technical libraries.....	121	184	376	301	323
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This category covers the operation of KSC's library facility by a support contractor. The KSC library contains over 31,000 books and bound journals; 168,000 technical documents; 650,000 microfiche documents; and 185,000 specifications and standards. The decrease from the FY 1977 budget reflects reduced requirements for library supplies. The increase in 1978 reflects contractor wage rate increases.

2. Educational/information program.....	322	27	134	153	161
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Funding provides 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. The increase from the 1977 budget is for support contractor wage increases, with the full year effect causing the 1978 increase.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
3. Scientific and technical information.....	3,414	1,240	3,011	3,145	3,392

Scientific and technical information services are provided to the total KSC population and include documentation, printing and reproduction, publication, photographic and translation services. This support includes the printing of test and checkout procedures, launch countdowns, microfilming, engineering drawings, telemetry data, and other related technical material. The increase from the 1977 budget to the 1977 current estimate is due to contractor wage rate increases. The increase in 1978 is due to continuing support contractor wage increases; contractor manyears are level.

ADMINISTRATIVE SUPPORT

V. <u>ADMINISTRATIVE SUPPORT</u>	<u>11,421</u>	<u>4,594</u>	<u>11,722</u>	<u>11,969</u>	<u>12,562</u>
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Basis of Fund Requirements

Summary of Administrative Support

A. <u>Communications</u>					
1. Leased lines and long distance.....	735	138	664	575	615
2. Local telephone service.....	1,165	295	1,350	1,258	1,319
3. Other communications.....	<u>163</u>	<u>39</u>	<u>94</u>	<u>166</u>	<u>177</u>
Subtotal, Communications.....	<u>2,063</u>	<u>472</u>	<u>2,108</u>	<u>1,999</u>	<u>2,111</u>
B. <u>Administrative Printing</u>	<u>208</u>	<u>41</u>	<u>220</u>	<u>246</u>	<u>238</u>
C. <u>Supplies, Materials and Equipment</u>	<u>1,312</u>	<u>450</u>	<u>1,299</u>	<u>1,339</u>	<u>1,339</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
<u>D. Transportation</u>					
1. Center operations.....	819	204	964	917	937
2. Common carrier.....	<u>178</u>	<u>32</u>	<u>134</u>	<u>137</u>	<u>151</u>
Subtotal, Transportation.....	<u>997</u>	<u>236</u>	<u>1,098</u>	<u>1,054</u>	<u>1,088</u>
<u>E. Administrative Support Services</u>					
1. Installation support services.....	5,902	3,178	6,003	6,349	6,692
2. Occupational medicine and environmental health.....	<u>939</u>	<u>217</u>	<u>994</u>	<u>982</u>	<u>1,094</u>
Subtotal, Administrative Support Services.	<u>6,841</u>	<u>3,395</u>	<u>6,997</u>	<u>7,331</u>	<u>7,786</u>
Total, Administrative Support.....	<u>11,421</u>	<u>4,594</u>	<u>11,722</u>	<u>11,969</u>	<u>12,562</u>
A. <u>Communications</u>	<u>2,063</u>	<u>472</u>	<u>2,108</u>	<u>1,999</u>	<u>2,111</u>

Funds for this category support all NASA personnel, contractor and civil service, located on the Kennedy Space Center, the Eastern Test Range and Vandenberg. It covers all communication services required to conduct official business within NASA, industry, and institutions throughout the country. The costs of local telephone service, Federal Telecommunications Systems (FTS), postage, long distance tolls, and teletype services for the total complement are in this category. The decrease from the 1977 budget reflects decreased requirements in this category. The increase in 1978 is due to increased rates.

B. <u>Administrative Printing</u>	<u>208</u>	<u>41</u>	<u>220</u>	<u>246</u>	<u>238</u>
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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 or by commercial printing firms. The increase from the 1977 budget estimate to the 1977 current estimate is required for long lead time printing services associated with KSC Shuttle activities. The 1978 estimate reflects a decrease in requirements partially offset by increased costs.

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u> <u>Actual</u>	<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	<u>Budget</u> <u>Estimate</u>
			(Thousands of Dollars)		
C. <u>Supplies, Materials and Equipment</u>	<u>1,312</u>	<u>450</u>	<u>1,299</u>	<u>1,339</u>	<u>1,339</u>

The requirements in this category cover a wide range of administrative supplies used by civil service and contractor personnel. Also included is institutional equipment, such as office equipment, transportation equipment, electronic equipment, and miscellaneous equipment. Rental of special-purpose business equipment such as specialized typewriters and printing equipment is also funded in this category. The increase from the 1977 budget estimate to the 1977 current estimate is due to price increases now in effect.

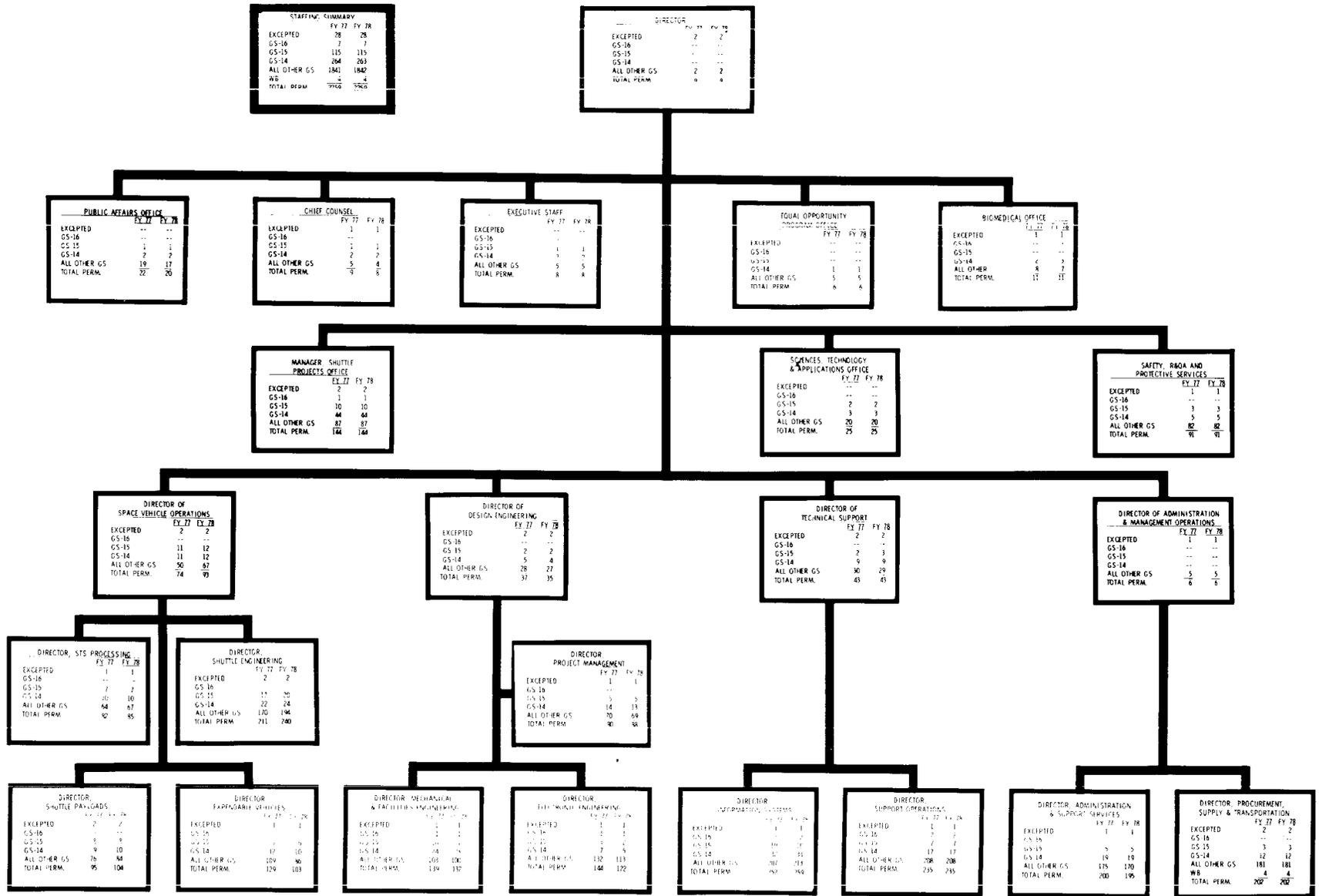
D. <u>Transportation</u>	<u>997</u>	<u>236</u>	<u>1,098</u>	<u>1,054</u>	<u>1,088</u>
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The major item in this category is the "cargo" motor pool operation provided by the General Services Administration (GSA). Funding requirements also cover the movement of supplies, materials, and equipment required by KSC and the Western Test Range by commercial carrier. The decrease from the 1977 budget estimate reflects a management decision to reduce costs in this area. The increase in 1978 is due to rising support contractor wage rates.

E. <u>Administrative Support Services</u>	<u>6,841</u>	<u>3,395</u>	<u>6,997</u>	<u>7,331</u>	<u>7,786</u>
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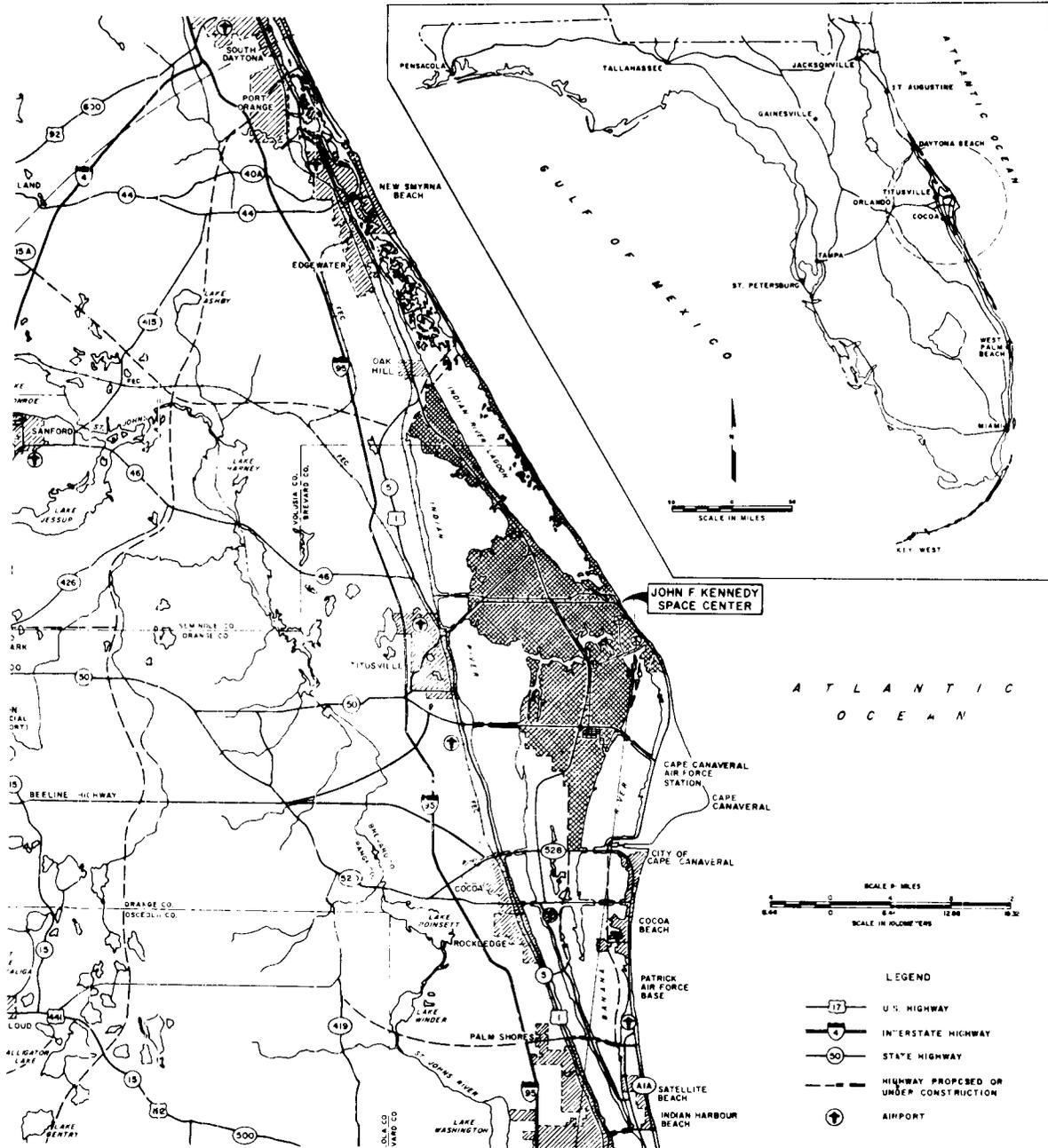
Installation support services are those support services not described elsewhere which have wide application throughout the Center, including servicing of office copying machines by commercial contractor, logistics services at KSC and NASA facilities, mail and distribution services, and installation support services at Vandenberg. Logistics services are provided by a support contractor at KSC and by the Eastern Test Range at Cape Canaveral Air Force Station. Services include receipt, storage, and issue of supplies and equipment as well as maintaining various management systems, such as repair, modification, and ordinance. Mail and distribution services are provided by a support contractor and include distribution of inter-office mail, expedite services, classified document control and operation of the KSC branch post office. Medical services are also included and provide both occupational medicine and environmental health for all civil service and contractor personnel. The increase from the 1977 budget estimate reflects mandatory support contractor wage rate increases. The increase in 1978 is due to negotiated support contractor wage rate increases.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN F. KENNEDY SPACE CENTER**



JOHN F. KENNEDY SPACE CENTER, NASA

AREA MAP

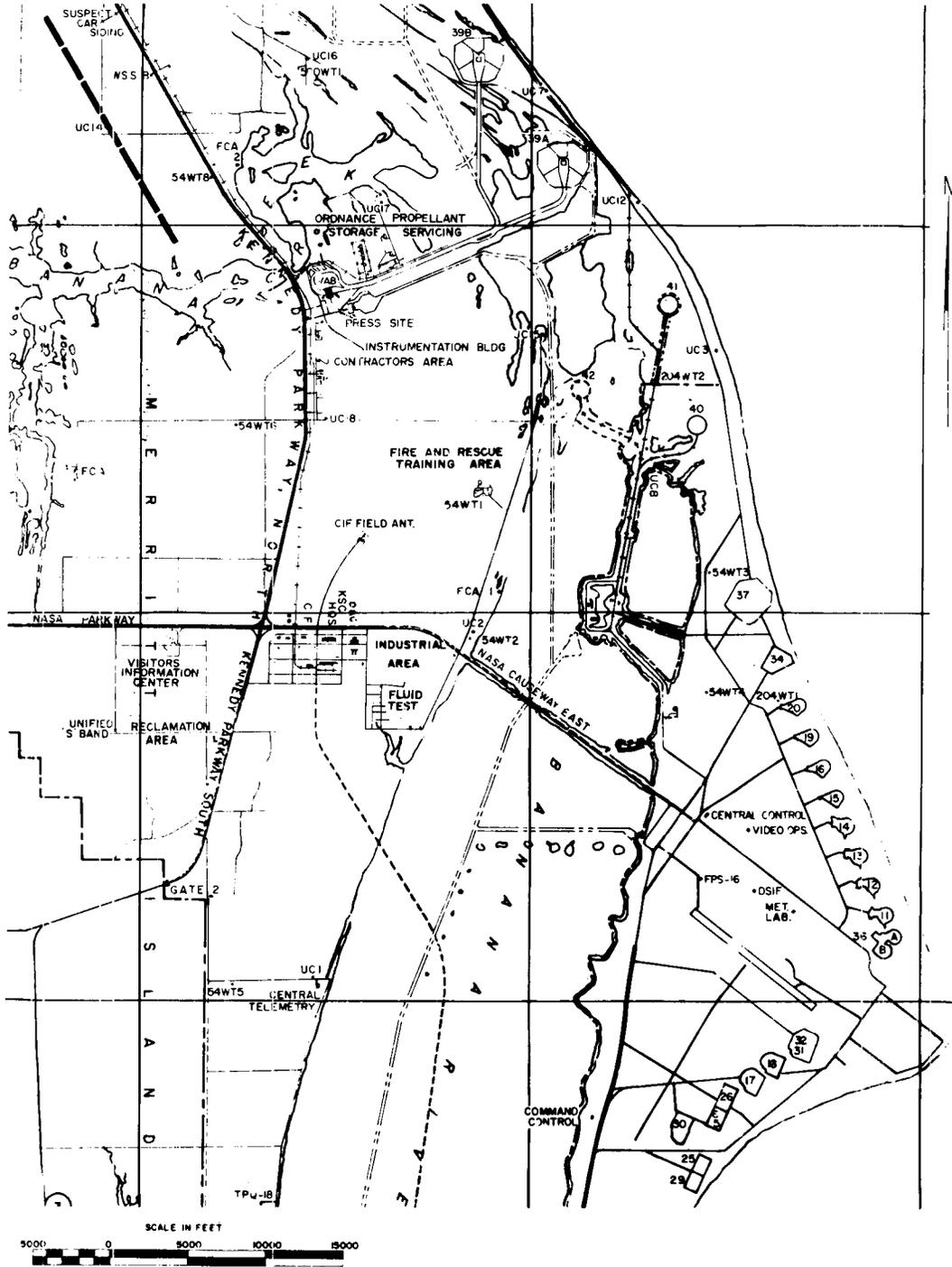


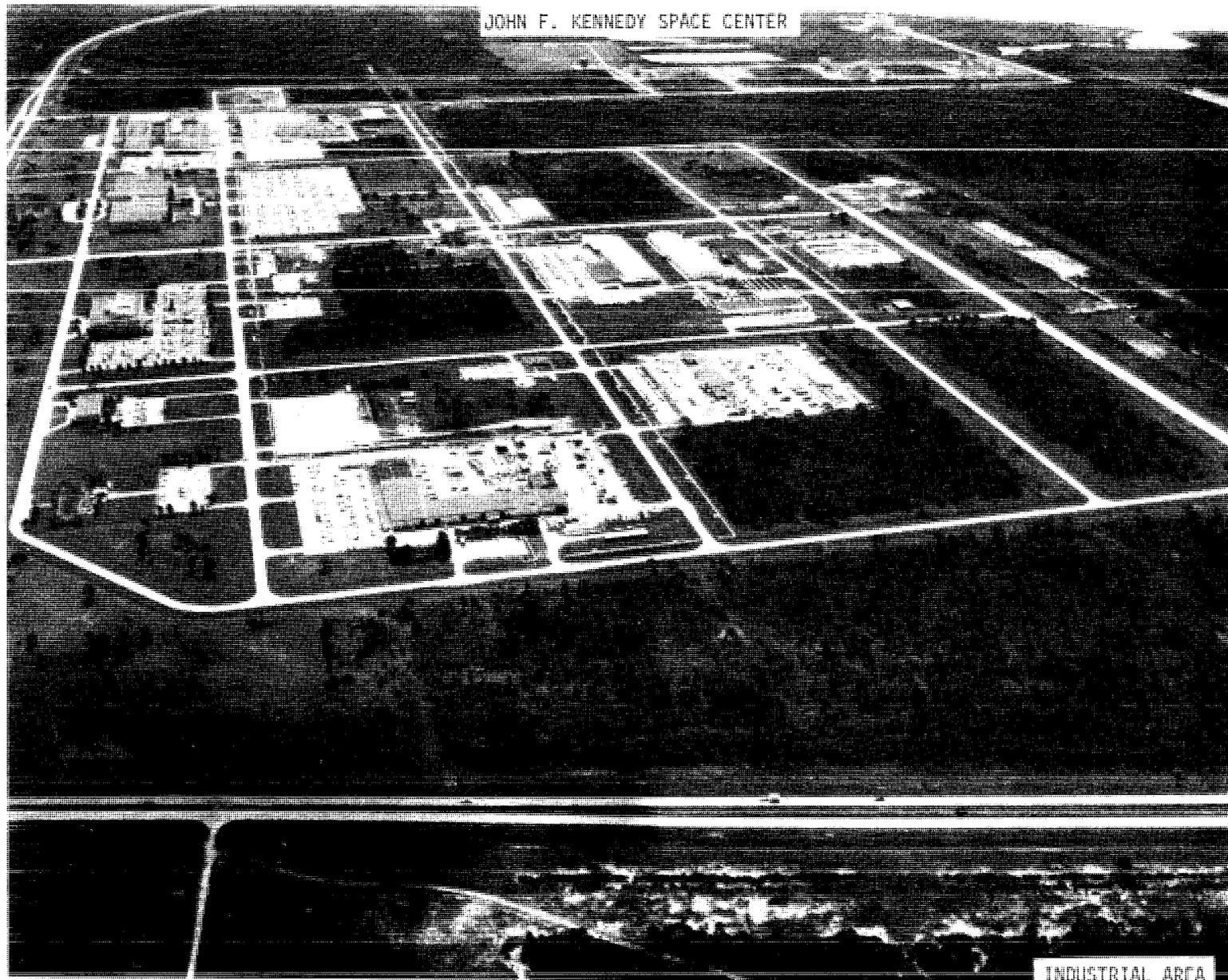
ATLANTIC OCEAN

SCALE - MILES
SCALE IN KILOMETERS

- LEGEND
- U.S. HIGHWAY
 - INTERSTATE HIGHWAY
 - STATE HIGHWAY
 - HIGHWAY PROPOSED OR UNDER CONSTRUCTION
 - AIRPORT

JOHN F. KENNEDY SPACE CENTER, NASA FISCAL YEAR 1978 ESTIMATES LOCATION PLAN





JOHN F. KENNEDY SPACE CENTER

INDUSTRIAL AREA

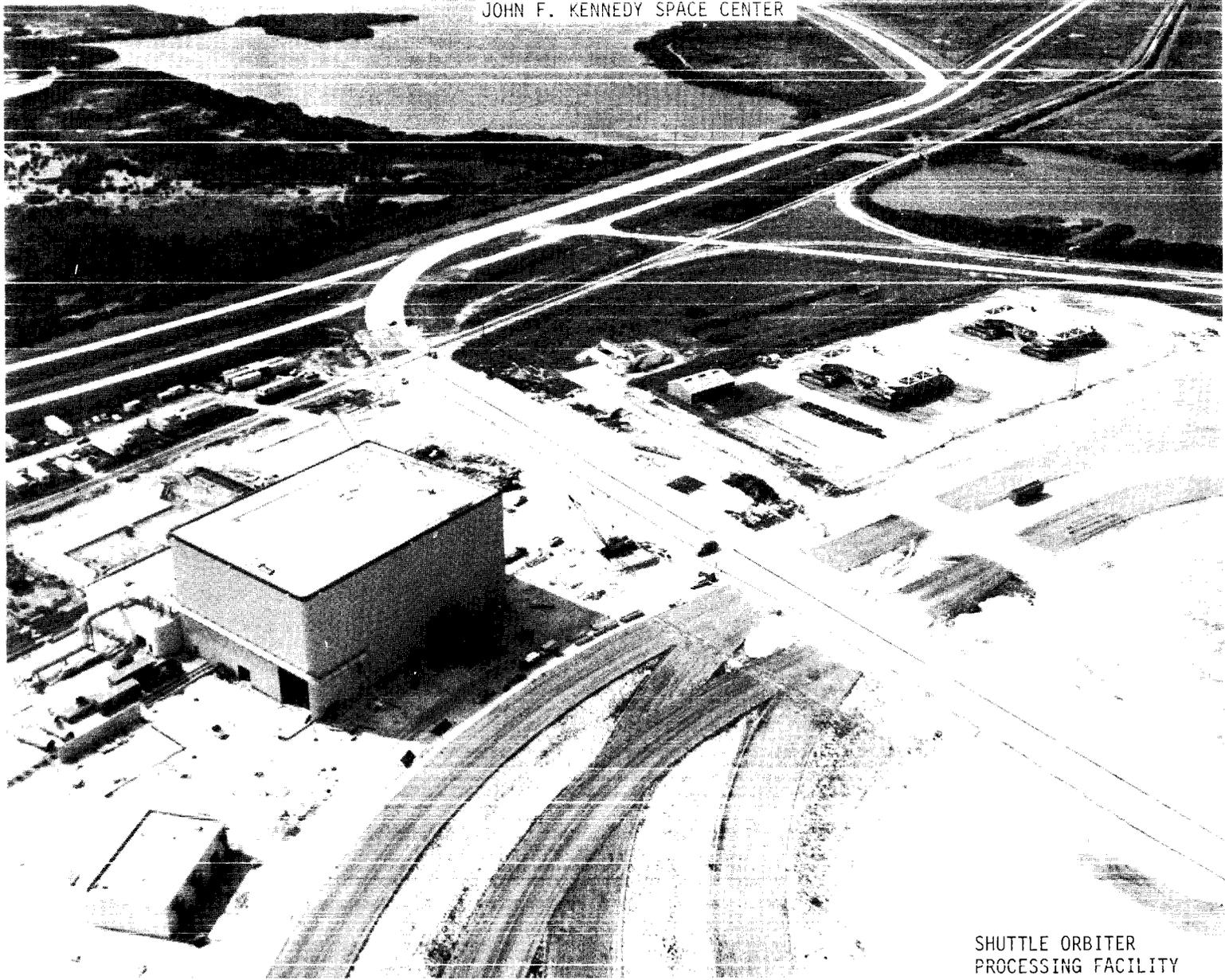
JOHN F. KENNEDY SPACE CENTER



SHUTTLE ORBITER
LANDING FACILITY

RPM 2-22

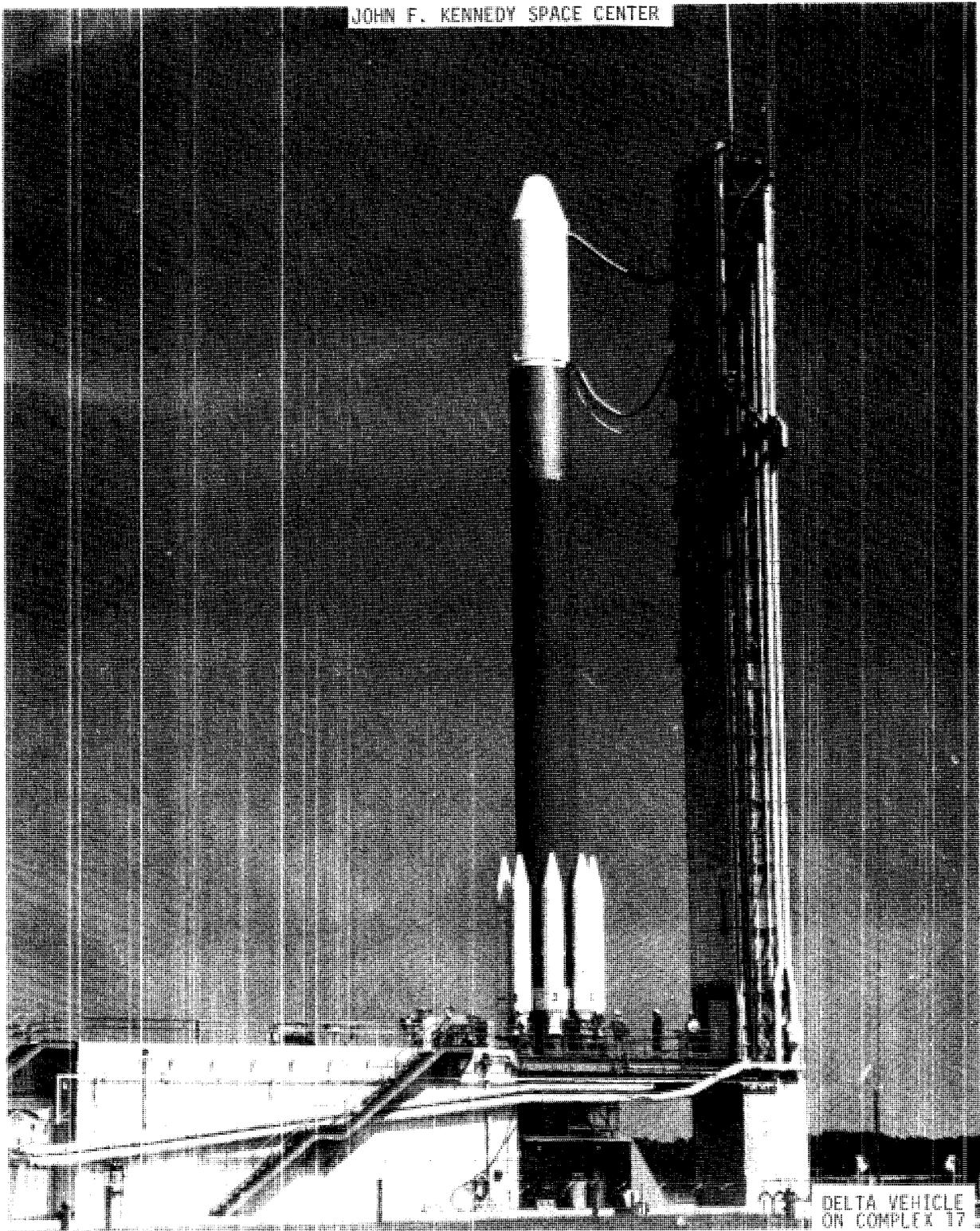
JOHN F. KENNEDY SPACE CENTER



SHUTTLE ORBITER
PROCESSING FACILITY

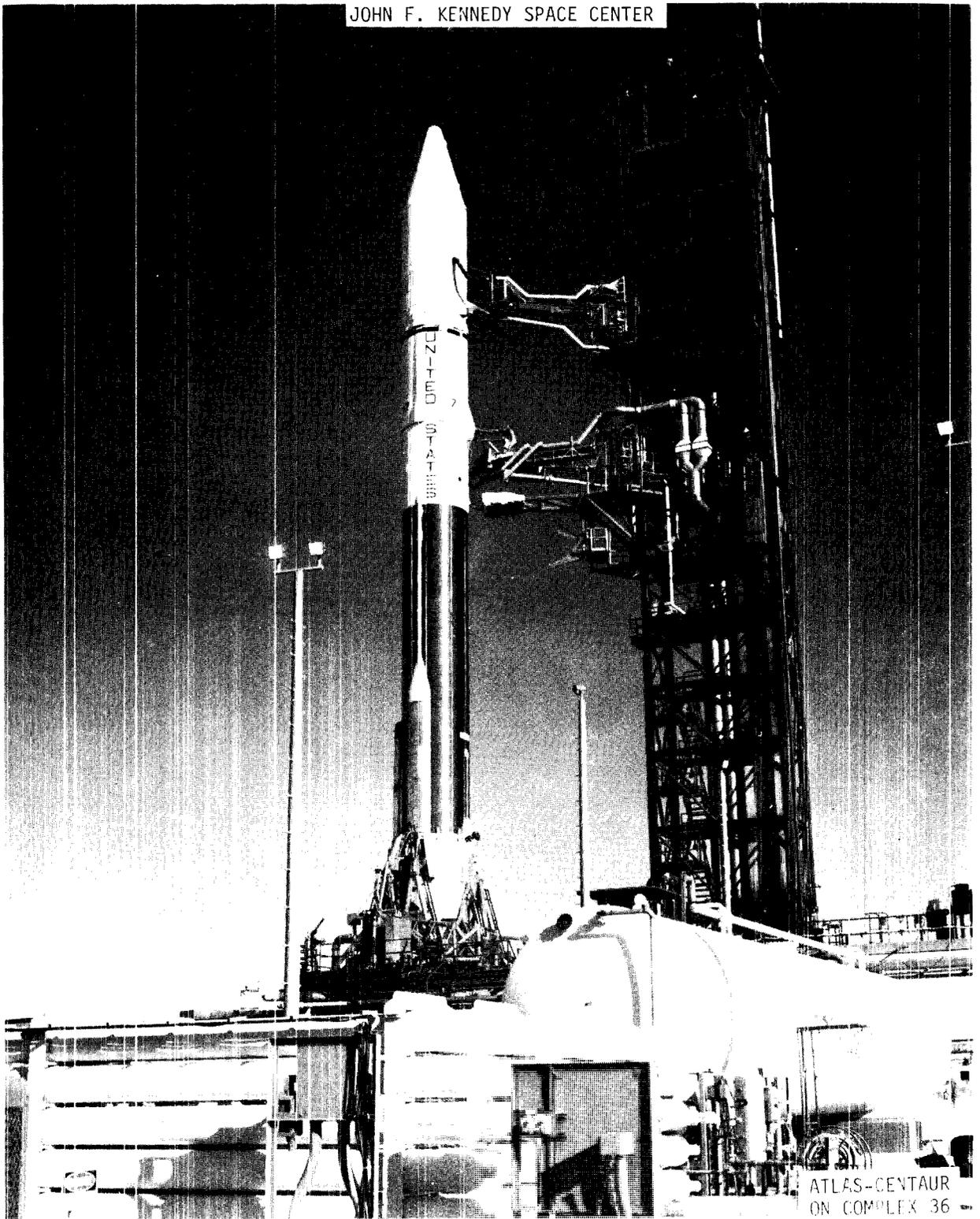
RPM 2-23

JOHN F. KENNEDY SPACE CENTER



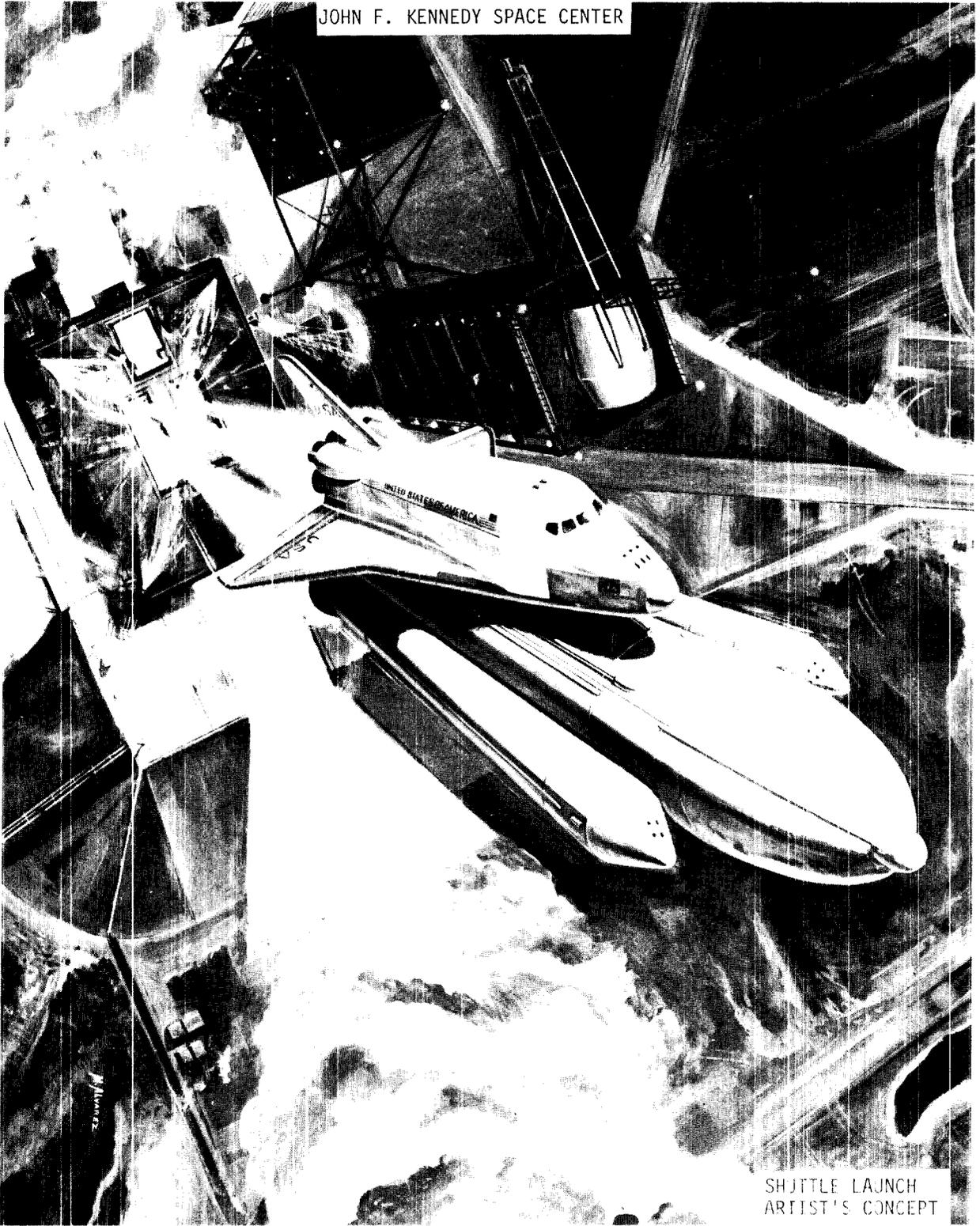
DELTA VEHICLE
ON COMPLEX 17

JOHN F. KENNEDY SPACE CENTER



ATLAS-CENTAUR
ON COMPLEX 36

JOHN F. KENNEDY SPACE CENTER



SHUTTLE LAUNCH
ARTIST'S CONCEPT

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

MARSHALL SPACE FLIGHT CENTER

DESCRIPTION

Operations of the Marshall Space Flight Center (MSFC) 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 is located on 1,840 acres under a nonrevocable use permit from the Army. Certain facilities such as the Redstone Arsenal Air Field and some utilities are used jointly by NASA and the Army. The Huntsville location has a deepwater access via the Tennessee, Ohio, and Mississippi Rivers. The capital investment as of September 30, 1976, was \$602,214,000.

The Michoud Assembly Facility (where the External Tank for the Space Shuttle is being produced) is located 15 miles east of New Orleans, Louisiana. Other MSFC activities and activities for other federal agencies are also conducted at this facility. The Michoud Facility controls 891 acres and provides 3,557,935 square feet of space, including the main assembly plant which has an area of 43 acres under one roof. The facility is located on the Gulf Intracoastal Waterway and has deepwater access via the Mississippi River. The capital investment as of September 30, 1976, was \$132,716,000.

The Slidell Computer Complex, a facility located at Slidell, Louisiana, 20 miles northeast of the Michoud Assembly Facility utilizes 14 acres and provides centralized computer services for MSFC, Michoud, National Space Technology Laboratories, other NASA Centers, and associated contractors, as well as other Government agencies as designated. The Slidell capital investment, as of September 30, 1976, was \$24,854,000.

The total capital investment of the Marshall Space Flight Center and its installations in Louisiana, including fixed assets in progress and contractor held facilities at various locations as of September 30, 1976, was \$759,784,000.

MISSION

The Marshall Space Flight Center at Huntsville, Alabama, became part of NASA in July 1960. Marshall serves as one of NASA's primary Centers for the design and development of space transportation systems, orbital systems, scientific payloads, and other systems for present and future space exploration. The Center has major responsibilities for Space Shuttle activities, the Spacelab Program, scientific projects such as the

High Energy Astronomy Observatory, the Space Telescope and Solar Heating and Cooling activities in support of the Energy Research and Development Administration. The Center has also been assigned significant tasks in the planning and defining of requirements for Space Transportation System Upper Stages, the Atmospheric Cloud Physics payload, and Space Processing Applications activities. In addition, the Center conducts supporting research and technology and various technical and scientific activities in support of other NASA programs.

In addition to on-site activities at Huntsville, MSFC manages the Michoud Assembly Facility (MAF) at New Orleans, Louisiana, and the Slidell Computer Complex at Slidell, Louisiana. Resident offices are maintained at other Centers and at, or adjacent to, industrial sites at various locations throughout the nation and in Europe for the Spacelab program.

The Center is currently involved in the direction and management of the following projects and activities:

Space Shuttle Projects:

- a. Space Shuttle Main Engine - the high performance, reusable, liquid hydrogen/liquid oxygen fueled rocket engine, for the orbiter vehicle.
- b. External Tank - the expendable propellant carrier containing the fuel required by the orbiter vehicle for lift-off and to achieve near insertion.
- c. Solid Rocket Booster - large solid propellant boosters, which fire in parallel with the main engine during lift off. These boosters are designed for retrieval, refurbishment and reuse.
- d. Testing, Integration and Analysis - performing system and static tests of the main propulsion system, conducting mated vertical ground vibration testing of the total vehicle, and structural testing of the solid rocket booster and external tank, utilizing existing facilities at MSFC and the National Space Technology Laboratories; performing systems analysis and system assessments in support of overall Shuttle projects activities.

The High Energy Astronomy Observatory, designed to obtain high quality, high resolution data on cosmic ray, gamma ray, and X-ray sources.

The Space Telescope, a 1978 new start, is a Shuttle-launched, optical telescope that provides for international scientific use and will significantly extend man's knowledge of the universe.

The Spacelab being developed by the European Space Agency which will operate with the Space Shuttle as a pressurized and habitable module, providing a versatile and reusable laboratory and observatory facility for manned and unmanned science and applications investigations and experimentation in earth orbit.

The Space Processing Applications Rocket Project, which utilizes sounding rockets to conduct near-term space processing experiments to define systems and processes for further development for Shuttle/Spacelab missions.

Spacelab Payload Mission Management on selected missions, including payload definition, integration and operations.

Integrated payload and mission planning, consisting of the development and maintenance of payload models, mission models, integrated payload interface requirement and special analyses.

Solar Heating and Cooling Activity, consisting of a significant role in the development of solar heating and cooling equipment for residential and commercial applications, management of the commercial demonstration program, and data management for the National Demonstration Program, in support of the Energy Research and Development Administration.

Materials Space Processing activities including associated ground-based research and the development and management of flight experiments.

Space Transportation System Upper Stages, which will be used to augment the Shuttle beyond the basic Shuttle transportation capability, specifically for high energy missions.

The Atmospheric Cloud Physics Laboratory (ACPL) which will be utilized to further the basic understanding of atmospheric cloud microphysical processes and phenomena, thereby contributing to improved weather predictions.

In addition to specific project assignments, MSFC provides technical support to a variety of additional activities involving studies and plans for future space missions and research and technology efforts focusing on advances in large vehicle structures, space propulsion, material science, guidance and control, electronics and information systems.

MSFC also has a continuing role in technology transfer activities, including transfer of aerospace technology to local agencies with emphasis on applications of earth resources data, and a technology utilization program to disseminate technology to the private sector.

SUMMARY OF RESOURCES REQUIREMENTS

	<u>FUNDS</u>				
	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
I. Personnel and Related Costs.....	106,665	27,337	106,273	109,788	108,187
II. Travel.....	2,206	526	1,905	2,307	2,291
III. Facilities Services.....	10,989	3,703	12,116	12,564	11,219
IV. Technical Services.....	6,659	1,893	6,876	7,153	6,755
V. Administrative Support.....	<u>6,280</u>	<u>2,250</u>	<u>5,995</u>	<u>6,745</u>	<u>6,241</u>
Total, fund requirements.....	<u>132,799</u>	<u>35,709</u>	<u>133,165</u>	<u>138,557</u>	<u>134,693</u>

Distribution of Permanent Positions by Program

	1976 Actual	Transition Quarter Actual	1977		1978
			Budget Estimate	Current Estimate	Budget Estimate
<u>Direct Positions</u>					
<u>Space Flight</u>	<u>2,546</u>	<u>2,546</u>	<u>2,456</u>	<u>2,391</u>	<u>2,314</u>
Space shuttle.....	1,529	1,529	1,538	1,518	1,403
Space flight operations.....	1,014	1,014	918	873	911
Expendable launch vehicles.....	3	3	---	---	---
<u>Space Science</u>	<u>378</u>	<u>378</u>	<u>354</u>	<u>393</u>	<u>451</u>
Physics and astronomy.....	378	378	354	393	451
Life sciences.....	---	---	---	---	---
<u>Space Applications</u>	<u>149</u>	<u>149</u>	<u>164</u>	<u>211</u>	<u>216</u>
<u>Aeronautics and Space Technology</u>	<u>74</u>	<u>74</u>	<u>236</u>	<u>68</u>	<u>74</u>
Aeronautical research and technology.....	11	11	11	13	13
Space research and technology.....	63	63	225	55	61
<u>Energy Technology Applications</u>	<u>151</u>	<u>151</u>	<u>---</u>	<u>175</u>	<u>190</u>
<u>Technology Utilization</u>	<u>12</u>	<u>12</u>	<u>12</u>	<u>12</u>	<u>12</u>
Subtotal, direct positions.....	3,310	3,310	3,222	3,250	3,257
<u>Indirect Positions</u>	<u>805</u>	<u>805</u>	<u>703</u>	<u>660</u>	<u>653</u>
Total, permanent positions.....	<u>4,115</u>	<u>4,115</u>	<u>3,925</u>	<u>3,910</u>	<u>3,910</u>

PERSONNEL AND RELATED COSTS

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
I. <u>PERSONNEL AND RELATED COSTS</u>	106,665	27,337	106,273	109,788	108,187
		<u>Basis of Fund Requirements</u>			
A. <u>Compensation and Benefits</u>					
1. <u>Compensation</u>					
a. Permanent positions.....	94,235	24,192	94,613	96,718	94,916
b. Nonpermanent.....	1,584	556	1,701	1,806	1,801
c. Reimbursable details.....	64	20	68	89	88
d. Overtime and other compensation.....	<u>600</u>	<u>142</u>	<u>636</u>	<u>580</u>	<u>567</u>
Subtotal, Compensation.....	96,483	24,910	97,018	99,193	97,372
2. <u>Benefits</u>	<u>9,765</u>	<u>2,309</u>	<u>8,832</u>	<u>10,077</u>	<u>10,297</u>
Subtotal, compensation and benefits.....	<u>106,248</u>	<u>27,219</u>	<u>105,850</u>	<u>109,270</u>	<u>107,669</u>
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	129	38	101	196	196
2. Personnel training.....	<u>288</u>	<u>80</u>	<u>322</u>	<u>322</u>	<u>322</u>
Subtotal, Supporting Costs.....	<u>417</u>	<u>118</u>	<u>423</u>	<u>518</u>	<u>518</u>
Total, Personnel and Related Costs.....	<u>106,665</u>	<u>27,337</u>	<u>106,273</u>	<u>109,788</u>	<u>108,187</u>
A. <u>Compensation and Benefits</u>	<u>106,248</u>	<u>27,219</u>	<u>105,850</u>	<u>109,270</u>	<u>107,669</u>
1. <u>Compensation</u>	<u>96,483</u>	<u>24,910</u>	<u>97,018</u>	<u>99,193</u>	<u>97,372</u>
a. Permanent positions.....	94,235	24,192	94,613	96,718	94,916

The increase from the 1977 budget estimate to the current estimate is due to the October 1976 pay raise, partially offset by increased reimbursable activity and lower civil service manpower levels. The decrease in 1978 is primarily attributable to the full year effect of the permanent personnel reduction to be accomplished by end of year 1977.

Basis of Costs for Permanent Positions

In 1978 the cost of permanent positions will be \$94,916, a decrease of \$1,802 from 1977. This decrease is calculated as follows:

Cost of permanent positions in 1977.....		96,718
Cost increases in 1978.....		+2,015
Within grade advances and career development:		
Full year effect of 1977 actions.....	+579	
Partial year effect of 1978 actions.....	+598	
Full year effect of October 1976 pay raise.....	+125	
Decrease in reimbursable activity.....	+713	
Cost decreases in 1978.....		-3,817
Turnover savings and abolished positions:		
Full year effect of 1977 actions.....	-1,973	
Partial year effect of 1978 actions.....	-1,479	
One less paid day in 1978.....	-365	_____
Cost of permanent positions in 1978.....		<u>94,916</u>

<u>1976</u>	Transition	<u>1977</u>		1978
<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
(Thousands of Dollars)				

b. Nonpermanent

1. Cost.....	\$1,584	\$556	\$1,701	\$1,806	\$1,801
2. Manyears.....	235	94	250	250	250

The increase in the 1977 current estimate over the 1977 budget is due to the October 1976 pay raise and the additional cost for reemployed annuitants as required by Public Law 94-397. The decrease between 1977 and the 1978 budget estimate is due to savings resulting from hiring at lower levels.

The 1978 plan includes 250 manyears which will be used to support the following programs at the levels shown below:

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>
College cooperative training.....	134
Summer employment.....	26
Youth opportunity.....	69
Other temporary employment.....	<u>21</u>
 Total.....	 <u>250</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
	(Thousands of Dollars)				
c. Reimbursable detailees.....	64	20	68	89	88

Reimbursable detailees are assigned to NASA from DoD to support the Center in the field of solid rocket motors and earth resources. This effort provides mutual benefits to NASA and DoD by providing NASA with special talent and by keeping DoD personnel current on space flight technology. The increase in 1977 from the budget estimate to the current estimate is due to the October 1976 pay raise. The 1978 effort is planned at essentially the same level as in 1977.

d. Overtime and other compensation.....	600	142	636	580	567
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The estimates for 1977 and 1978 are lower due to continued emphasis by Center management to maintain the overtime at the lowest level consistent with mission requirements in order to provide funding for mandatory increases in other areas.

2. <u>Benefits</u>	<u>9,765</u>	<u>2,309</u>	<u>8,832</u>	<u>10,077</u>	<u>10,297</u>
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The increase in the 1977 budget estimate to the 1977 current estimate is due to the October 1976 pay raise, increased health benefit premium rates, and the workman's compensation costs which were budgeted in Headquarters in 1977. The 1978 increase is due to increased costs of workman's compensation and health benefits, partially offset by lower retirement contributions.

The distribution of these costs by major categories is as follows:

<u>Category of Costs</u>	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter Actual</u>	<u>Budget Estimate</u>	<u>Current Estimate</u>	<u>Budget Estimate</u>
			(Thousands of Dollars)		
Contribution to the Civil Service					
Retirement Fund.....	6,660	1,509	6,701	6,783	6,666
Contribution for employee life insurance..	436	117	430	470	464
Contribution for employee health insurance	1,761	469	1,583	1,901	1,952
Contribution to FICA.....	33	9	34	34	34
Incentive awards.....	95	19	84	84	84
Severance pay.....	151	---	---	62	57
Workman's compensation.....	<u>629</u>	<u>186</u>	<u>---</u>	<u>743</u>	<u>1,040</u>
Total.....	<u>9,765</u>	<u>2,309</u>	<u>8,832</u>	<u>10,077</u>	<u>10,297</u>
B. <u>Supporting Costs</u>	<u>417</u>	<u>118</u>	<u>423</u>	<u>518</u>	<u>518</u>
1. Transfer of personnel.....	129	38	101	196	196

These funds are required to cover expenses of employees transferred by the Center and provide for certain relocation costs, such as the expenses of selling and buying a home and the movement of household goods. The increase shown for 1977 is due to cost increases in conjunction with increased relocation of personnel to meet program objectives. It is planned that expenses for this category in 1978 will remain at the 1977 level.

The personnel training costs are based on the continuation of current training programs and the need to reorient skills of employees into areas compatible with the direction of the NASA roles and missions assigned

to MSFC. A prime objective is to ensure a cadre of highly motivated trained and experienced personnel not readily available in the labor market. The 1978 requirements remain constant with that estimated for 1977.

<u>TRAVEL</u>					
	<u>1976</u>	Transition	<u>1977</u>		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
II. <u>TRAVEL</u>	<u>2,206</u>	<u>526</u>	<u>1,905</u>	<u>2,307</u>	<u>2,291</u>
<u>Basis of Fund Requirements</u>					
<u>Summary of Travel by Major Category</u>					
A. Program Travel.....	1,924	459	1,667	1,991	1,991
B. Meetings and Technical Seminars.....	32	6	30	30	30
C. Administrative Travel.....	<u>250</u>	<u>61</u>	<u>208</u>	<u>286</u>	<u>270</u>
Total, Travel.....	<u>2,206</u>	<u>526</u>	<u>1,905</u>	<u>2,307</u>	<u>2,291</u>
.					
A. <u>Program Travel</u>	<u>1,924</u>	<u>459</u>	<u>1,667</u>	<u>1,991</u>	<u>1,991</u>

Approximately 88 percent of the total MSFC travel estimate is direct program travel. Travel requirements include those for on-going programs such as the Shuttle including Space Shuttle Main Engine, External Tank and Solid Rocket Booster, Spacelab, IUS/SSUS, Space Telescope, HEAO and Spacelab Mission Management activities, and space science and applications payloads.

The Space Shuttle Program is rapidly approaching its most demanding phase, with hardware development at its peak and preparations for the ground and flight test program gaining momentum. At the same time, the STS Operations Program is engaged in user development and establishment of STS interfaces external to MSFC. All

will require close surveillance of existing contracts and contractor performance. In addition, Marshall is the only point where all three major Shuttle assemblies will be "mated" before the first launch craft is put together at Kennedy Space Center. These activities will require extensive pre-preparation effort, thus requiring extra travel.

The increase from the 1977 budget estimate to the current estimate reflects this increased program activity and increased per diem rates implemented by GSA. The 1978 estimate indicates a leveling off of program travel as well as increased use of teleconferencing.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			Budget Estimate	Current Estimate	
	(Thousands of Dollars)				
B. <u>Meetings and Seminars Travel</u>	<u>32</u>	<u>6</u>	<u>30</u>	<u>30</u>	<u>30</u>

Travel in this category is for MSFC participation in meetings and technical seminars with representatives of the aerospace community. This participation allows personnel to benefit from exposure to technological advances outside MSFC, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the meetings are working panels convened to solve problems for the benefit of the Government.

C. <u>Administrative Travel</u>	<u>250</u>	<u>61</u>	<u>208</u>	<u>286</u>	<u>270</u>
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Administrative travel is required for the direction and coordination of general management matters. It includes travel by managers in such areas as personnel, financial management and procurement activities and travel of the Center's top management to NASA Headquarters, other NASA Centers, and contractor plants. The increase from the 1977 budget estimate to the current estimate is due to higher than expected travel for procurement activities necessitated by the increase in management activities and increased per diem rates. The decrease from 1977 to 1978 reflects a planned reduction in travel for general management matters.

FACILITIES SERVICES

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Current <u>Estimate</u> <u>Estimate</u>		1978 Budget <u>Estimate</u>
	(Thousands of Dollars)				
III. <u>FACILITIES SERVICES</u>	10,989	3,703	12,116	12,564	11,219

Basis of Fund Requirements

Summary of Facilities Services

A. Maintenance and Related Services

1. Maintenance of buildings and grounds.....	1,801	1,523	2,037	2,287	1,205
2. Maintenance of equipment.....	535	203	588	680	125
3. Custodial services.....	2,253	731	2,590	2,509	2,719
Subtotal.....	<u>4,589</u>	<u>2,457</u>	<u>5,215</u>	<u>5,476</u>	<u>4,049</u>

B. Operation of Facilities

1. Utilities.....	5,693	1,062	6,170	6,345	6,447
2. Supplies and Equipment.....	707	184	731	743	723
Subtotal.....	<u>6,400</u>	<u>1,246</u>	<u>6,901</u>	<u>7,088</u>	<u>7,170</u>
Total, Facilities Services.....	<u>10,989</u>	<u>3,703</u>	<u>12,116</u>	<u>12,564</u>	<u>11,219</u>

A. <u>Maintenance and Related Services</u>	4,589	2,457	5,215	5,476	4,049
1. Maintenance of buildings and grounds.....	1,801	1,523	2,037	2,287	1,205

These services are performed by the U.S. Army Missile Command (AMC) on a reimbursable basis and by MSFC support contractor personnel. Over four million square feet of space are involved, of which approximately 6 percent are Army buildings used and maintained by MSFC. The grounds cover 1,841 acres of which 1,243 acres are improved and 598 acres are unimproved. A major portion of the maintenance of buildings and grounds is performed by the Center's support contractor who maintains a miscellaneous crafts capability composed of buildings and construction trades. The increase from the 1977 budget estimate to the 1977 current estimate reflects increased costs for skilled labor and supplies and materials.

The 1978 estimate reflects a reduction of support contractor effort. The estimate also reflects the reduction of facilities work such as painting, roofing, resurfacing and preventive maintenance. Emergency repair work is also funded from these funds.

	<u>1976 Actual</u>	<u>Transition Quarter Actual</u>	<u>1977</u>		<u>1978 Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
2. Maintenance of equipment.....	535	203	588	680	125

This subfunction provides for the cost of maintenance and repair of office and shop equipment conducted by several small contractors, and includes such items as amplifiers, adding machines, calculators, typewriters, lathes, and crimping and milling machines.

The increase from the 1977 budget to the current estimate is primarily the result of negotiated increases in wage rates of skilled technicians, and price escalation of spare parts required in the repair of this equipment.

The decrease in 1978 reflects a planned reduction in maintenance and repair activities to provide the necessary funds for higher priority activities.

3. Custodial services.....	2,253	731	2,590	2,509	2,719
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Custodial services are performed by support service contractor personnel and include janitorial services for some three million square feet of area in numerous buildings. Included are 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, including clean room attire; movement and disposal of approximately 90,000 cubic yards of refuse annually at 135 different pickup points; and fire protection service for some 2,456,000 square feet of area.

The decrease in 1977 from the budget estimate to the current estimate is due primarily to re-competition of the janitorial contract, resulting in a lower annual cost.

The 1978 estimate reflects a continued reduction in services offset by mandatory wage rate increases.

B. <u>Operation of Facilities</u>	<u>6,400</u>	<u>1,246</u>	<u>6,901</u>	<u>7,088</u>	<u>7,170</u>
1. Utilities.....	5,693	1,062	6,170	6,345	6,447

This subfunction includes the cost of utility services furnished principally by the U.S. Army Missile Comand on a reimbursable basis. Utilities include electricity, steam, water, sewage, propane gas and burner fuel. Electricity, steam and water usage is metered to the Center. Sewage cost is pro-rated based on on-post population (per capita), and propane gas and burner fuel are procured locally.

The change from the 1977 budget estimate to the current estimate is due primarily to an increase in electricity rates. The increase in 1978 is due to rate increases for electricity, steam, water and sewage service, offset by reduced consumption.

The 1977 current estimate and the 1978 estimate reflect a reduction in the planned usage of electrical power and fuel oil in order to conform with the agency plan of reducing utility consumption.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
	(Thousands of Dollars)				
2. Supplies and equipment.....	707	184	731	743	723

This subfunction includes building materials (chemical, electrical, maintenance, hardware); instrumentation; metals, pipes, valves and fittings plus mechanical equipment; and shop machinery. These items are necessary to support the maintenance and repair of all MSFC facilities.

The 1977 amount reflects a reduction in the requirement for supplies and equipment offset by increased prices. The 1978 amount reflects a further reduction in supplies and equipment partially offset by price escalation.

TECHNICAL SERVICES

IV. <u>TECHNICAL SERVICES</u>	<u>6,659</u>	<u>1,893</u>	<u>6,876</u>	<u>7,153</u>	<u>6,755</u>
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Basis of Fund Requirements

Summary of Technical Services

A. Automatic Data Processing

1. Equipment.....	598	240	526	653	770
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	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
			(Thousands of Dollars)		
2. Programming and operations.....	<u>3,849</u>	<u>982</u>	<u>4,039</u>	<u>4,011</u>	<u>3,474</u>
Subtotal.....	<u>4,447</u>	<u>1,222</u>	<u>4,565</u>	<u>4,664</u>	<u>4,244</u>
B. <u>Engineering Services</u>	<u>130</u>	<u>133</u>	<u>281</u>	<u>408</u>	<u>163</u>
C. <u>Scientific and Technical Information and Educational Programs</u>					
1. Operation of Redstone Scientific and Information Center.....	833	214	875	778	817
2. Educational/informational programs.....	123	33	100	123	130
3. Scientific and technical information.....	<u>1,126</u>	<u>291</u>	<u>1,055</u>	<u>1,180</u>	<u>1,401</u>
Subtotal.....	<u>2,082</u>	<u>538</u>	<u>2,030</u>	<u>2,081</u>	<u>2,348</u>
Total, Technical Services.....	<u>6,659</u>	<u>1,893</u>	<u>6,876</u>	<u>7,153</u>	<u>6,755</u>
A. <u>Automatic Data Processing</u>	<u>4,447</u>	<u>1,222</u>	<u>4,565</u>	<u>4,664</u>	<u>4,244</u>

This subfunction includes the cost of the support service contract for ADP operations, programming, and systems design. It also includes the cost of lease, maintenance and repair of ADP equipment. The increase in automatic data processing from the 1977 budget to current estimate reflects the increased costs of maintenance of ADP equipment.

The 1978 amount reflects a reduction of ADP effort partially offset by wage increases, increased cost of maintenance, and increased rental of peripheral ADP equipment.

B. <u>Engineering Services</u>	<u>130</u>	<u>133</u>	<u>281</u>	<u>408</u>	<u>163</u>
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This subfunction provides for engineering design service, master planning and Operating Systems Recertification.

The increase from the 1977 budget to the current estimate is due to the on-going Operating Systems Recertification being expanded.

In 1978 the reduced level reflects a phase-down of effort in the Operating Systems Recertification. A reduction of effort in engineering design also results from reduced maintenance and repair of facilities.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	<u>Budget</u> <u>Estimate</u>
(Thousands of Dollars)					
C. <u>Scientific and Technical Information and</u>					
<u>Educational Programs</u>	<u>2,082</u>	<u>538</u>	<u>2,030</u>	<u>2,081</u>	<u>2,348</u>
1. Operation of Redstone Scientific and Information Center.....	833	214	875	778	817

This subfunction covers the cost of the Center's share of the operation of the Redstone Scientific Information Center (RSIC), operated by the U.S. Army Missile Command, on a reimbursable basis and includes 198,000 books and journals, 2,800 periodicals and 400,000 technical papers. It also maintains over 1,000,000 documents on microfilm.

The current estimate for 1977 is lower than the 1977 budget as a result of a reduction in the support contractor effort. The slight increase in 1978 represents an increase in library supplies including increased subscription rates.

2. Educational/Information Programs.....	123	33	100	123	130
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The increase from the 1977 budget to the 1977 current estimate reflects unanticipated support contractor wage rate increases and increased costs of supplies. 1978 is estimated slightly higher than 1977 to cover the procurement of supplies for the Visitor Information Center.

3. Scientific and Technical Information.....	1,126	291	1,055	1,180	1,401
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This subfunction includes graphics, models work, chart, and related art work, and photo materials for Scientific and Technical Information Programs. The increase from the 1977 budget estimate to the 1977 current estimate is due to unanticipated increases in support contractor wages. The increase in 1978 represents an increase in the graphic and models support due to higher program requirements and higher costs of labor, supplies and materials.

ADMINISTRATIVE SUPPORT

	<u>1976</u> <u>Actual</u>	<u>Transition</u> <u>Quarter</u> <u>Actual</u>	<u>1977</u>		<u>1978</u> <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
			(Thousands of Dollars)		
V. <u>ADMINISTRATIVE SUPPORT</u>	<u>6,280</u>	<u>2,250</u>	<u>5,995</u>	<u>6,745</u>	<u>6,241</u>

Basis of Fund Requirements

Summary of Administrative Support

A. Communications

1. Leased lines and long distance tolls....	715	149	624	576	604
2. Local telephone service.....	696	220	862	704	696
3. Other communications.....	<u>450</u>	<u>111</u>	<u>91</u>	<u>494</u>	<u>516</u>
Subtotal.....	<u>1,861</u>	<u>480</u>	<u>1,577</u>	<u>1,774</u>	<u>1,816</u>

B. <u>Administrative Printing</u>	299	80	352	315	321
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C. <u>Supplies, Materials and Equipment</u>	1,535	877	1,311	1,236	910
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D. Transportation

1. Center operations.....	1,185	364	1,138	1,664	1,483
2. Common carrier.....	<u>61</u>	<u>16</u>	<u>65</u>	<u>78</u>	<u>83</u>
Subtotal.....	<u>1,246</u>	<u>380</u>	<u>1,203</u>	<u>1,742</u>	<u>1,566</u>

E. Administrative Support Services.....

1. Installation support services.....	879	317	1,041	1,129	1,001
2. Occupational medicine and environmental health.....	<u>460</u>	<u>116</u>	<u>511</u>	<u>549</u>	<u>627</u>
Subtotal.....	<u>1,339</u>	<u>433</u>	<u>1,552</u>	<u>1,678</u>	<u>1,628</u>

Total, Administrative Support.....	<u>6,280</u>	<u>2,250</u>	<u>5,995</u>	<u>6,745</u>	<u>6,241</u>
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	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u> <u>Actual</u>	<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	<u>Budget</u> <u>Estimate</u>
			(Thousands of Dollars)		
A. <u>Communications</u>	<u>1,861</u>	<u>480</u>	<u>1,577</u>	<u>1,774</u>	<u>1,816</u>

This subfunction provides for leased lines and long distance tolls, local phone and exchange services, message services, minor communication projects and radio services. It also includes the Headquarters distribution of postage costs to the benefiting Centers not previously included in Center estimates.

The increase from the 1977 budget to the current estimate is due to the allocation of postage costs, which were previously budgeted in Headquarters, to benefiting centers partially offset by a reduction in local phone services and FTS rates. The 1978 estimate reflects a further reduction of service offset by mandatory rate increases.

B. <u>Administrative Printing</u>	<u>299</u>	<u>80</u>	<u>352</u>	<u>315</u>	<u>321</u>
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This subfunction provides for administrative printing and reproduction of instructions, directives, budgetary and programmatic data, requests for quotations, procurement and contracting documents, public affairs material, etc. This service is obtained through Government printing facilities as well as commercial sources.

The decrease from the 1977 budget estimate to the current estimate is based on projected reduction in out-of-house printing requirements.

The requirements in 1978 are planned at a reduced rate, offset by mandatory price increases.

C. <u>Supplies, Materials and Equipment</u>	<u>1,535</u>	<u>877</u>	<u>1,311</u>	<u>1,236</u>	<u>910</u>
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This subfunction provides for such items of administrative supplies as fuels and lubricants, miscellaneous aircraft and vehicle supplies, office supplies, furniture, and general purpose equipment such as photographic, safety, electrical, office equipment, motor vehicle and transportation equipment.

The reduction from the 1977 budget estimate to the current estimate is due to a reduction in the inventory partially offset by the price escalation of office supplies.

The reduction in 1978 is due to consumption reductions in all items included in this subfunction.

	1976	Transition	1977		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
D. <u>Transportation</u>	<u>1,246</u>	<u>380</u>	<u>1,203</u>	<u>1,742</u>	<u>1,566</u>

This subfunction encompasses the maintenance and operation of vehicles, aircraft operation, and services, transportation of things, and maintenance and repair of mobile equipment.

The increase from the 1977 budget to the current estimate is due primarily to increased costs resulting from the recompetition/renegotiation of the support contracts, which include motor vehicle and aircraft operations and maintenance.

The decrease in 1978 is due to reduced levels in operation and maintenance of the vehicles and aircraft.

E. <u>Administrative Support Services</u>	<u>1,339</u>	<u>433</u>	<u>1,552</u>	<u>1,678</u>	<u>1,628</u>
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The major services in this function provide general installation support. Included is operation and rental of photocopying equipment, occupational and industrial health, patent counsel and tort claims and miscellaneous services, and maintenance and repair of photo and reproduction equipment.

The increase from the 1977 budget to the current estimate is due to increased requirements for office equipment repair and chemical disposal. The decrease in FY 1978 is due to a lower level of effort, offset by negotiated support contractor wage increases.

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

MSFC SUMMARY		
	FY-77	FY-78
EXCEPTED	49	49
GS-16	12	12
GS-15	221	220
GS-14	586	584
ALL OTHER GS	3028	3031
WAGE BOARD	14	14
TOTAL PERMANENT	3910	3910

OFFICE OF DIRECTOR		
	FY-77	FY-78
EXCEPTED	3	3
GS-16	0	0
GS-15	0	0
GS-14	2	2
ALL OTHER GS	7	7
WAGE BOARD	0	0
TOTAL PERMANENT	12	12

ASSOCIATE DIRECTOR FOR SCIENCE		
	FY-77	FY-78
EXCEPTED	1	1
GS-16	0	0
GS-15	1	1
GS-14	0	0
ALL OTHER GS	2	2
WAGE BOARD	0	0
TOTAL PERMANENT	4	4

SAFETY & MANNED FLIGHT AWARENESS OFFICE		
	FY-77	FY-78
EXCEPTED	0	0
GS-16	0	0
GS-15	2	2
GS-14	3	3
ALL OTHER GS	15	15
WAGE BOARD	0	0
TOTAL PERMANENT	20	20

PUBLIC AFFAIRS OFFICE		
	FY-77	FY-78
EXCEPTED	0	0
GS-16	0	0
GS-15	0	0
GS-14	1	1
ALL OTHER GS	18	18
WAGE BOARD	0	0
TOTAL PERMANENT	19	19

CHIEF COUNSEL		
	FY-77	FY-78
EXCEPTED	1	1
GS-16	0	0
GS-15	2	2
GS-14	4	4
ALL OTHER GS	10	10
WAGE BOARD	0	0
TOTAL PERMANENT	17	17

CENTER PLANS AND RESOURCES CONTROL OFFICE		
	FY-77	FY-78
EXCEPTED	0	0
GS-16	0	0
GS-15	3	3
GS-14	8	8
ALL OTHER GS	33	33
WAGE BOARD	0	0
TOTAL PERMANENT	44	44

EQUAL OPPORTUNITY OFFICE		
	FY-77	FY-78
EXCEPTED	0	0
GS-16	0	0
GS-15	1	1
GS-14	1	1
ALL OTHER GS	7	7
WAGE BOARD	0	0
TOTAL PERMANENT	9	9

SHUTTLE PROJECTS OFFICE		
	FY-77	FY-78
EXCEPTED	5	5
GS-16	1	1
GS-15	21	21
GS-14	49	49
ALL OTHER GS	142	142
WAGE BOARD	0	0
TOTAL PERMANENT	218	218

MICHOU D ASSEMBLY FACILITY		
	FY-77	FY-78
EXCEPTED	0	0
GS-16	0	0
GS-15	3	3
GS-14	3	3
ALL OTHER GS	21	21
WAGE BOARD	0	0
TOTAL PERMANENT	27	27

SPECIAL PROJECTS OFFICE		
	FY-77	FY-78
EXCEPTED	1	1
GS-16	0	0
GS-15	2	2
GS-14	14	14
ALL OTHER GS	30	30
WAGE BOARD	0	0
TOTAL PERMANENT	47	47

SPACELAB PROGRAM OFFICE		
	FY-77	FY-78
EXCEPTED	2	2
GS-16	0	0
GS-15	2	2
GS-14	12	12
ALL OTHER GS	27	27
WAGE BOARD	0	0
TOTAL PERMANENT	43	43

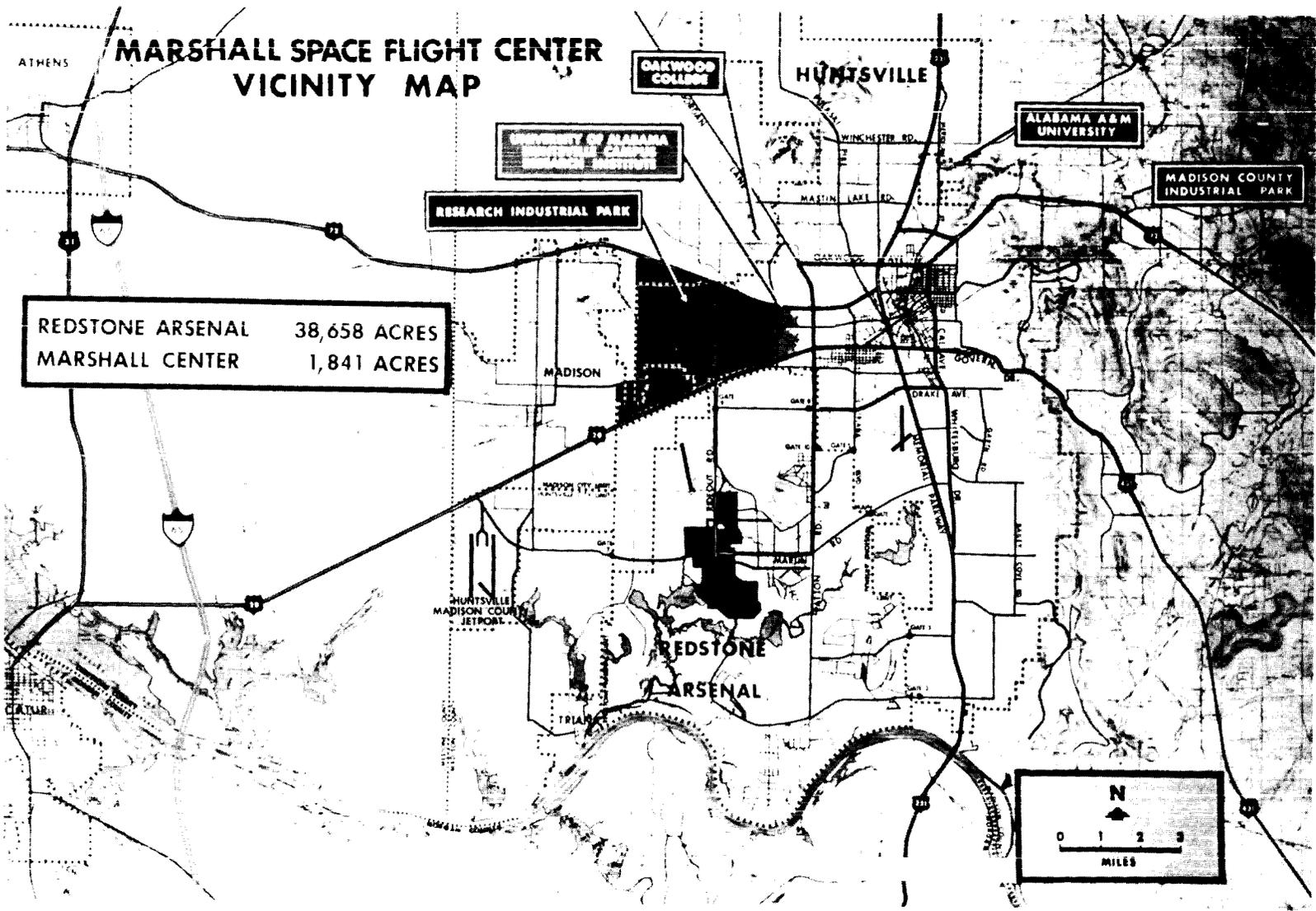
SPACELAB PAYLOAD PROJECT OFFICE		
	FY-77	FY-78
EXCEPTED	3	3
GS-16	0	0
GS-15	4	4
GS-14	17	17
ALL OTHER GS	36	36
WAGE BOARD	0	0
TOTAL PERMANENT	59	59

SPACE SCIENCE PROJECTS OFFICE		
	FY-77	FY-78
EXCEPTED	0	0
GS-16	1	1
GS-15	9	9
GS-14	17	17
ALL OTHER GS	23	23
WAGE BOARD	0	0
TOTAL PERMANENT	50	50

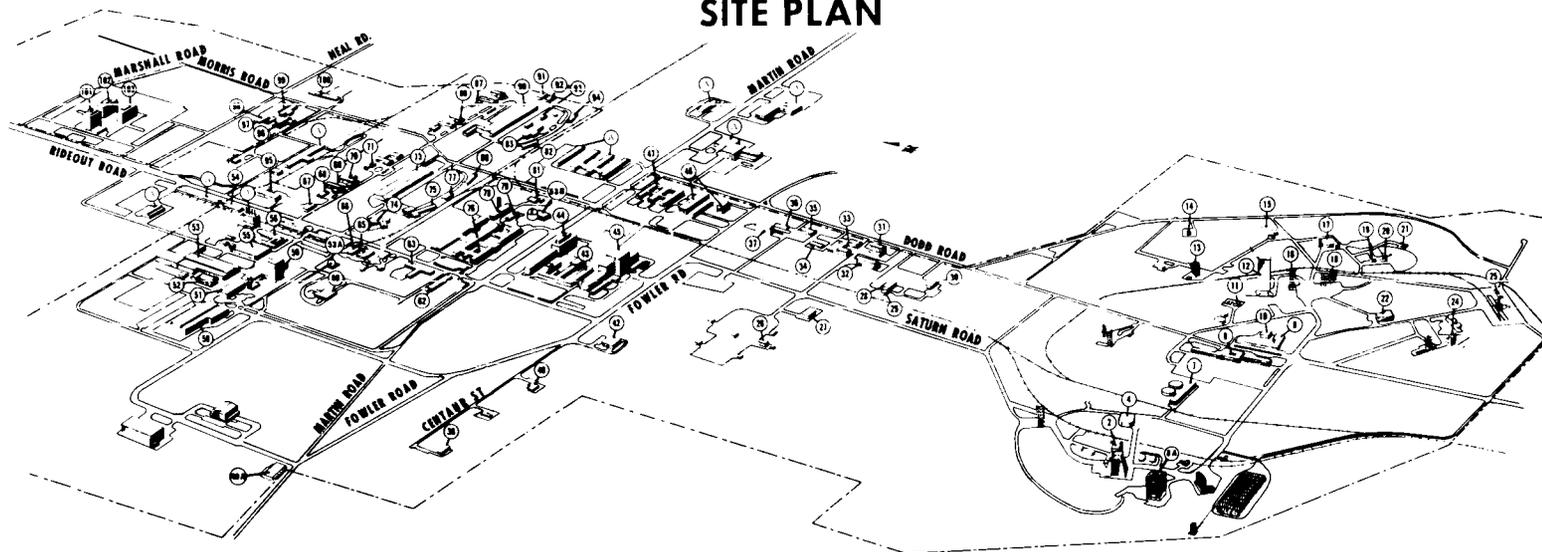
PROGRAM DEVELOPMENT		
	FY-77	FY-78
EXCEPTED	7	7
GS-16	2	2
GS-15	28	28
GS-14	57	57
ALL OTHER GS	151	151
WAGE BOARD	0	0
TOTAL PERMANENT	245	245

SCIENCE AND ENGINEERING		
	FY-77	FY-78
EXCEPTED	24	24
GS-16	8	8
GS-15	126	125
GS-14	337	336
ALL OTHER GS	1791	1794
WAGE BOARD	0	0
TOTAL PERMANENT	2286	2286

ADMINISTRATION & PROGRAM SUPPORT		
	FY-77	FY-78
EXCEPTED	2	2
GS-16	0	0
GS-15	17	17
GS-14	61	61
ALL OTHER GS	716	716
WAGE BOARD	14	14
TOTAL PERMANENT	810	810



MARSHALL SPACE FLIGHT CENTER SITE PLAN



HEADQUARTERS AREA

95	4207	COMMUNICATIONS FACILITY
96	4241	SHOP AND STORAGE BUILDING
97	S-4244	STORAGE BUILDING
98	S-4251	EQUIPMENT SHED
99	4250	OFFICE AND SHOP BUILDING
100	4249	OFFICE BUILDING
101	4200	OFFICE BUILDING
102	4202	OFFICE BUILDING
103	4201	OFFICE BUILDING

LAB AND SUPPORT AREA

38	4628	CRYOGENIC TESTING FACILITY
40	4623	LABORATORY BUILDING
42	4605	NON-DESTRUCTIVE EVALUATION LABORATORY
43	4612	MATERIALS LABORATORY
44	4610	OFFICE AND ENGINEERING BUILDING
45	4619	STRUCTURES AND MECHANICS LABORATORY
46	4650	SHOP AND CALIBRATION LABORATORY
47	4663	COMPUTER FACILITY
49A	4740	WATER POLLUTION CONTROL FACILITY
50	4708	ENGINEERING AND DEVELOPMENT LABORATORY
51	4760	SURFACE TREATMENT FACILITY
52	S-4706	NEUTRAL BUOYANCY FACILITY
53	4705	FABRICATION AND MACHINE SHOP
53A	4775	HIGH REYNOLDS FACILITY
53B	4467	CELESTIAL & OPTICAL SENSORS FACILITY

54	4723	TRAINING FACILITY
55	4711	DEVELOPMENTAL PROCESSES LABORATORY
56	4712	OFFICE BUILDING
59	4707	SHOP AND ASSEMBLY BUILDING
62	S-4747	AIR COMPRESSOR BUILDING
63	4746	CALIBRATION LABORATORY
65	4732	BISONIC WIND TUNNEL FACILITY
66	4733	IMPULSE BASE FLOW FACILITY
67	4306	OFFICE BUILDING
68	4312	OFFICE BUILDING
69	4311	SHOCK TUNNEL FACILITY
70	4313	SHOP BUILDING
71	4332	ENVIRONMENTAL TEST LABORATORY
73	4471	STORAGE AND OFFICE BUILDING
74	4485	OFFICE BUILDING
75	4491	OFFICE AND LABORATORY BUILDING
76	4487	LABORATORY AND OFFICE BUILDING
77	S-4479	STORAGE SHED
78	4476	ENVIRONMENTAL TEST FACILITY
79	S-4436	AUTOMATION CHECKOUT BUILDING
80	4492	ELECTRICAL SYSTEMS LABORATORY BUILDING
81	4475	HAZARDOUS OPERATIONS LABORATORY
82	4493	SHOP AND STORAGE BUILDING

83	4483	VEHICLE MAINTENANCE SHOP
86	4353	PHOTO LAB
87	4372	MILLIMETER WAVELENGTH BUILDING
90	4481	SPACE SCIENCES LABORATORY
91	S-4498	STORAGE BUILDING
92	S-4499	STORAGE BUILDING
93	4482	TRANSPORTATION SUPPORT BUILDING
94	4494	CENTER ACTIVITIES BUILDING

TEST AREA

WEST AREA

2	4670	PROPULSION & STRUCTURAL TEST FACILITY
4	4674	BLOCKHOUSE
7	4667	PUMP HOUSE
8	4666	OFFICE BUILDING
8A	4699	STRUCTURAL TEST FACILITY

EAST AREA

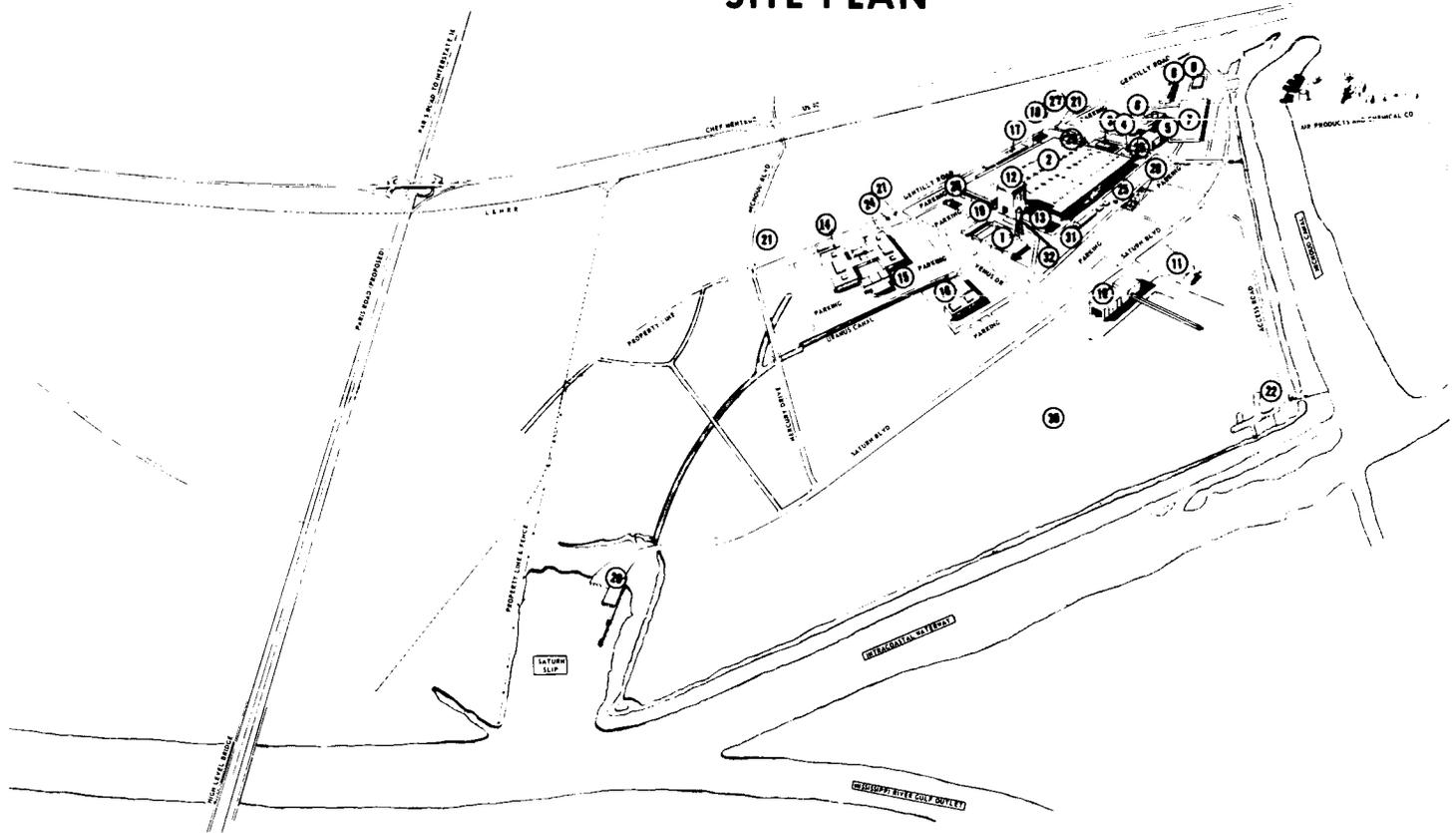
9	4566	DOCUMENTATION REPOSITORY
10	4567	PUMP AND BOILER HOUSE
11	S-4549	DEIONIZED WATER PLANT

12	4550	STRUCTURAL TEST FACILITY
13	4522	PROPULSION SYSTEMS COMPONENT TEST STAND
14	4530	PROPULSION SYSTEMS COMPONENT TEST STAND
15	4561	SHOP AND LABORATORY BUILDING
16	4557	STRUCTURAL TEST FACILITY
17	4583	TEST AND DATA RECORDING FACILITY
18	4548	PROPULSION SYSTEMS COMPONENT TEST FACILITY
19	S-4539	TEST STAND SUPPORT BUILDING
20	4540	MODEL PROPULSION SYSTEMS TEST STAND (ACOUSTIC)
21	4541	TEST STAND CONTROL BUILDING
22	4570	BLOCKHOUSE AND CABLE TUNNELS
24	4514	PROPULSION SYSTEMS TEST STAND
25	4572	PROPULSION AND STRUCTURAL TEST FACILITY

TEST SUPPORT AREA

26	4646	OFFICE BUILDING
27	4648	HIGH PRESSURE TEST FACILITY
28	S-4659	HP GN_2 FACILITY
29	S-4660	BOILER PLANT
30	S-4647	COMPRESSOR BUILDING
31	S-4655	MULTI PURPOSE HIGH BAY FACILITY
32	S-4656	HYDRAULIC EQUIPMENT DEVELOPMENT FACILITY
33	S-4653	COMPONENTS SERVICE BUILDING
34	4678	OFFICE AND STORAGE BUILDING
35	S-4654	OFFICE BUILDING
36	S-4651	SHOP BUILDING
37	4649	MULTI PURPOSE HIGH BAY FACILITY

MICHLOUD ASSEMBLY FACILITY SITE PLAN



MANUFACTURING AND ASSEMBLY

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

TEST FACILITIES

- 10 | 420 TEST & CHECKOUT FACILITY
- 11 | 404 HIGH PRESSURE TEST FACILITY

- 12 | 110 VERTICAL ASSEMBLY & HYDROSTATIC TEST
- 13 | 130 SYSTEMS ENGINEERING

ENGINEERING & ADMINISTRATION

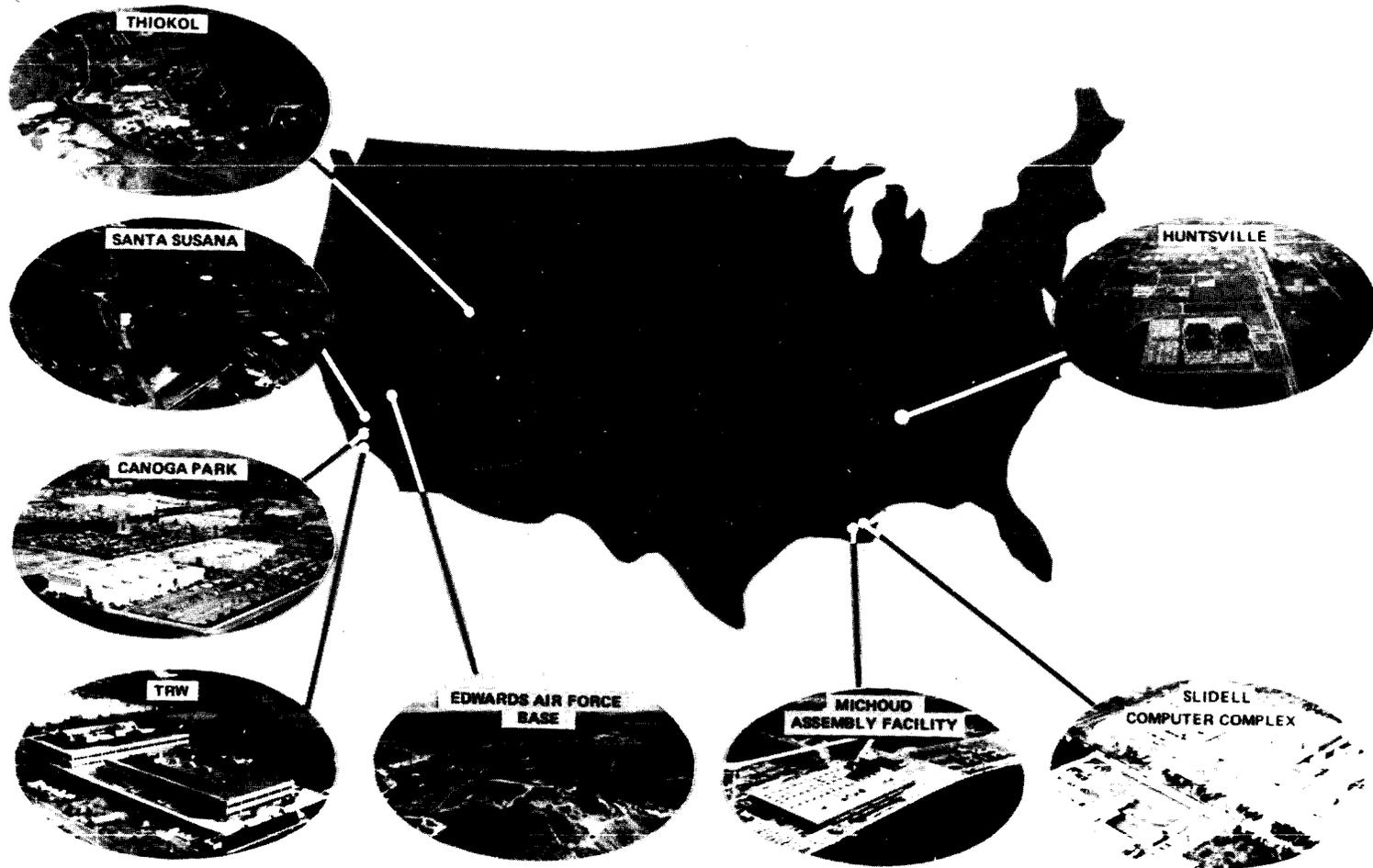
- 14 | 350 OFFICE AND ENGINEERING BUILDING
- 15 | 351 CAFETERIA
- 16 | 320 CONTRACTOR SERVICES BUILDING
- 17 | 101 ADMINISTRATION
- 18 | 102 ENGINEERING
- 19 | 301 MAINTENANCE SHOP

TRANSPORTATION, UTILITIES & MISC

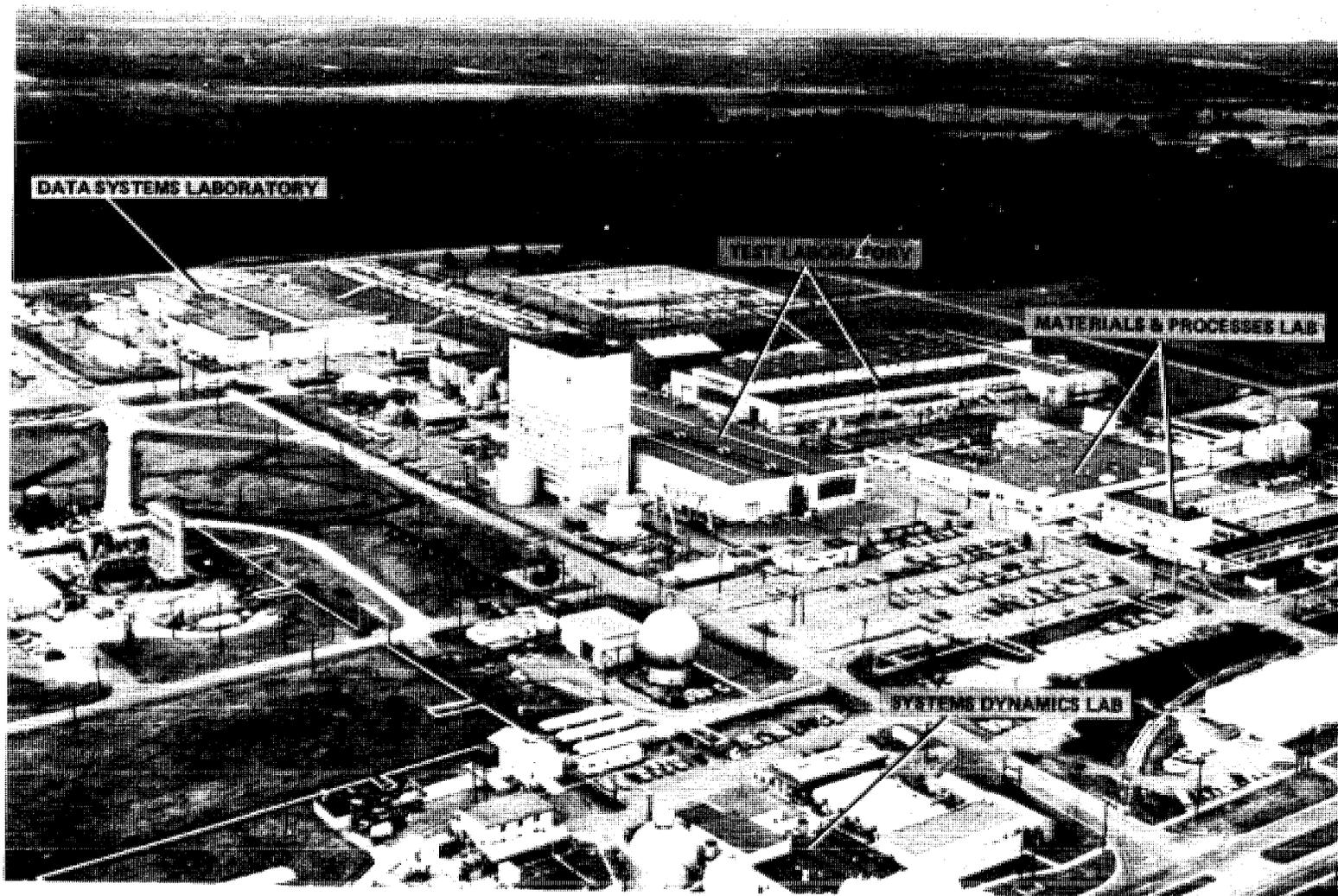
- 20 | 480 BARGE DOCK
- 21 | GUARD HOUSE
- 22 | 450 MAIN PUMP STATION

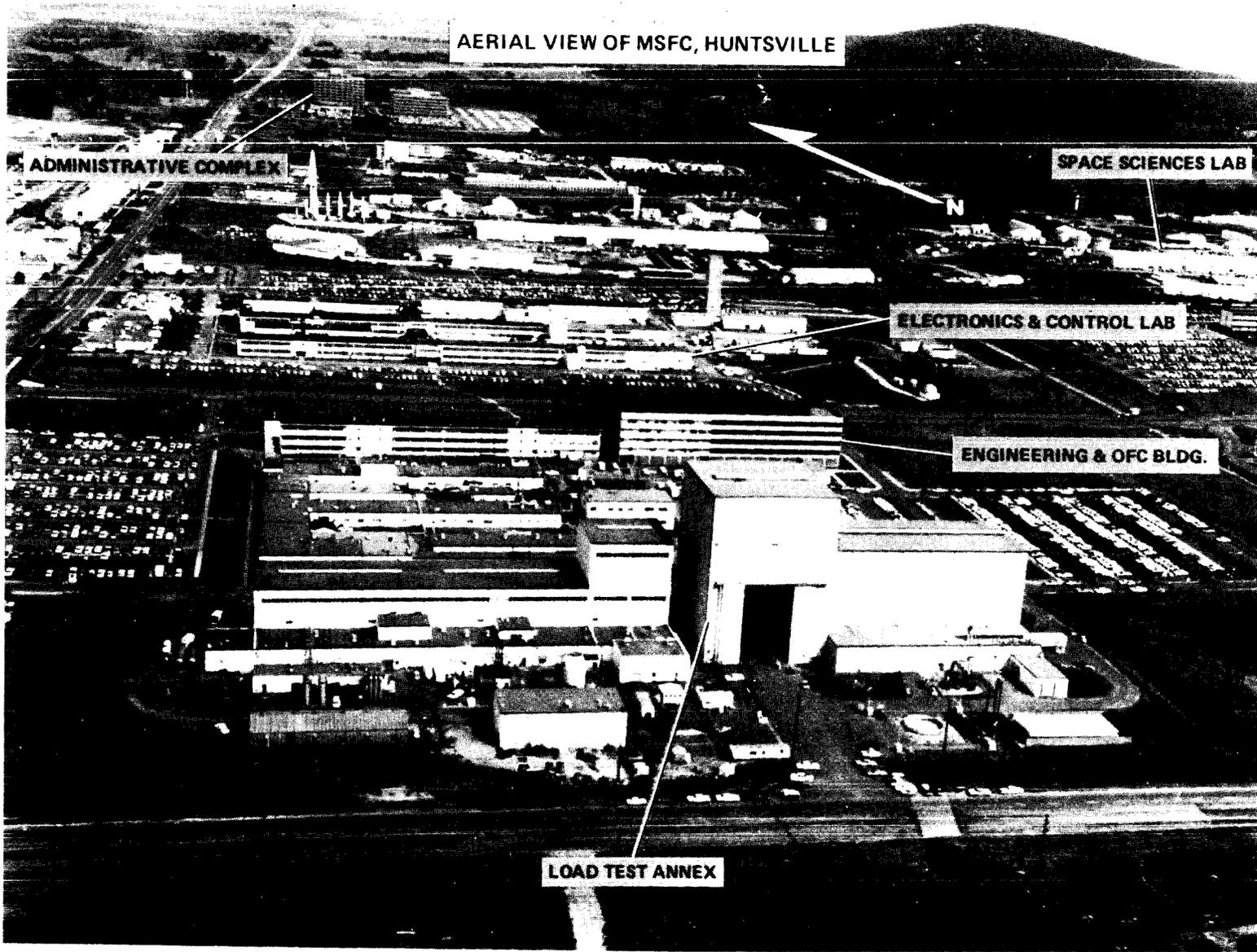
- 23 | 201 PUMP STATION NO 1
- 24 | 304 PUMP STATION NO 3
- 25 | 143 PUMP STATION NO 4
- 26 | 308 WEST MASTER SUBSTATION
- 27 | 121 MAIN SUBSTATION
- 28 | 170 CHEMICAL WASTE LAGOON
- 29 | 119 PAINT SHOP
- 30 | 403 SALVAGE YARD
- 31 | 105 TRANSPORTATION
- 32 | 302 ELEVATED WATER TOWER

**MARSHALL SPACE FLIGHT CENTER
PROGRAM FACILITIES**



SCIENCE & ENGINEERING AREA – MSFC, HUNTSVILLE





AERIAL VIEW OF MSFC, HUNTSVILLE

ADMINISTRATIVE COMPLEX

SPACE SCIENCES LAB

ELECTRONICS & CONTROL LAB

ENGINEERING & OFC BLDG.

LOAD TEST ANNEX

EAST TEST AREA – MSFC, HUNTSVILLE



SHUTTLE DYNAMIC TEST STAND

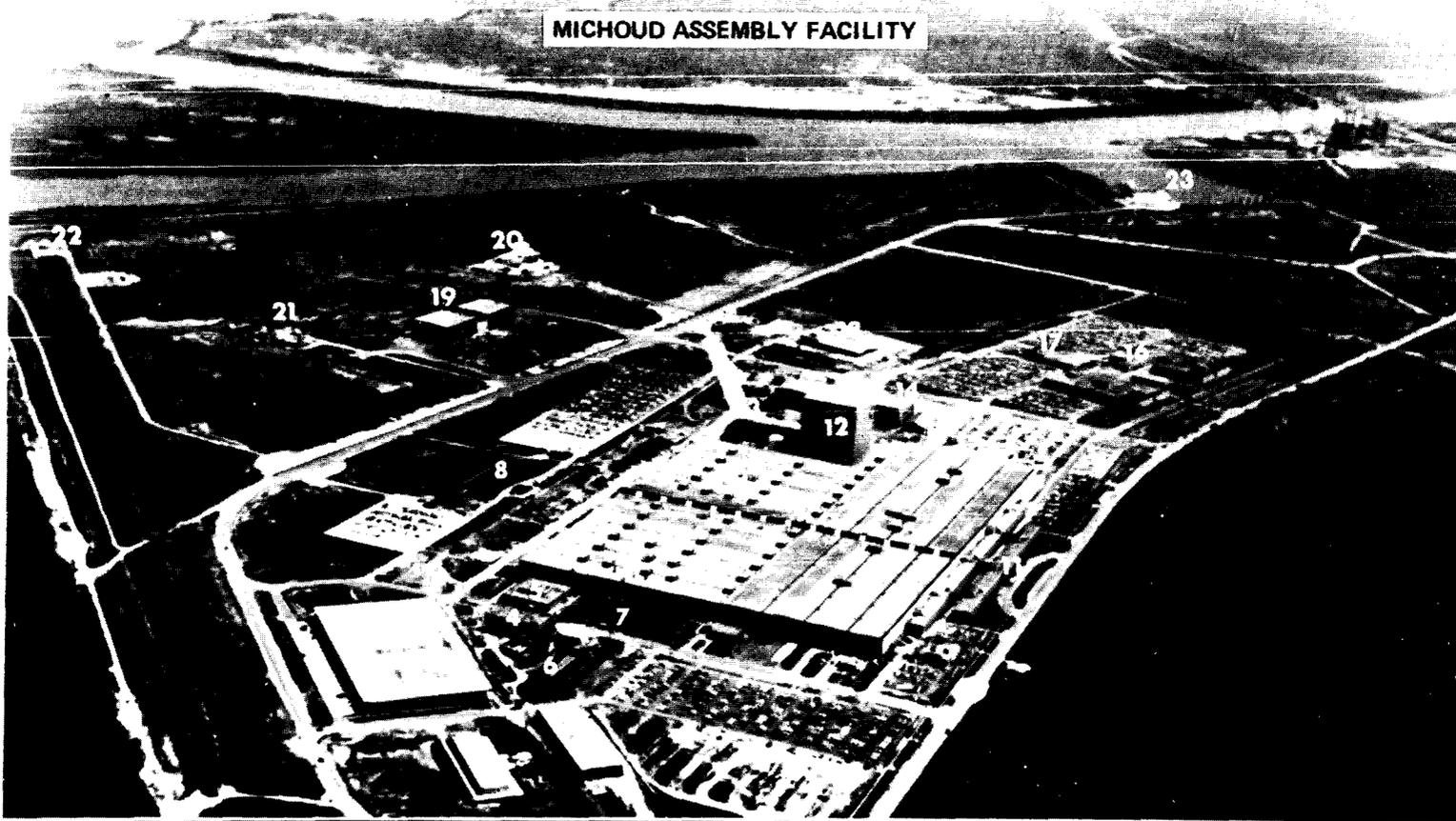
HOT GAS FACILITY

ACOUSTIC MODEL TEST

S-IVB TEST STAND

SRB STRUCTURAL TEST

MICHOUD ASSEMBLY FACILITY



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

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

NATIONAL SPACE TECHNOLOGY LABORATORIES

DESCRIPTION

The National Space Technology Laboratories is located in southwest Mississippi, approximately 50 miles northeast of New Orleans, Louisiana. Total land area is 138,807 acres of which 13,480 acres make up the actual installation owned by NASA. The remaining 125,327 acres are held as a buffer zone. In the buffer zone, 7,162 acres are owned by NASA, and 118,165 acres are under restrictive easements. The installation has deep water access via the Pearl River and the Intracoastal Waterway. Capital investment for the National Space Technology Laboratories as of September 30, 1976, was \$317,526,000.

MISSION

The National Space Technology Laboratories (NSTL), formerly the Mississippi Test Facility (MTF), was constructed and operated during the sixties for acceptance testing of the booster stages of the Saturn V rocket system. The redesignation by NASA of MTF to the new NSTL in June 1974, recognized the emerging role of the installation in space and environmental technology efforts. In addition, NSTL is the prime static test facility for large liquid propellant rocket engines.

The National Space Technology Laboratories is the site for static testing of the Space Shuttle Main Engine and the Main Propulsion Test Article. In addition to providing Shuttle support, NSTL provides services and facilities for collocated government agencies engaged in the application of space technology. These include the Department of Interior, the Department of Commerce, the Environmental Protection Agency, the Department of Transportation, the Department of Defense, the State of Mississippi, and the State of Louisiana.

SUMMARY OF RESOURCES REQUIREMENTS

	<u>FUNDS</u>				
	1976	Transition	<u>1977</u>		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
	(Thousands of Dollars)				
I. Personnel and Related Costs.....	1,723	437	1,802	1,885	1,910
II. Travel.....	<u>29</u>	<u>7</u>	<u>31</u>	<u>32</u>	<u>32</u>
Total, fund requirements.....	<u>1,752</u>	<u>444</u>	<u>1,833</u>	<u>1,917</u>	<u>1,942</u>

Distribution of Permanent Positions by Program

	1976	Transition	<u>1977</u>		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
<u>Indirect Positions</u>	<u>70</u>	<u>70</u>	<u>70</u>	<u>70</u>	<u>70</u>
Total, permanent positions.....	<u>70</u>	<u>70</u>	<u>70</u>	<u>70</u>	<u>70</u>

PERSONNEL AND RELATED COSTS

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			<u>Budget</u> Estimate	<u>Current</u> Estimate	
(Thousands of Dollars)					
I. <u>PERSONNEL AND RELATED COSTS</u>	1,723	437	1,802	1,885	1,910
<u>Basis of Fund Requirements</u>					
A. <u>Compensation and Benefits</u>					
1. <u>Compensation</u>					
a. Permanent positions.....	1,544	388	1,619	1,689	1,705
b. Nonpermanent.....	19	8	20	21	23
c. Overtime and other compensation.....	<u>6</u>	<u>1</u>	<u>7</u>	<u>6</u>	<u>6</u>
Subtotal, Compensation.....	1,569	397	1,646	1,716	1,734
2. <u>Benefits</u>	<u>149</u>	<u>39</u>	<u>151</u>	<u>162</u>	<u>169</u>
Subtotal, Compensation and Benefits.....	<u>1,718</u>	<u>436</u>	<u>1,797</u>	<u>1,878</u>	<u>1,903</u>
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	3	---	---	4	4
2. Personnel training.....	<u>2</u>	<u>1</u>	<u>5</u>	<u>3</u>	<u>3</u>
Subtotal, Supporting Costs.....	<u>5</u>	<u>1</u>	<u>5</u>	<u>7</u>	<u>7</u>
Total, Personnel and Related Costs.....	<u>1,723</u>	<u>437</u>	<u>1,802</u>	<u>1,885</u>	<u>1,910</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
A. <u>Compensation and Benefits</u>	<u>1,718</u>	<u>436</u>	<u>1,797</u>	<u>1,878</u>	<u>1,903</u>
1. <u>Compensation</u>	<u>1,569</u>	<u>397</u>	<u>1,646</u>	<u>1,716</u>	<u>1,734</u>
a. Permanent positions.....	1,544	388	1,619	1,689	1,705

The current estimate for 1977 increased from the 1977 budget estimate as a result of the October 1976 pay raise. The 1978 estimate is increased as shown below:

Basis of Cost for Permanent Positions

In 1978 the cost of permanent positions will be \$1,705, an increase of \$16 from 1977. The increase is calculated as follows:

Cost of permanent positions in 1977.....	1,689
Cost of increases in 1978.....	+34
Within grade advances and career development:	
Full year effect of 1977 actions.....	+22
Partial year effect of 1978 actions.....	+9
Full year effect of October 1976 pay raise.....	+3
Cost decreases in 1978.....	-18
Turnover savings and abolished positions:	
Full year effect of 1977 actions.....	-6
Partial year effect of 1978 actions.....	-6
One less paid day in 1978.....	-6
Cost of permanent positions in 1978.....	<u>1,705</u>

	<u>1976</u>	<u>Transition</u>	<u>1977</u>		<u>1978</u>
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			

b. Nonpermanent

1. Cost.....	\$19	\$8	\$20	\$21	\$23
2. Manyears.....	2	1	2	2	2

The 1978 plan includes two manyears, the same as 1977, which will be used to support the college cooperative training program.

The increase in 1977 from the budget estimate to the current estimate is due to the cost of the October 1976 pay raise. The increase in 1978 is due to within grade advances and the full year effect of the pay raise.

c. Overtime and other compensation.....	6	1	7	6	6
---	---	---	---	---	---

The 1977 and 1978 funds cover the overtime necessary to meet management and other administrative requirements in such areas as procurement and financial management.

2. <u>Benefits</u>	<u>149</u>	<u>39</u>	<u>151</u>	<u>162</u>	<u>169</u>
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The current estimate for 1977 increased from the 1977 budget estimate as a result of the increase in the rates for employee health insurance and the October 1976 pay raise. The small increase in 1978 is due to the full year effects of the pay raise, and the contribution for employee health insurance.

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		<u>1978</u> Budget <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	

(Thousands of Dollars)

The following table indicates the personnel benefits cost by major category:

Category of Costs

Contribution to Civil Service Retirement Fund.....	111	29	115	119	121
Contribution for Employee Life Insurance...	7	2	7	8	8
Contribution for Employee Health Insurance.	30	8	28	33	38
Incentive Awards.....	<u>1</u>	<u>---</u>	<u>1</u>	<u>2</u>	<u>2</u>
Total.....	<u>149</u>	<u>39</u>	<u>151</u>	<u>162</u>	<u>169</u>
B. <u>Supporting Costs</u>	<u>5</u>	<u>1</u>	<u>5</u>	<u>7</u>	<u>7</u>
1. Transfer of personnel.....	3	---	---	4	4

The current estimate for 1977 is increased from the 1977 budget estimate to reflect 1976 actual experience. The 1978 estimate is based on the same number of moves as in 1977.

2. Personnel training.....	2	1	5	3	3
----------------------------	---	---	---	---	---

The personnel training costs are based on the Center's urgent need for "Upward Mobility" training for females and minorities. In 1976, NSTL's training program was fully implemented by the end of the fiscal year. The increase from 1976 to the 1977 current estimate reflects the full year costs, which are estimated to remain at the same level in 1978.

TRAVEL

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
	(Thousands of Dollars)				
II. <u>TRAVEL</u>	29	7	31	32	32

Basis of Fund Requirements

Summary of Travel by Major Category

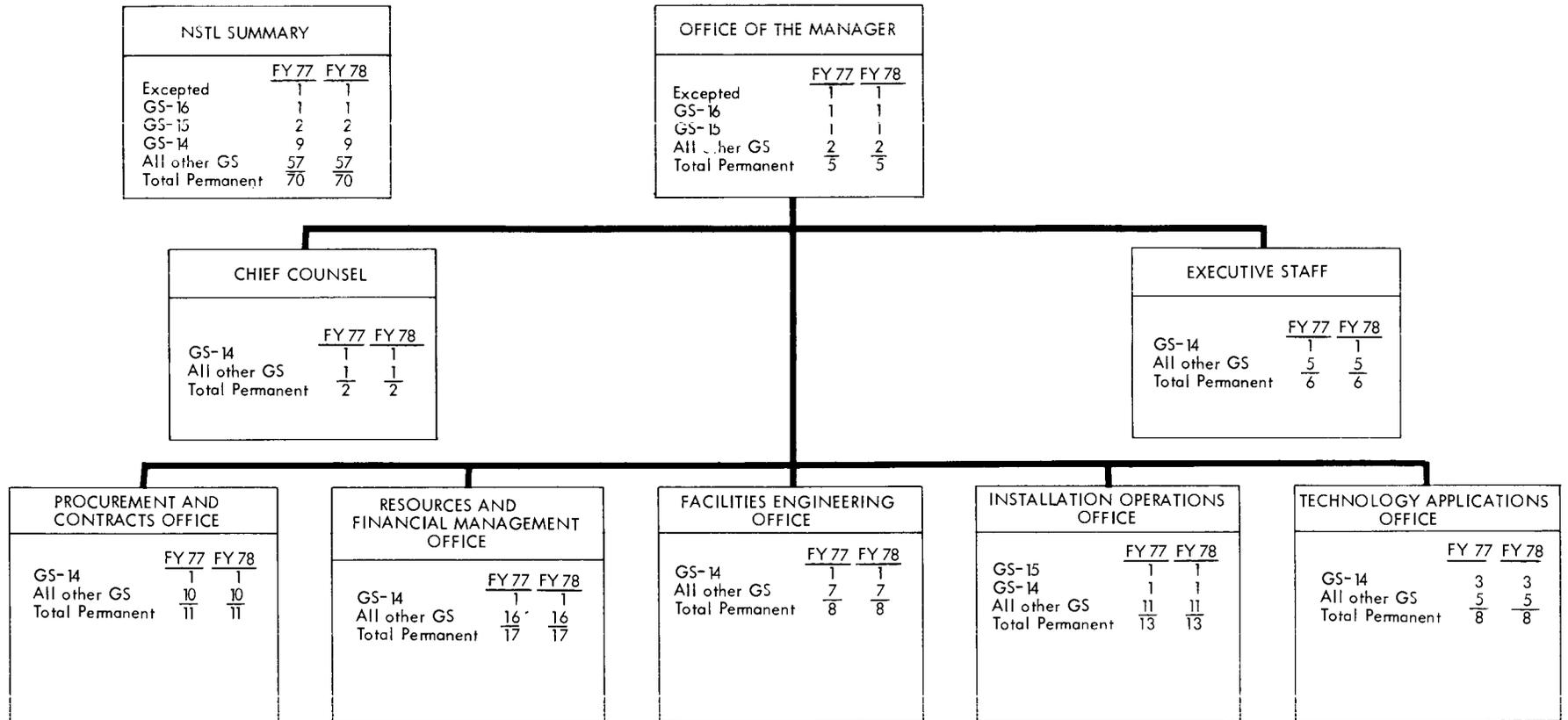
A. Program Travel.....	6	1	4	4	4
B. Administrative Travel.....	<u>23</u>	<u>6</u>	<u>27</u>	<u>28</u>	<u>28</u>
Total, Travel.....	<u>29</u>	<u>7</u>	<u>31</u>	<u>32</u>	<u>32</u>
A. <u>Program Travel</u>	<u>6</u>	<u>1</u>	<u>4</u>	<u>4</u>	<u>4</u>

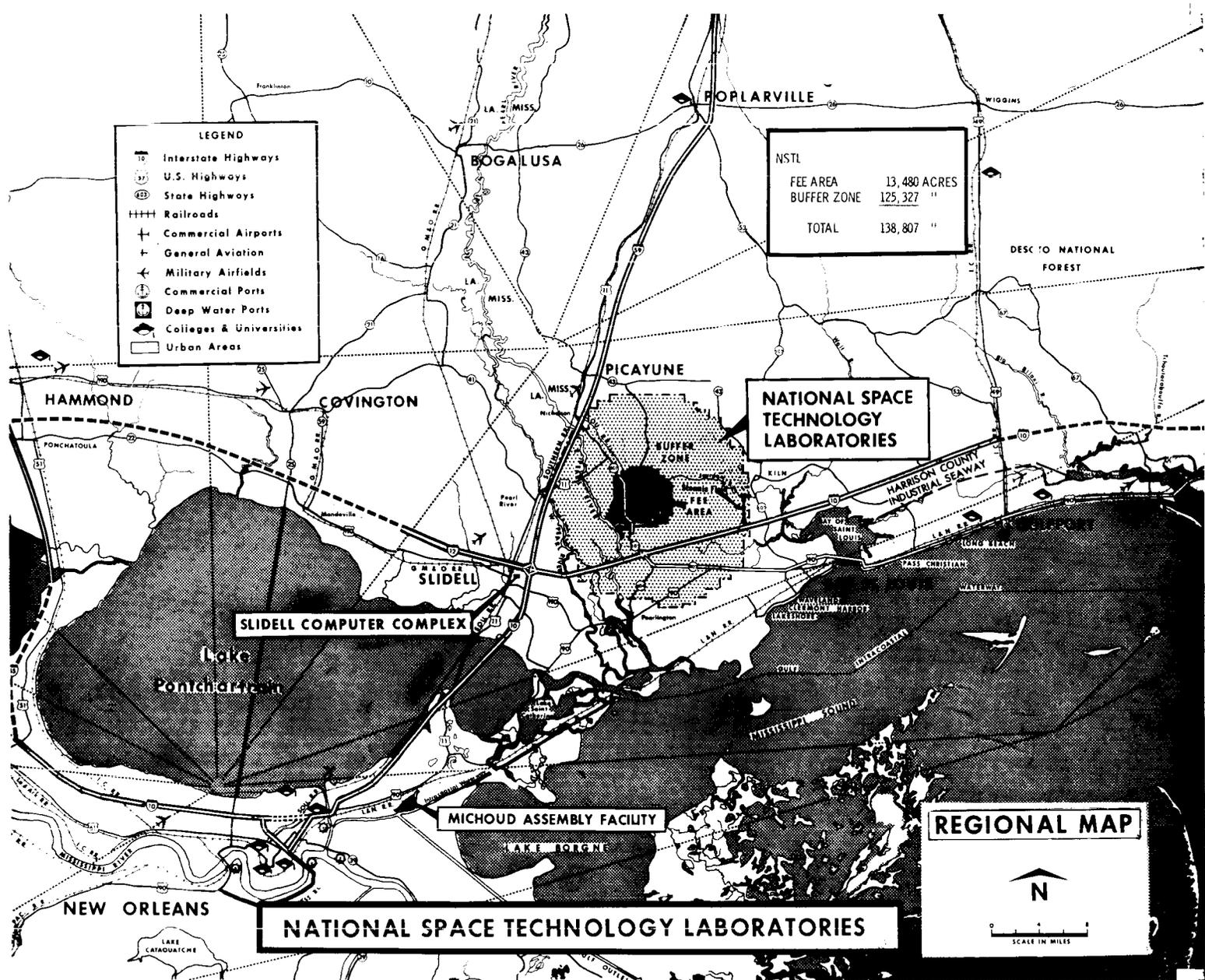
Program travel requirements at NSTL are in support of the Office of Applications programs and travel required for the Shuttle program.

B. <u>Administrative Travel</u>	<u>23</u>	<u>6</u>	<u>27</u>	<u>28</u>	<u>28</u>
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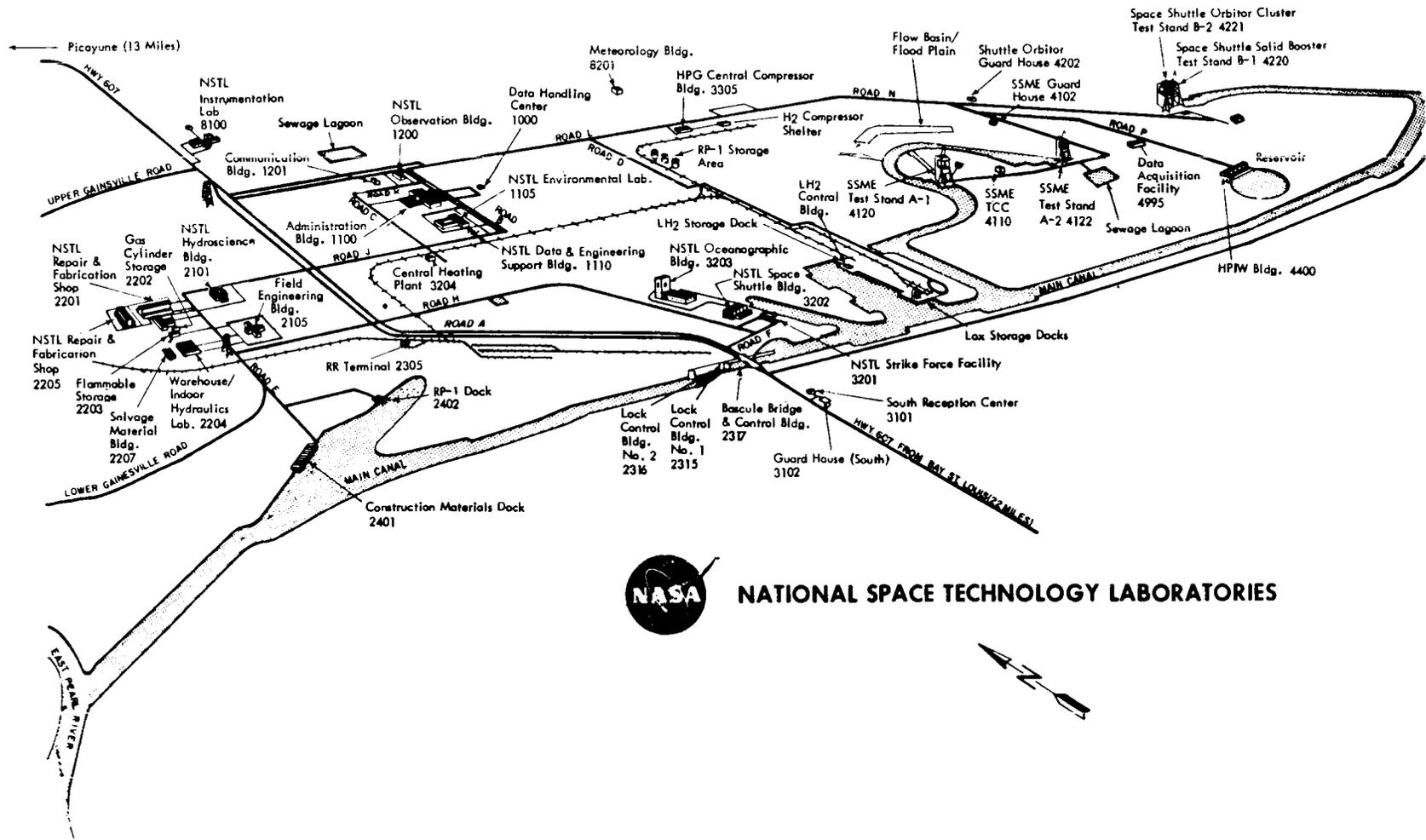
Travel requirements are associated with the operation and maintenance of the facility, committee assignments, management meetings, and administrative matters such as legal, contracting, finance and resources management. The increase from the 1977 budget to the current estimate reflects increased per diem rates. The estimate for 1978 is at the same level as in 1977.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 NATIONAL SPACE TECHNOLOGY LABORATORIES

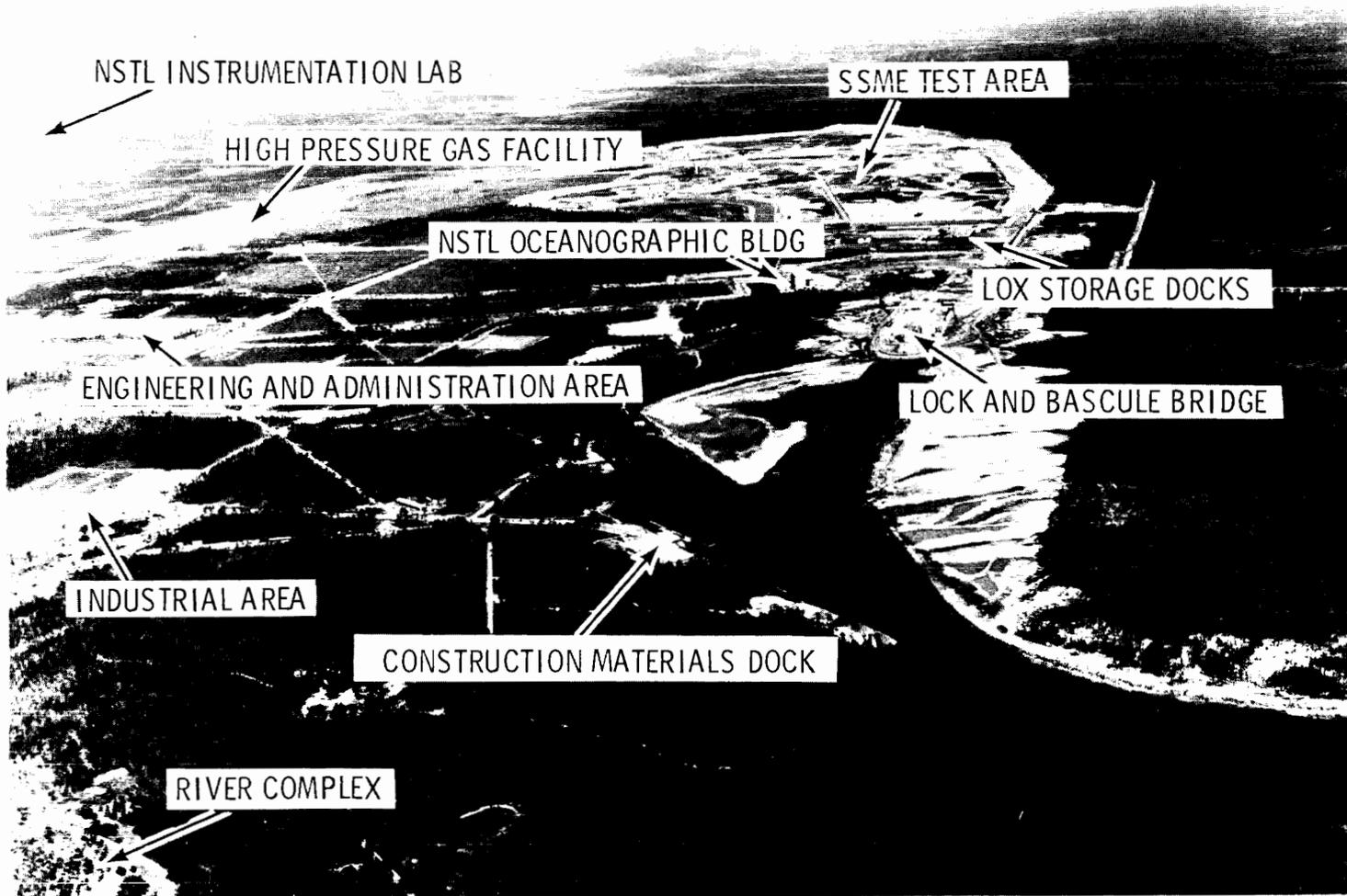




NSTL LOCATION PLAN



NATIONAL SPACE TECHNOLOGY LABORATORIES-AERIAL VIEW



RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

GODDARD SPACE FLIGHT CENTER

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 totalling 640 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 contractor-held facilities at various locations as of September 30, 1976, was \$658,266,000.

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.

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 in space science and applications. The Goddard Center has developed many diverse capabilities: the management of complex 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.

Goddard is responsible for the development of sounding rocket and automated earth orbital spacecraft, including experiment integration. This includes applications satellite projects and scientific satellite projects, as well as satellites in the small Explorer series. Goddard is also responsible for maintaining a technical discipline base as well as developing and managing experiments in the areas of space physics, space astronomy, stratospheric research, weather and climate, earth and ocean dynamics, communications, and in aspects of planetary science, pollution monitoring, and earth resources. Goddard is responsible for flight command and control of automated earth orbital spacecraft as well as tracking and data acquisition for automated earth orbital flights, and the earth orbital phase of deep space flight. This includes management and

operation of the world-wide Spacecraft Tracking and Data Network (STDN) and NASA Communications Network (NASCOM), and development of the Tracking and Data Acquisition Relay Satellite. Goddard is responsible for the development and procurement of solid propulsion systems for automated earth orbital systems. Goddard is also responsible for the development and procurement of launch systems, including sounding rockets and the Delta launch vehicle. Goddard also has responsibilities for development of basic information systems technology and space technology, including space vehicle structures and space guidance and control.

Major Goddard activities are concentrated in the following areas:

Scientific Satellites - During the past year, GSFC-managed scientific satellites have continued to make scientific discoveries which are advancing our knowledge of the solar system and the universe. Atmosphere Explorer (AE)-D and E, launched in October and November 1975, have conducted numerous investigations of chemical processes and energy transfer mechanisms which control the earth's upper atmosphere. OAO Copernicus, an ultra-violet observatory; SAS-C, an X-ray observatory; and OSO-8, a solar observatory; all launched in prior years, continue to provide new and unexpected data and discoveries for the scientific teams participating in the observing program. International Ultra-violet Explorer (IUE), to be launched in 1978 for the use of both the United States and foreign astronomers, will study ultra-violet stellar spectra. International Sun Earth Explorer (ISEE) will use three satellites to conduct plasma and spatial and temporal studies of the earth's magnetosphere. This is the United States' contribution to the international magnetospheric study. ISEE-A (NASA) and ISEE-B (ESA) will be launched in a piggy-back configuration in October 1977, and ISEE-C (NASA) will be launched in July 1978. The qualified protoflight experiment (Cosmic X-ray Background-HEAO-A2) was delivered to the contractor in April 1976. GSFC has been assigned management responsibility of instrument development mission and science operations for the Space Telescope, a major new start in FY 1978. The Delta Vehicle launched 13 successful missions, including 5 NASA missions; 1 NOAA mission; and 7 fully reimbursable missions.

Applications Satellites - Work is underway on many flight projects including flight hardware for the Applications Explorer Missions A and B involving the Heat Capacity Mapping Radiometer instrument and the Stratospheric Aerosol and Gas Experiment instrument module. The first NOAA operational mission, Geostationary Orbiting Environmental Satellite (GEOS)-1, was launched in October 1976. NASA has continued to provide basic orbital parameters for both SMS-1 and 2 to NOAA in support of the GEOS system. The design phase for the TIROS-N spacecraft and a majority of the meteorological instruments has been completed. The Landsat satellites have operated successfully for the past year, covering 95% of the land mass with 30% or less cloud cover. The Nimbus-6 satellite was launched in June 1976, with a complement of nine (9) instruments to further the study of the earth in remote and atmospheric and earth surface observations. GSFC with management responsibilities for Landsat D project using the Thematic Mapper instrument will greatly enhance current uses of Landsat data and expand the use of these data to new areas.

International Program - Goddard continues in its responsibility to carry out international cooperative efforts in space exploration. HELIOS-B, launched in January 1976, is a German built satellite containing three Goddard experiments which is investigating the properties of the processes in interplanetary space close to the sun. The design phase has been started on the international cooperative program with Italy to launch the San Marco-D satellite in 1980, which will explore the relationship between solar activity and meteorological phenomenon.

Tracking and Data Acquisition - The Goddard managed Space Flight Tracking and Data Network (STDN) provides tracking and communications coverage for all of NASA's earth orbiting satellites. The STDN also provides project management for the Tracking and Data Relay Satellite (TDRSS) scheduled for launch in 1979. The system will become operational in 1980.

Sounding Rockets - During 1976, more than 44 sounding rocket launchings, primarily from Wallops Station, Virginia, were conducted by Goddard bringing the number of sounding rocket launchings in the program since 1959 to approximately 1,900.

SUMMARY OF RESOURCES REQUIREMENTS

	<u>FUNDS</u>				
	1976	Transition	1977		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
I. Personnel and Related Costs.....	91,037	23,425	89,679	97,675	97,696
II. Travel.....	2,293	613	2,288	2,234	2,251
III. Facilities Services.....	8,358	2,637	10,523	8,596	8,880
IV. Technical Services.....	2,083	492	1,864	1,973	1,959
V. Administrative Support.....	<u>4,809</u>	<u>1,459</u>	<u>4,822</u>	<u>5,394</u>	<u>5,347</u>
Total, fund requirements.....	<u>108,580</u>	<u>28,626</u>	<u>109,176</u>	<u>115,872</u>	<u>116,133</u>

Distribution of Permanent Positions by Program

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
<u>Direct Positions</u>					
<u>Space Flight</u>	<u>146</u>	<u>146</u>	<u>128</u>	<u>141</u>	<u>143</u>
Space shuttle.....	25	25	14	34	31
Space flight operations.....	13	13	---	11	16
Expendable launch vehicles.....	108	108	114	96	96
<u>Space Science</u>	<u>1,163</u>	<u>1,163</u>	<u>1,042</u>	<u>1,088</u>	<u>991</u>
Physics and astronomy.....	1,019	1,019	933	989	919
Lunar and planetary exploration.....	144	144	109	99	72
<u>Space Applications</u>	<u>649</u>	<u>649</u>	<u>727</u>	<u>696</u>	<u>781</u>
<u>Aeronautics and Space Technology</u>	<u>112</u>	<u>112</u>	<u>114</u>	<u>78</u>	<u>76</u>
Aeronautical research and technology.....	---	---	---	---	---
Space research and technology.....	112	112	114	78	76
<u>Energy Technology Applications</u>	<u>2</u>	<u>2</u>	<u>---</u>	<u>1</u>	<u>1</u>
<u>Tracking and Data Acquisition</u>	<u>695</u>	<u>695</u>	<u>709</u>	<u>684</u>	<u>674</u>
<u>Technology Utilization</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>9</u>	<u>9</u>
Subtotal, direct positions.....	2,773	2,773	2,726	2,697	2,675
<u>Indirect Positions</u>	<u>979</u>	<u>979</u>	<u>949</u>	<u>978</u>	<u>950</u>
Total, permanent positions.....	<u>3,752</u>	<u>3,752</u>	<u>3,675</u>	<u>3,675</u>	<u>3,625</u>

PERSONNEL AND RELATED COSTS

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
			(Thousands of Dollars)		
I. <u>PERSONNEL AND RELATED COSTS</u>	<u>91,037</u>	<u>23,425</u>	<u>89,679</u>	<u>97,675</u>	<u>97,696</u>
		<u>Basis of Fund Requirements</u>			
A. <u>Compensation and Benefits</u>					
1. <u>Compensation</u>					
a. Permanent positions.....	81,386	20,784	80,186	87,047	86,815
b. Nonpermanent.....	687	295	891	847	898
c. Overtime and other compensation.....	<u>674</u>	<u>145</u>	<u>646</u>	<u>766</u>	<u>770</u>
Subtotal, Compensation.....	82,747	21,224	81,723	88,660	88,483
2. <u>Benefits</u>	<u>7,679</u>	<u>2,001</u>	<u>7,334</u>	<u>8,376</u>	<u>8,561</u>
Subtotal, Compensation and Benefits.....	<u>90,426</u>	<u>23,225</u>	<u>89,057</u>	<u>97,036</u>	<u>97,044</u>
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	74	33	100	100	106
2. Personnel training.....	<u>537</u>	<u>167</u>	<u>522</u>	<u>539</u>	<u>546</u>
Subtotal, supporting costs.....	<u>611</u>	<u>200</u>	<u>622</u>	<u>639</u>	<u>652</u>
Total, Personnel and Related Costs.....	<u>91,037</u>	<u>23,425</u>	<u>89,679</u>	<u>97,675</u>	<u>97,696</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget</u> Estimate	<u>Current</u> Estimate	
(Thousands of Dollars)					
A. <u>Compensation and Benefits</u>	90,426	23,225	89,057	97,036	97,044
1. <u>Compensation</u>	82,747	21,224	81,723	88,660	88,483
a. Permanent positions.....	81,386	20,784	80,186	87,047	86,815

Basis of Cost for Permanent Positions FY 1978

The estimate for compensation (starting from prior year cost) 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, and the October 1976 pay increase. 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:

Cost of permanent positions in 1977.....	87,047
Cost increases in FY 1978.....	+1,798
Within grade advances and career development:	
Full year effect of FY 1977 actions.....	+983
Partial year effect of FY 1978 actions.....	+720
Full year effect of October 1976 pay raise.....	+95
Cost decreases in FY 1978.....	-2,030
Turnover savings and abolished positions:	
Full year effect of FY 1977 actions.....	-634
Partial year effect of FY 1978 actions.....	-1,074
One less paid day in FY 1978.....	-322
Cost of permanent positions in FY 1978.....	<u>86,815</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
b. Nonpermanent					
1. Cost.....	\$687	\$295	\$891	\$847	\$898
2. Manyears.....	95	50	116	101	101

The 1977 estimate includes the October 1976 pay raise which is more than offset by a reduction of 15 manyears. The 1978 budget estimate reflects the full-year effect of the October 1976 pay raise and the implementation of Public Law 94-397 in conjunction with the increased use of reemployed annuitants during the period of permanent personnel reductions. The 1978 estimate will support the following programs at the levels indicated below:

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>				
College cooperative training.....					35
Summer employment.....					13
Opportunity programs.....					41
Other temporary employment.....					<u>12</u>
Total.....					<u>101</u>
c. Overtime and other compensation.....	674	145	646	766	770

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. The level of effort in 1978 is the same as 1977. The increase from the 1977 budget to the current estimate is due to the October 1976 pay raise and increased overtime for wage grade employees.

2. <u>Benefits</u>	<u>7,679</u>	<u>2,001</u>	<u>7,334</u>	<u>8,376</u>	<u>8,561</u>
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In the 1977 budget, the entire cost of workmen's compensation was included in the Headquarters. The 1978 budget reflects the Center's cost for this item. The increase from the 1977 budget to current estimate

reflects the change in workmen's compensation plus the higher cost of health insurance and the October 1976 pay raise. The 1978 budget estimate reflects the full year cost of the pay raise and health insurance increase.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	

(Thousands of Dollars)

The following table indicates the cost of personnel benefits by the major categories:

Category of Costs

Contribution to the Civil Service					
Retirement Fund.....	5,587	1,431	5,613	6,127	6,121
Contribution for employees life					
insurance.....	356	90	353	363	363
Contribution for employees health					
insurance.....	1,486	408	1,255	1,639	1,819
Contribution to FICA.....	24	12	29	19	19
Incentive awards.....	85	39	50	86	86
Workman's compensation.....	69	20	---	81	92
Other benefits.....	<u>72</u>	<u>1</u>	<u>34</u>	<u>61</u>	<u>61</u>
Total.....	<u>7,679</u>	<u>2,001</u>	<u>7,334</u>	<u>8,376</u>	<u>8,561</u>
B. <u>Supporting Costs</u>	<u>611</u>	<u>200</u>	<u>622</u>	<u>639</u>	<u>652</u>
1. Transfer of personnel'.....	74	33	100	100	106

The category includes the reimbursement to employees for movement of household goods to the employee's new duty station and other relocation expenses. Estimates for 1978 are planned at basically the 1977 level.

2. Personnel training..... 537 167 522 539 546

The personnel training costs are based on continuation of current training programs and the need to reorient skills of employees in areas compatible with the direction of current space program and Goddard's role in the program. The increase from the 1977 budget to the current estimate reflects 1976 and Transition Quarter experience. The 1978 increase is to accommodate slightly higher tuition rates.

TRAVEL

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
(Thousands of Dollars)					
II. <u>TRAVEL</u>	<u>2,293</u>	<u>613</u>	<u>2,288</u>	<u>2,234</u>	<u>2,251</u>

Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Travel.....	1,860	513	1,944	1,849	1,874
B. Meeting and Technical Seminars.....	256	68	240	207	209
C. Administrative Travel.....	<u>177</u>	<u>32</u>	<u>104</u>	<u>178</u>	<u>168</u>
Total, Travel.....	<u>2,293</u>	<u>613</u>	<u>2,288</u>	<u>2,234</u>	<u>2,251</u>

A. <u>Program Travel</u>	<u>1,860</u>	<u>513</u>	<u>1,944</u>	<u>1,849</u>	<u>1,874</u>
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Program related travel is subdivided into the following areas:

Development travel includes the transportation of persons, per diem allowances, and other incidental expenses associated with participation in the development programs and projects, such as: (1) scientific and engineering evaluations; (2) review or approval of designs and fabrication; (3) processes, component or sub-system tests; (4) quality control; and (5) other technical direction and coordination.

Research, technology, and study program travel includes the transportation of persons, per diem allowances, and other incidental expenses associated with participation in research, technology and study programs such as: (1) scientific and engineering evaluations; (2) review and approval of concepts and experiments; (3) evaluation of data, etc.; (4) feasibility studies; and (5) other technical direction and coordination.

Systems test and launch operations travel includes the transportation of persons, per diem allowances and other incidental expenses associated with participation in system status or airborne tests, and vehicle launches, such as: (1) preparation of pretest/launch plans and procedures; (2) facility test/launch operations engineering, simulation, and testing; (3) test/launch monitor functions; and (4) post test/launch evaluation and data reduction.

Engineering, construction, and maintenance of facilities travel includes the transportation of persons, per diem allowances and other incidental expenses associated with the preparation, review, coordination and approval of: (1) preliminary engineering reports; (2) engineering drawings and specifications; (3) construction work packages; (4) inspection and quality control; and (5) maintenance and repair.

The decrease from the 1977 budget to the current estimate is due to the NASA travel reduction program, partially offset by an increase in per diem rates. The increase from 1977 to 1978 reflects increased requirements of the Tracking and Data Relay Satellite project.

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
			(Thousands of Dollars)		
B. <u>Meetings and Technical Seminars</u>	<u>256</u>	<u>68</u>	<u>240</u>	<u>207</u>	<u>209</u>

Scientific and technical meetings, seminars and symposia travel includes transportation of persons, per diem allowances, and other incidental expenses associated with attendance at special meetings related to the technical and scientific mission of NASA.

The decrease from 1977 budget to current estimate is due to the NASA travel reduction program, partially offset by increased per diem rates. The 1978 travel requirements for meetings and seminars remains at essentially the same level as in 1977.

C. <u>Administrative Travel</u>	<u>177</u>	<u>32</u>	<u>104</u>	<u>178</u>	<u>168</u>
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General administrative travel includes transportation of persons, per diem allowances, and other incidental expenses associated with participation in any administrative activities related to: (1) procurement and contract administration; (2) public affairs; (3) interagency coordination; (4) industry affairs; (5) legislative affairs; (6) legal affairs; (7) labor relations; (8) personnel functions; and (9) resources management.

Permanent change of station includes transportation of persons, per diem allowance, and other incidental expenses associated with the following: (1) a new employee reporting to the initial duty station, where the new hire has been determined to be eligible for reimbursement; (2) a change of assignment to a new permanent duty station; and (3) family travel expense associated with the above.

Local transportation includes personal travel in and around the official station of the employee, including tolls, parking fees, and taxi fares.

Rental of passenger-carrying vehicles includes the cost of vehicles used when such vehicles are obtained under contract, lease or rental arrangements.

The increase from 1977 budget to current estimate reflects a reassessment of the type of travel being performed and increased per diem rates. The decrease in 1978 is to provide for higher priority program travel requirements.

FACILITIES SERVICES

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
III. <u>FACILITIES SERVICES</u>	8,358	2,637	10,523	8,596	8,880

Basis of Fund Requirements

Summary of Facilities Services

A. <u>Rental of Real Property</u>	1,359	289	1,300	1,103	1,067
B. <u>Maintenance and Related Services</u>					
1. Maintenance, repair and alterations of buildings and grounds.....	1,325	472	1,017	1,044	1,098

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977 <u>Budget</u> <u>Current</u> <u>Estimate</u> <u>Estimate</u>		1978 <u>Budget</u> <u>Estimate</u>
			(Thousands of Dollars)		
2. Custodial services.....	1,431	656	1,646	1,691	1,605
3. Maintenance of equipment.....	<u>268</u>	<u>55</u>	<u>302</u>	<u>306</u>	<u>335</u>
Subtotal.....	<u>3,024</u>	<u>1,183</u>	<u>2,965</u>	<u>3,041</u>	<u>3,038</u>
C. <u>Operation of Facilities</u>					
1. Utilities.....	3,550	1,031	5,690	3,968	4,230
2. Supplies and equipment.....	<u>425</u>	<u>134</u>	<u>568</u>	<u>484</u>	<u>545</u>
Subtotal.....	<u>3,975</u>	<u>1,165</u>	<u>6,258</u>	<u>4,452</u>	<u>4,775</u>
Total, Facilities Services.....	<u>8,358</u>	<u>2,637</u>	<u>10,523</u>	<u>8,596</u>	<u>8,880</u>
A. <u>Rental of Real Property</u>.....	<u>1,359</u>	<u>289</u>	<u>1,300</u>	<u>1,103</u>	<u>1,067</u>

Rental of land and buildings property is required to house personnel and provide storage and warehouse space for equipment, supplies, and materials.

The decrease from 1977 budget to the current estimate is due to vacating the Riggs Building earlier than planned, revision of services costs at the Armstrong Building and reduced requirement for station director's housing resulting from closing tracking stations.

The change from 1977 to 1978 represents a decrease in GSA lease costs and vacating the Lafayette Building.

B. <u>Maintenance and Related Services</u>.....	<u>3,024</u>	<u>1,183</u>	<u>2,965</u>	<u>3,041</u>	<u>3,038</u>
1. Maintenance, repair and alterations of buildings and grounds.....	1,325	472	1,017	1,044	1,098

This activity provides for maintenance, repair, and alterations of buildings, grounds, and utility systems; and minor construction. This includes 35 buildings comprising 2.5 million square feet, 1,092 acres of ground, 489 acres of surfaced areas, and utility systems.

The increase from the 1977 budget to the 1977 current estimate is attributable to an additional 3 manyears of effort added to this area. The additional effort and subsequent dollars were necessary due to increased facilities completed in 1976 and the Transition Quarter, plus additional modification and rehabilitation effort due to reorganizations within the Center.

The increase from 1977 to 1978 is due to anticipated cost increases for maintenance services, offset by a decrease of 2 manyears of effort for ground maintenance services.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
2. Custodial services.....	1,431	656	1,646	1,691	1,605

Custodial services include security, janitorial, laundry services and refuse handling.

Increase from the 1977 budget to the current estimate reflects a slight increase in the janitorial contract to provide service to additional areas and facilities not previously included in the budget estimate and to restore effort previously reduced due to budgetary constraints, that would have resulted in an unacceptable level of support. The 1977 current estimate also provides for contractual wage increases for both contracts based on recent wage determinations.

The decrease from 1977 to 1978 is due to a planned reduction of 19 manyears in the janitorial contract, offset by an increase for wage rates for the janitorial and guard services contract, and the laundry and refuse removal service.

3. Maintenance of equipment.....	268	55	302	306	335
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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.

The increase from 1977 to 1978 is due to the fact that more maintenance is required as equipment is replaced less frequently.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
C. <u>Operation of Facilities</u>	<u>3,975</u>	<u>1,165</u>	<u>6,258</u>	<u>4,452</u>	<u>4,775</u>
1. Utilities.....	3,550	1,031	5,690	3,968	4,230

The cost of utilities - electricity, gas, fuel, oil, water, sewage - is budgeted in this function.

The 1977 current estimate and the 1978 estimate reflect a reduction in the planned usage of electrical power and fuel oil in order to conform with the agency plan of reducing utility consumption.

The increase from 1977 to 1978 is due to rate increases for all utilities, partially offset by an additional planned reduction in usage.

2. Supplies and equipment.....	425	134	568	484	545
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The supplies, materials, and equipment used to maintain and operate GSFC facilities are budgeted in this subcategory. The amount required is based on the number of personnel supported, the number of facilities operated and the level of equipment replacement.

The decrease from the 1977 budget to the current estimate is primarily due to 1976 year-end and Transition Quarter purchases of plant equipment.

The increase from 1977 to 1978 is due to recent cost increases and to provide the necessary equipping of proposed additional facilities.

TECHNICAL SERVICES

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Current <u>Estimate Estimate</u>		1978 Budget <u>Estimate</u>
			(Thousands of Dollars)		
IV. <u>TECHNICAL SERVICES</u>	2,083	492	1,864	1,973	1,959
<u>Basis of Fund Requirements</u>					
<u>Summary of Technical Services</u>					
A. <u>Automatic Data Processing</u>					
1. Equipment.....	317	71	221	262	290
2. Programming and operation.....	<u>881</u>	<u>222</u>	<u>869</u>	<u>911</u>	<u>809</u>
Subtotal.....	<u>1,198</u>	<u>293</u>	<u>1,090</u>	<u>1,173</u>	<u>1,099</u>
B. <u>Engineering Services</u>	<u>92</u>	<u>28</u>	<u>84</u>	<u>89</u>	<u>94</u>
C. <u>Scientific and Technical Information and Educational Programs</u>					
1. Operation of NASA technical library.....	321	97	294	354	375
2. Educational/informational programs.....	318	46	273	179	203
3. Scientific and technical information.....	<u>154</u>	<u>28</u>	<u>123</u>	<u>178</u>	<u>188</u>
Subtotal.....	<u>793</u>	<u>171</u>	<u>690</u>	<u>711</u>	<u>766</u>
Total, Technical Services.....	<u>2,083</u>	<u>492</u>	<u>1,864</u>	<u>1,973</u>	<u>1,959</u>
A. <u>Automatic Data Processing</u>	<u>1,198</u>	<u>293</u>	<u>1,090</u>	<u>1,173</u>	<u>1,099</u>

This category provides for the lease, purchase, maintenance, and programming and operations services of ADP equipment which is not dedicated to research or operational systems.

The increase from the 1977 budget estimate to the 1977 current estimate results from cost increases for lease and maintenance of equipment, purchase of software packages and programming and operations support contract wage rate increases. Increases are partially offset by a reduction of 3 support contractor manyears.

The decrease from 1977 to 1978 represents a reduction of 9 support contractor manyears of effort for programming and operations support, offset by increased costs for leases, contractual services and maintenance, and wage rate increases for contractor support.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978
			Budget <u>Estimate</u>	Current <u>Estimate</u>	Budget <u>Estimate</u>
(Thousands of Dollars)					
B. <u>Engineering Services</u>	<u>92</u>	<u>28</u>	<u>84</u>	<u>89</u>	<u>94</u>

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

C. <u>Scientific and Technical Information and Educational Programs</u>	<u>793</u>	<u>171</u>	<u>690</u>	<u>711</u>	<u>766</u>
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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.....	321	97	294	354	375
--	-----	----	-----	-----	-----

The technical library provides reference, acquisition, cataloging, translating and dissemination services to all employees.

The increase from the 1977 budget to the current estimate is due to mandatory cost increases associated with the new library contract.

The increase from 1977 to 1978 is due to negotiated contractor wage rate increases in the library contract.

2. Educational/information programs.....	318	46	273	179	203
--	-----	----	-----	-----	-----

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.

The decrease from the 1977 budget to the current estimate is due to accelerated completion of the Visitors Center in 1976, and the acquisition of exhibits, materials, and contractual services earlier than planned.

The increase from 1977 to 1978 is due to cost increases for preparation of informational materials and exhibits, and management and maintenance of the Visitors Center.

	<u>1976</u> <u>Actual</u>	<u>Transition</u> <u>Quarter</u> <u>Actual</u>	<u>1977</u>		<u>1978</u> <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
			(Thousands of Dollars)		
3. Scientific and technical information.....	154	28	123	178	188

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

The increase from the 1977 budget to the current estimate is due to increased costs for all writing, editing, publication and graphic services required for preparation of documents.

The increase from 1977 to 1978 is due to contractual cost increases for graphic and documentation services.

ADMINISTRATIVE SUPPORT

V. <u>ADMINISTRATIVE SUPPORT</u>	<u>4,809</u>	<u>1,459</u>	<u>4,822</u>	<u>5,394</u>	<u>5,347</u>
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Basis of Fund Requirements

Summary of Administrative Support

A. Communications

1. Leased lines and long distance.....	792	187	918	858	909
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	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977 <u>Budget</u> <u>Current</u> <u>Estimate</u> <u>Estimate</u>		1978 <u>Budget</u> <u>Estimate</u>
			(Thousands of Dollars)		
2. Local telephone service.....	1,148	332	1,085	1,085	1,163
3. Other communications.....	<u>235</u>	<u>64</u>	<u>15</u>	<u>240</u>	<u>257</u>
Subtotal, Communications.....	<u>2,175</u>	<u>583</u>	<u>2,018</u>	<u>2,183</u>	<u>2,329</u>
B. <u>Administrative Printing</u>	<u>95</u>	<u>20</u>	<u>107</u>	<u>151</u>	<u>160</u>
C. <u>Supplies, Materials and Equipment</u>	<u>876</u>	<u>199</u>	<u>671</u>	<u>943</u>	<u>849</u>
D. <u>Transportation</u>					
1. Center operations.....	1,168	516	1,541	1,554	1,423
2. Common carrier.....	<u>13</u>	<u>1</u>	<u>5</u>	<u>9</u>	<u>8</u>
Subtotal, Transportation.....	<u>1,181</u>	<u>517</u>	<u>1,546</u>	<u>1,563</u>	<u>1,431</u>
E. <u>Administrative Support Services</u>					
1. Installation support services.....	181	30	122	119	101
2. Occupational medicine and environmental health.....	<u>301</u>	<u>110</u>	<u>358</u>	<u>435</u>	<u>477</u>
Subtotal, Administrative Support Services.....	<u>482</u>	<u>140</u>	<u>480</u>	<u>554</u>	<u>578</u>
Total, Administrative Support.....	<u>4,809</u>	<u>1,459</u>	<u>4,822</u>	<u>5,394</u>	<u>5,347</u>
A. <u>Communications</u>	<u>2,175</u>	<u>583</u>	<u>2,018</u>	<u>2,183</u>	<u>2,329</u>

Included in this estimate are the costs of leased lines, long distance tolls, local telephone exchange services, and other administrative communications.

The change from the 1977 budget to the 1977 current estimate is due to the reduction in the number of instrument relocations and the number of leased lines, and a lower assessment for FTS than originally planned, offset by mandatory rate increases for commercial services.

The increase from 1977 to 1978 is due to the full year effect of rate increases for Federal Telephone Service (FTS) and commercial usage.

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
			(Thousands of Dollars)		
B. <u>Administrative Printing and Reproduction</u>	<u>95</u>	<u>20</u>	<u>107</u>	<u>151</u>	<u>160</u>

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.

The increase from the 1977 budget to the current estimate is due to increased costs for all printing and duplicating services, and to increased requirements such as updating of management handbooks.

The estimate for 1978 provides for contractual cost increases for these services.

C. <u>Supplies, Materials and Equipment</u>	<u>876</u>	<u>199</u>	<u>671</u>	<u>943</u>	<u>849</u>
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This category includes general maintenance materials, office supplies, subscriptions, computer supplies, print shop supplies and materials for the motor pool and mailroom, as well as motor vehicles and transportation equipment, office equipment and furniture, and mail handling equipment.

The increase from the 1977 budget to the current estimate reflects increased costs for supplies and equipment. These items have escalated in cost at a rate greater than anticipated since the time of the 1977 budget preparation.

The estimated decrease in 1978 reflects reduced procurement requirements in several of these areas.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	<u>Estimate</u>
(Thousands of Dollars)					
D. <u>Transportation</u>	<u>1,181</u>	<u>517</u>	<u>1,546</u>	<u>1,563</u>	<u>1,431</u>

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. Also included in the contract are services for packing, crating, rigging, and local movements.

The increase from the 1977 budget to the current estimate is due to contractual wage rate increases for the transportation contract, partially offset by a slight reduction in the support contractor services.

The change from 1977 to 1978 reflects contractual wage rate increases, offset by a further reduction in the support contractor effort for the transportation contract.

E. <u>Administrative Support Services</u>	<u>482</u>	<u>140</u>	<u>480</u>	<u>554</u>	<u>578</u>
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Administrative support services include general support services such as logistics support, supply operations, mail and messenger services, Center medical services, and on-site support for copier equipment operations.

The increase from the 1977 budget to the current estimate results from the addition of 2 manyears for the medical service contract to augment the employee medical program in line with NASA management instructions. Also included are wage rate increases for support contract personnel for the medical services, and increased costs for the copier equipment contract, partially offset by reduction of 7 manyears from the copier equipment operations contract due to a decision to remove the operators and make the machines self-service.

One manyear has been added to the medical services contract in 1978 to fully implement the employee medical program. Also provided are negotiated wage rate increases for the medical services contract.

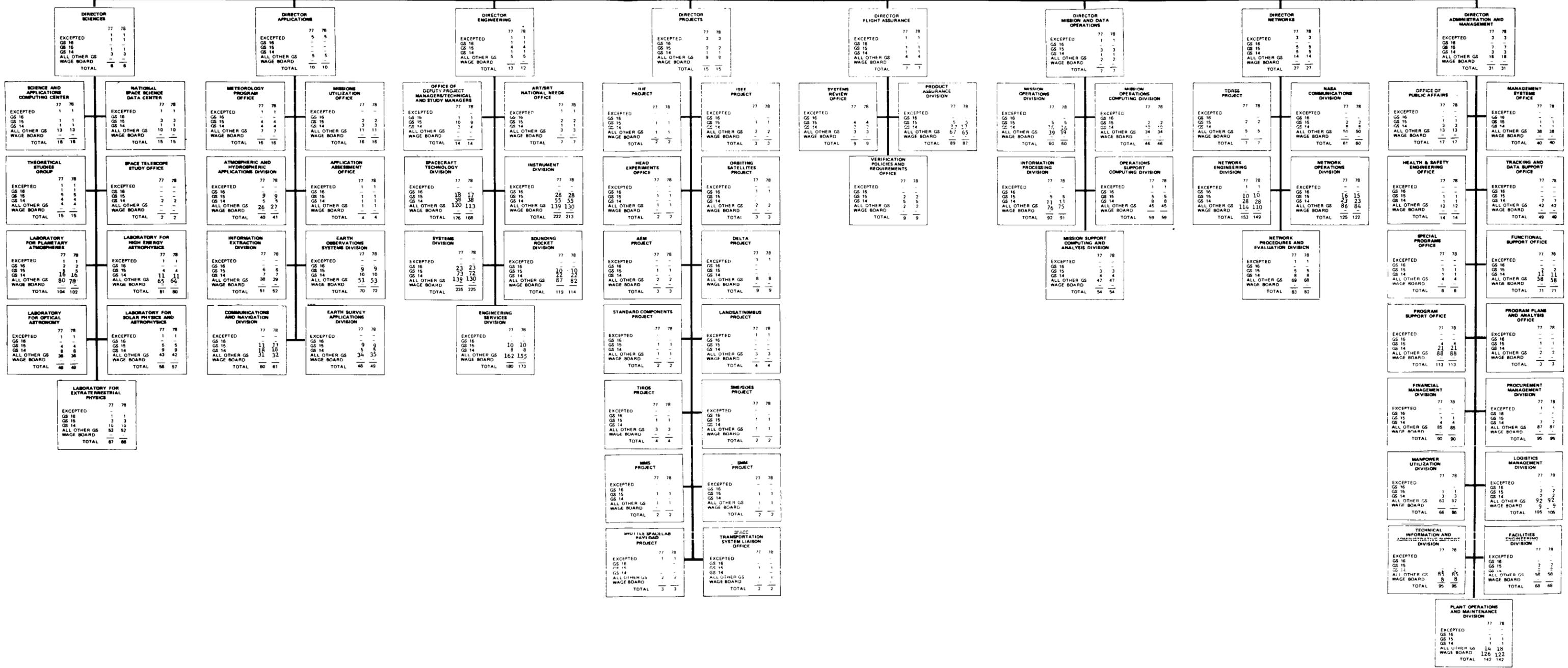
GODDARD SPACE FLIGHT CENTER NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ORGANIZATION AND STAFFING SUMMARY

STAFFING SUMMARY	
EXCEPTED	37
GS 16	40
GS 15	8
GS 14	207
GS 13	204
ALL OTHER GS	2637
WAGE BOARD	162
TOTAL	3675

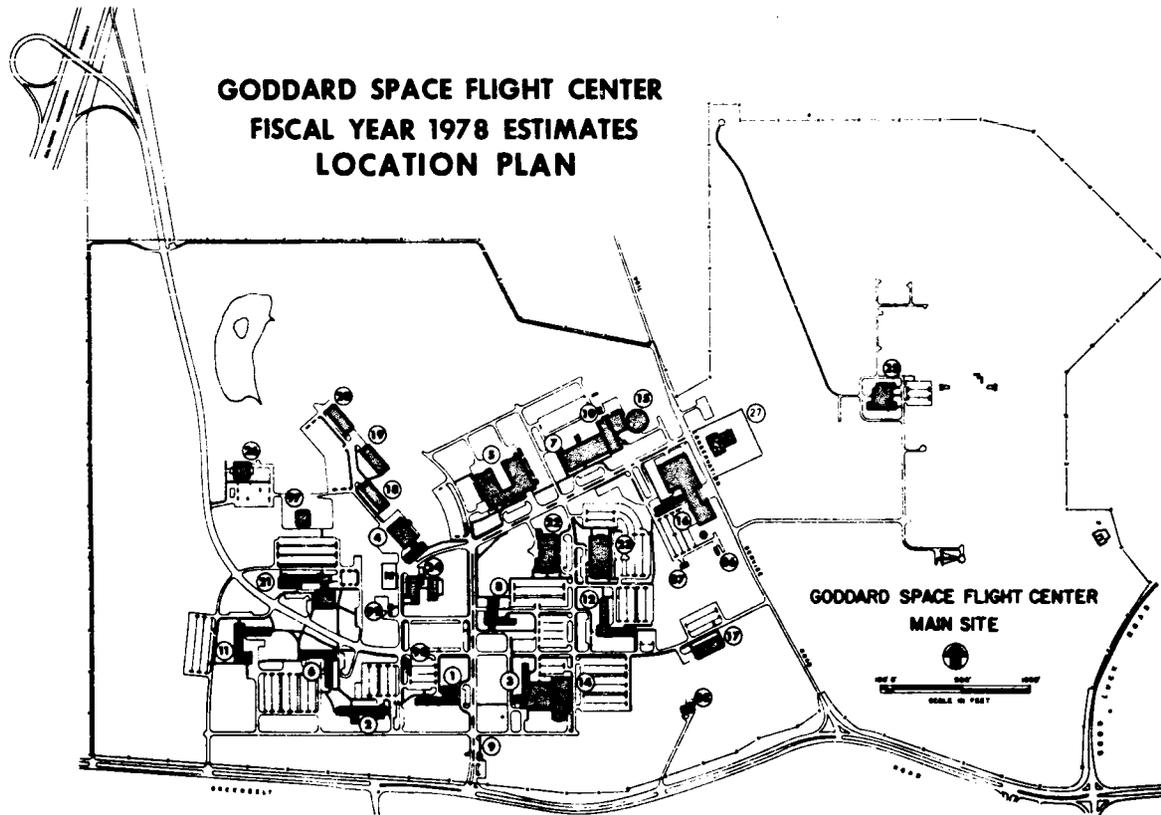
OFFICE OF THE DIRECTOR	
EXCEPTED	77
GS 16	3
GS 15	1
GS 14	1
ALL OTHER GS	7
WAGE BOARD	7
TOTAL	12

ADVANCED PLANS OFFICE	
EXCEPTED	77
GS 16	1
GS 15	1
GS 14	1
ALL OTHER GS	1
WAGE BOARD	1
TOTAL	3

GODDARD INSTITUTE FOR SPACE STUDIES	
EXCEPTED	77
GS 16	1
GS 15	1
GS 14	4
GS 13	3
ALL OTHER GS	8
WAGE BOARD	8
TOTAL	16



**GODDARD SPACE FLIGHT CENTER
FISCAL YEAR 1978 ESTIMATES
LOCATION PLAN**



- 1 SPACE PROJECTS BUILDING
- 2 RESEARCH PROJECTS LABORATORY
- 3 CENTRAL FLIGHT CONTROL & RANGE OPERATIONS BUILDING
- 4 GENERAL PURPOSE FACILITY BUILDING
- 5 INSTRUMENT CONSTRUCTION & INSTALLATION LABORATORY
- 6 SPACE SCIENCES LABORATORY
- 7 PAYLOAD TESTING FACILITY
- 8 SATELLITE SYSTEMS BUILDING
- 9 MAIN GATE HOUSE
- 10 ENVIRONMENTAL TESTING LABORATORY
- 11 APPLIED SCIENCES LABORATORY
- 12 TRACKING & TELEMETRY LABORATORY
- 14 SPACECRAFT OPERATIONS FACILITY
- 15 LAUNCH PHASE SIMULATOR
- 16 DEVELOPMENT OPERATIONS BUILDING
- 17 MULTI-PURPOSE BUILDING
- 18 BUSINESS OPERATIONS BUILDING
- 19 MULTI-PURPOSE BUILDING
- 20 GEOCHEMISTRY BUILDING
- 21 METEOROLOGICAL SYSTEMS DEVELOPMENT LABORATORY
- 22 MECHANICAL TEST FACILITY & QUALITY ASSURANCE LABORATORY
- 23 DATA INTERPRETATION LABORATORY
- 24 CENTRAL HEATING & REFRIGERATION PLANT
- 25 NETWORK TRAINING & TEST FACILITY
- 26 NASA SPACE SCIENCE DATA CENTER
- 27 MOBILE EQUIPMENT SUPPORT FACILITY
- 86 ANTENNA CONTROL BUILDING
- 87 GAS CYLINDER STORAGE BUILDING
- 88 VISITORS' CENTER
- 97 PLANT MAINTENANCE SUPPORT FACILITY
- 98 BUDGET BUILDING
- 99 CONSTRUCTION FIELD OFFICE

**GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND**



RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

WALLOPS FLIGHT CENTER

DESCRIPTION

Wallops Flight Center 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 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 one-half mile wide at its widest point. Located on the island are rocket storage buildings, blockhouses, assembly shops and 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 Flight Center, totalling 6,166 acres, consists of 1,833 acres on the main base, 3,085 acres on Wallops Island, 108 acres on the mainland tracking site, and 1,140 acres on marsh land. The total capital investment, including fixed assets in progress and contractor-held facilities at various locations as of September 30, 1976, was \$135,440,000.

MISSION

Wallops Flight Center prepares, assembles, launches, and tracks space vehicles and acquires scientific information from them. 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. Center personnel assist these scientific research teams with their projects and develop, as necessary, special types of instrumentation and equipment to complete the mission and manage NASA research projects.

Research at Wallops Flight Center is directed toward gathering information about the earth's atmosphere and its near space environment. The Center utilizes 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 Flight Center has launched seventeen satellites and approximately 9,000 other research vehicles consisting of from one to seven stages in quest of 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 projects, anti-skid tests on grooved runways, collision avoidance programs, and laser and radar tracking of aircraft and satellites.

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

The Center is also responsible for a portion of the National Sounding Rocket Program. This requires interface with the scientific, university and international communities. Engineering support provided includes analytical, feasibility, and design studies, payload, vehicle and recovery systems engineering, test and evaluation, and data analysis and reporting.

Wallops Flight Center is also active in 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 Flight Center to observe operations or seek assistance in establishing sounding rocket facilities of their own.

SUMMARY OF RESOURCES REQUIREMENTS

	<u>FUNDS</u>		Transition		1977		1978
	1976 <u>Actual</u>	Quarter <u>Actual</u>	Budget <u>Estimate</u>	Current <u>Estimate</u>			<u>Budget Estimate</u>
(Thousands of Dollars)							
I. Personnel and Related Costs.....	8,687	2,271	9,104	9,531			9,913
II. Travel.....	251	131	274	271			283
III. Facilities Services.....	3,148	1,137	3,234	3,071			2,968
IV. Technical Services.....	213	85	235	219			229
V. Administrative Support.....	<u>782</u>	<u>361</u>	<u>807</u>	<u>807</u>			<u>833</u>
Total, Fund Requirements.....	<u>13,081</u>	<u>3,985</u>	<u>13,654</u>	<u>13,899</u>			<u>14,226</u>

Distribution of Permanent Positions by Program

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
<u>Direct Positions</u>					
<u>Space Flight</u>	<u>4</u>	<u>4</u>	<u>3</u>	<u>4</u>	<u>4</u>
Space flight operations.....	1	1	---	---	---
Expendable launch vehicles.....	3	3	3	4	4
<u>Space Science</u>	<u>63</u>	<u>63</u>	<u>59</u>	<u>59</u>	<u>58</u>
Physics and astronomy.....	62	62	59	59	58
Lunar and planetary exploration.....	1	1	---	---	---
<u>Space Applications</u>	<u>57</u>	<u>57</u>	<u>59</u>	<u>59</u>	<u>59</u>
<u>Aeronautics and Space Technology</u>	<u>20</u>	<u>20</u>	<u>22</u>	<u>21</u>	<u>21</u>
Aeronautical research and technology.....	18	18	20	21	21
Space research and technology.....	2	2	2	---	---
<u>Tracking and Data Acquisition</u>	<u>99</u>	<u>99</u>	<u>99</u>	<u>99</u>	<u>99</u>
<u>Technology Utilization</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Subtotal, direct positions.....	244	244	243	243	242
<u>Indirect Positions</u>	<u>171</u>	<u>171</u>	<u>171</u>	<u>171</u>	<u>171</u>
Total, permanent positions.....	<u>415</u>	<u>415</u>	<u>414</u>	<u>414</u>	<u>413</u>

PERSONNEL AND RELATED COSTS

	<u>1976</u>	<u>Transition</u>	<u>1977</u>		<u>1978</u>
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
I. <u>PERSONNEL AND RELATED COSTS</u>	<u>8,687</u>	<u>2,271</u>	<u>9,104</u>	<u>9,531</u>	<u>9,913</u>
<u>Basis of Fund Requirements</u>					
A. <u>Compensation and Benefits</u>					
1. <u>Compensation</u>					
a. Permanent positions.....	7,559	1,934	7,895	8,271	8,580
b. Nonpermanent.....	163	73	210	221	226
c. Reimbursable detailees.....	---	---	20	---	---
d. Overtime and other compensation.....	<u>141</u>	<u>33</u>	<u>141</u>	<u>163</u>	<u>163</u>
Subtotal, Compensation.....	7,863	2,040	8,266	8,655	8,969
2. <u>Benefits</u>	<u>764</u>	<u>198</u>	<u>777</u>	<u>815</u>	<u>878</u>
Subtotal, Compensation and Benefits.....	<u>8,627</u>	<u>2,238</u>	<u>9,043</u>	<u>9,470</u>	<u>9,847</u>
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	2	13	6	6	6
2. Personnel training.....	<u>58</u>	<u>20</u>	<u>55</u>	<u>55</u>	<u>60</u>
Subtotal, Supporting Costs.....	<u>60</u>	<u>33</u>	<u>61</u>	<u>61</u>	<u>66</u>
Total, Personnel and Related Costs.....	<u>8,687</u>	<u>2,271</u>	<u>9,104</u>	<u>9,531</u>	<u>9,913</u>

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
(Thousands of Dollars)					
A. <u>Compensation and Benefits</u>	<u>8,627</u>	<u>2,238</u>	<u>9,043</u>	<u>9,470</u>	<u>9,847</u>
1. <u>Compensation</u>	<u>7,863</u>	<u>2,040</u>	<u>8,266</u>	<u>8,655</u>	<u>8,969</u>
a. Permanent positions.....	7,559	1,934	7,895	8,271	8,580

The funds shown above will support 414 permanent positions in FY 1977 and 413 in FY 1978.

Basis of Cost for Permanent Positions

In 1978, the cost of permanent positions will be \$8,580, an increase of \$309 from 1977. This increase is calculated as follows:

Cost of permanent positions in 1977.....	\$8,271
Cost increase in 1978.....	+450
Within grade advances and career development:	
Full year effect of 1977 actions.....	+233
Partial year effect of 1978 actions.....	+212
Full year effect of October 1976 pay raise.....	+5
Cost decreases in 1978.....	-141
Turnover savings and abolished positions:	
Full year effect of 1977 actions.....	-57
Partial year effect of 1978 actions.....	-55
One less paid day in 1978.....	-29
Cost of permanent positions in 1978.....	<u>\$8,580</u>

b. Nonpermanent positions

1. Cost.....	\$163	\$73	\$210	\$221	\$226
2. Manyears.....	33	10	31	33	33

The increase from the 1977 budget to the current estimate is due to the October 1976 pay raise and a two-manyear increase in the Co-op program. The increase between the 1977 current estimate and the 1978 budget estimate reflects slightly higher costs for the Co-op and opportunity programs. The 1978 estimate will support the following programs at the levels indicated below:

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>
College cooperative training.....	14
Summer employment.....	3
Opportunity programs.....	14
Other temporary employment.....	<u>2</u>
Total.....	<u>33</u>

	<u>1976</u>	Transition	<u>1977</u>		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
	(Thousands of Dollars)				
c. Reimbursable detailees.....	---	---	20	---	---
<p>The 1977 current estimate decrease reflects the cancellation of a reimbursable detailee in conjunction with change of the Center's aeronautical project requirements.</p>					
d. Overtime and other compensation.....	141	33	141	163	163

Overtime funds are required at Wallops primarily to meet operational requirements of the sounding rocket programs of the Physics and Astronomy and Space Applications programs. Many factors beyond the Center's control, such as launch schedules, weather holds, and range clearance problems necessitate work beyond normal hours to operate the launch facilities, provide instrumentation support, and conduct tracking and data acquisition activities required to assure mission success. The increase from the 1977 budget to the current estimate is due to the October 1976 pay raise and an increase necessary for scheduled launch support. The 1978 requirements remain at the 1977 level.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
2. Benefits.....	764	198	777	815	878

The current estimate for 1977 is increased over the budget estimate to account for the October 1976 pay raise, and the inclusion of workman's compensation previously funded through NASA Headquarters. The 1978 increase reflects the full year effect of higher rates for health insurance and increased retirement costs associated with increased compensation. The following table indicates the cost of benefits by the major categories:

Category of Cost

Contribution to the Civil Service Retirement Fund	533	137	555	582	630
Contribution for employees life insurance.....	36	9	33	36	36
Contribution for employees health insurance.....	180	47	177	180	190
FICA.....	5	3	9	5	5
Incentive awards.....	1	---	1	1	1
Workman's compensation.....	7	2	---	9	13
Other benefits.....	<u>2</u>	<u>---</u>	<u>2</u>	<u>2</u>	<u>3</u>
Total.....	<u>764</u>	<u>198</u>	<u>777</u>	<u>815</u>	<u>878</u>

B. <u>Supporting Costs</u>	<u>60</u>	<u>33</u>	<u>61</u>	<u>61</u>	<u>66</u>
1. Transfer of personnel.....	2	13	6	6	6

The transfer of personnel costs in 1977 and 1978 will cover the expenses for one permanent change of station move planned for each year.

2. Personnel training.....	58	20	55	55	60
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The estimates for personnel training provide for costs of the Wallops Flight Center engineering technician apprentice program. Because of its remote location, Wallops historically has had difficulty recruiting qualified engineers and engineering techniques. The increase in 1978 is necessary because of higher tuition costs.

<u>TRAVEL</u>					
	1976	Transition	1977		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
II. <u>TRAVEL</u>	<u>251</u>	<u>131</u>	<u>274</u>	<u>271</u>	<u>283</u>

Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Travel.....	102	31	138	112	116
B. Meetings and Technical Seminars.....	38	7	22	41	42
C. Administrative Travel.....	<u>111</u>	<u>93</u>	<u>114</u>	<u>118</u>	<u>125</u>
Total, Travel.....	<u>251</u>	<u>131</u>	<u>274</u>	<u>271</u>	<u>283</u>

The requirements for travel in 1978 are essentially the same as in 1977. The distribution between sub-functions has been changed from the 1977 budget to the current estimate based on estimated requirements. The increase from 1977 to 1978 reflects higher costs for local transportation contract and a slight increase in launch-related travel.

A. <u>Program Travel</u>	102	31	138	112	116
--------------------------------	-----	----	-----	-----	-----

These costs include travel to industrial contractors and educational institutions, NASA installations, other government installations, and launch sites in support of the Wallops mission.

B. <u>Meetings and Technical Seminars</u>	38	7	22	41	42
---	----	---	----	----	----

This travel is for the attendance at NASA-sponsored meetings, other government-sponsored meetings, and meetings sponsored by nongovernment organizations. It provides opportunities for participating personnel to benefit from exposure to technological advances outside WFC.

C. <u>Administrative Travel</u>	111	93	114	118	125
---------------------------------------	-----	----	-----	-----	-----

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

FACILITIES SERVICES

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
	(Thousands of Dollars)				
III. <u>FACILITIES SERVICES</u>	3,148	1,137	3,234	3,071	2,968
<u>Basis of Fund Requirements</u>					
<u>Summary of Facilities Services</u>					
A. <u>Maintenance and Related Services</u>					
1. Maintenance, repair and alterations of buildings and grounds.....	551	175	601	520	541
2. Custodial services.....	821	416	894	792	769
3. Maintenance of equipment.....	<u>271</u>	<u>152</u>	<u>208</u>	<u>208</u>	<u>86</u>
Subtotal.....	<u>1,643</u>	<u>743</u>	<u>1,703</u>	<u>1,520</u>	<u>1,396</u>
B. <u>Operations of Facilities</u>					
1. Utilities.....	1,036	304	1,220	1,082	1,103
2. Supplies and equipment.....	<u>469</u>	<u>90</u>	<u>311</u>	<u>469</u>	<u>469</u>
Subtotal.....	<u>1,505</u>	<u>394</u>	<u>1,531</u>	<u>1,551</u>	<u>1,572</u>
Total, Facilities Services.....	<u>3,148</u>	<u>1,137</u>	<u>3,234</u>	<u>3,071</u>	<u>2,968</u>
A. <u>Maintenance and Related Services</u>	<u>1,643</u>	<u>743</u>	<u>1,703</u>	<u>1,520</u>	<u>1,396</u>
1. Maintenance, repair and alterations of buildings and grounds.....	551	175	601	520	541

Over 330 buildings and approximately one million square feet of building space on 6,166 acres must be maintained. The corrosive environment at Wallops Flight Center 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. The decrease from the 1977 budget to the current estimate is due to the completion of minor construction projects during the Transition Quarter. The increase in 1978 is due to mandatory support contractor wage rate increases.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
2. Custodial services.....	821	416	894	792	769
<p>This category includes fire protection, protective guard service, and janitorial services for 100 buildings and 711,325 square feet of floor space. The decrease from the 1977 budget to the current estimate is due to changed phasing of funds over the Transition Quarter and 1977. The 1978 decrease is due to a planned reduction in the janitorial contract partially offset by mandatory wage rate increases.</p>					
3. Maintenance of equipment.....	271	152	208	208	86
<p>Provides for operational maintenance of technical and administrative equipment, and operation of the heating plant. The 1978 budget decrease reflects a planned change in the phasing of contractual obligations to provide funds for mandatory increased costs in other areas.</p>					
B. <u>Operations of Facilities</u>	<u>1,505</u>	<u>394</u>	<u>1,531</u>	<u>1,551</u>	<u>1,572</u>
1. Utilities.....	1,036	304	1,220	1,082	1,103
<p>The 1977 current estimate and the 1978 estimate reflect a planned reduction in the usage of electrical power and heating fuel oil in order to conform with the agency plan of reducing utility consumption, partially offset by mandatory rate increases.</p>					
2. Supplies and equipment.....	469	90	311	469	469
<p>Provides for the purchase of supplies and equipment used in support of the physical plant. The current 1977 and 1978 estimate of requirements for supplies and equipment will maintain inventories and replacements at current levels.</p>					

TECHNICAL SERVICES

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Current <u>Estimate</u> <u>Estimate</u>		1978 Budget <u>Estimate</u>
			(Thousands of Dollars)		
IV. <u>TECHNICAL SERVICES</u>	213	85	235	219	229
<u>Basis of Fund Requirements</u>					
<u>Summary of Technical Services</u>					
A. <u>Automatic Data Processing</u>					
1. Equipment.....	7	58	22	10	10
2. Programming and operation.....	<u>52</u>	<u>---</u>	<u>64</u>	<u>50</u>	<u>53</u>
Subtotal.....	<u>59</u>	<u>58</u>	<u>86</u>	<u>60</u>	<u>63</u>
B. <u>Engineering Services</u>					
	<u>40</u>	<u>10</u>	<u>10</u>	<u>40</u>	<u>40</u>
C. <u>Scientific and Technical Information and Educational Programs</u>					
1. Operation of NASA technical library.....	94	9	131	98	104
2. Educational/informational programs.....	<u>20</u>	<u>8</u>	<u>8</u>	<u>21</u>	<u>22</u>
Subtotal.....	<u>114</u>	<u>17</u>	<u>139</u>	<u>119</u>	<u>126</u>
Total, Technical Services.....	<u>213</u>	<u>85</u>	<u>235</u>	<u>219</u>	<u>229</u>

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					

A. Automatic Data Processing..... 59 58 86 60 63

Provides for the lease, maintenance, operations, programming and analysis, and supplies of all ADP equipment not applicable to Research and Development. The 1977 and 1978 estimates of requirements have been reduced to reflect the changed phasing of the obligation plan from the Transition Quarter through 1978.

B. Engineering Services..... 40 10 10 40 40

Provides for the planning of facility activation, and facility modification. The 1977 current estimate has been increased to reflect current requirements. 1978 requirements are estimated to remain at the 1977 level.

C. Scientific and Technical Information and
Educational Programs..... 114 17 139 119 126

1. Library services..... 94 9 131 98 104

The Wallops library consists of 3,645 square feet of floor space which houses 21,596 books, 2,161 bound periodicals, current issues of 440 magazine subscriptions, 19,400 hardcopy technical reports and approximately 700,000 microfiche reports. The 1977 current estimate has been decreased to reflect the current level of requirements. The 1978 estimate provides for mandatory support contract wage increases.

2. Educational programs..... 20 8 8 21 22

Provides for the visitors center, exhibits, and public information releases. The 1977 current estimate reflects current requirements. 1978 requirements are expected to remain at essentially the same level.

ADMINISTRATIVE SUPPORT

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
			(Thousands of Dollars)		
V. <u>ADMINISTRATIVE SUPPORT</u>	<u>782</u>	<u>361</u>	<u>807</u>	<u>807</u>	<u>833</u>

Basis of Fund Requirements

Summary of Administrative Support

A. Communications

1. Leased lines and long distance.....	23	3	6	3	4
2. Local telephone service.....	95	74	122	102	106
3. Other communications.....	<u>22</u>	<u>5</u>	<u>---</u>	<u>23</u>	<u>25</u>
Subtotal, Communications.....	<u>140</u>	<u>82</u>	<u>128</u>	<u>128</u>	<u>135</u>

B. Administrative Printing.....

57	66	73	63	67
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C. Supplies, Materials and Equipment.....

481	175	522	511	519
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D. Transportation

1. Center operations.....	54	12	42	54	58
2. Common carrier.....	<u>30</u>	<u>6</u>	<u>23</u>	<u>30</u>	<u>32</u>
Subtotal, Transportation.....	<u>84</u>	<u>18</u>	<u>65</u>	<u>84</u>	<u>90</u>

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
(Thousands of Dollars)					
E. <u>Administrative Support Services</u>					
1. Installation support services.....	1	---	---	1	1
2. Occupational medicine and environmental health.....	<u>19</u>	<u>20</u>	<u>19</u>	<u>20</u>	<u>21</u>
Subtotal, Administrative Support Services..	<u>20</u>	<u>20</u>	<u>19</u>	<u>21</u>	<u>22</u>
Total, Administrative Support.....	<u>782</u>	<u>361</u>	<u>807</u>	<u>807</u>	<u>833</u>
A. <u>Communications</u>	<u>140</u>	<u>82</u>	<u>128</u>	<u>128</u>	<u>135</u>

These funds provide for the local telephone and exchange service, Federal Telecommunications Service, leased lines, long distance tolls and postage. The 1978 increase reflects mandatory contractor wage increases.

B. <u>Administrative Printing</u>	<u>57</u>	<u>66</u>	<u>73</u>	<u>63</u>	<u>67</u>
---	-----------	-----------	-----------	-----------	-----------

This estimate includes contracted services for printing, reproduction, and microfilming in support of Center administrative activities. The 1977 current estimate is decreased based on reduced requirements partially offset by mandatory contractor wage rate increases. The 1978 increase reflects the full year effect of the contractor wage increases.

C. <u>Supplies, Materials and Equipment</u>	<u>481</u>	<u>175</u>	<u>522</u>	<u>511</u>	<u>519</u>
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This category provides for general administrative operating and service materials and equipment. The 1978 estimate is essentially the same level as 1977 with the only increase due to the increased rental cost of quick copy equipment.

D. <u>Transportation</u>	<u>84</u>	<u>18</u>	<u>65</u>	<u>84</u>	<u>90</u>
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This includes costs for the operation of the motor pool, common carrier, and the maintenance and repair of the administrative aircraft. The 1977 current estimate reflects the current level of requirements. The 1978 increase is due to mandatory contractor wage increases.

	1976	Transition	1977		1978
	Actual	Quarter	Budget	Current	Budget
		Actual	Estimate	Estimate	Estimate
		(Thousands of Dollars)			
E. <u>Administrative Support Services</u>	<u>20</u>	<u>20</u>	<u>19</u>	<u>21</u>	<u>22</u>

Medical services are budgeted for in this category. The requirements for medical services are level with slight cost increases based on negotiated contractor wage rates.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 ORGANIZATION AND STAFFING CHART
 WOLLOPS FLIGHT CENTER

STAFFING CHART		
	<u>CY 77</u>	<u>BY 78</u>
Excepted	2	2
GS-16	2	2
CS-15	12	12
GS-14	29	29
All Other GS	327	327
Wage Grade	42	41
Total Permanent	414	413

DIRECTOR		
	<u>CY</u>	<u>BY</u>
Excepted	2	2
GS-16	0	0
GS-15	3	3
GS-14	0	0
All Other GS	2	2
Wage Grade	0	0
Total Permanent	7	7

OPERATIONS DIRECTORATE		
	<u>CY</u>	<u>BY</u>
Excepted	-	-
GS-16	1	1
GS-15	3	3
GS-14	6	6
All Other GS	107	107
Wage Grade	3	3
Total Permanent	120	120

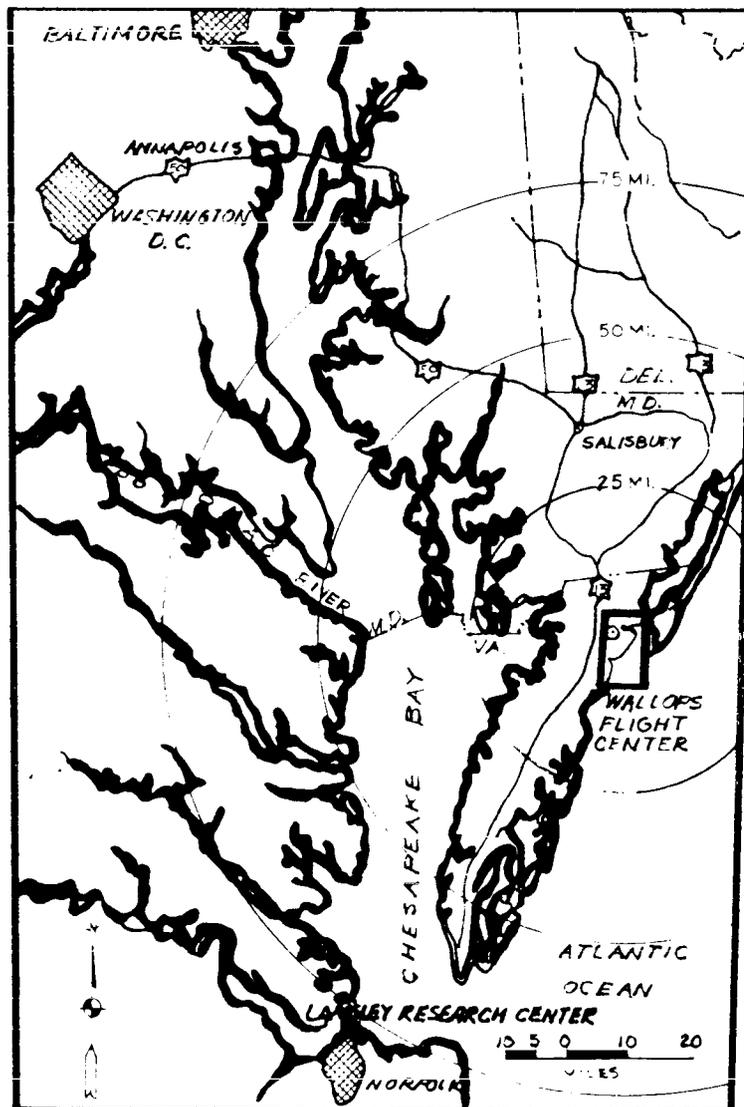
ENGINEERING DIRECTORATE		
	<u>CY</u>	<u>BY</u>
Excepted	-	-
GS-16	1	1
GS-15	4	4
GS-14	12	12
All Other GS	75	75
Wage Grade	0	0
Total Permanent	92	92

ADMINISTRATION DIRECTORATE		
	<u>CY</u>	<u>BY</u>
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	2	2
All Other GS	72	72
Wage Grade	0	0
Total Permanent	75	75

TECHNICAL SUPPORT DIRECTORATE		
	<u>CY</u>	<u>BY</u>
Excepted	-	-
GS-16	-	-
GS-15	0	0
GS-14	1	1
All Other GS	62	62
Wage Grade	39	38
Total Permanent	102	101

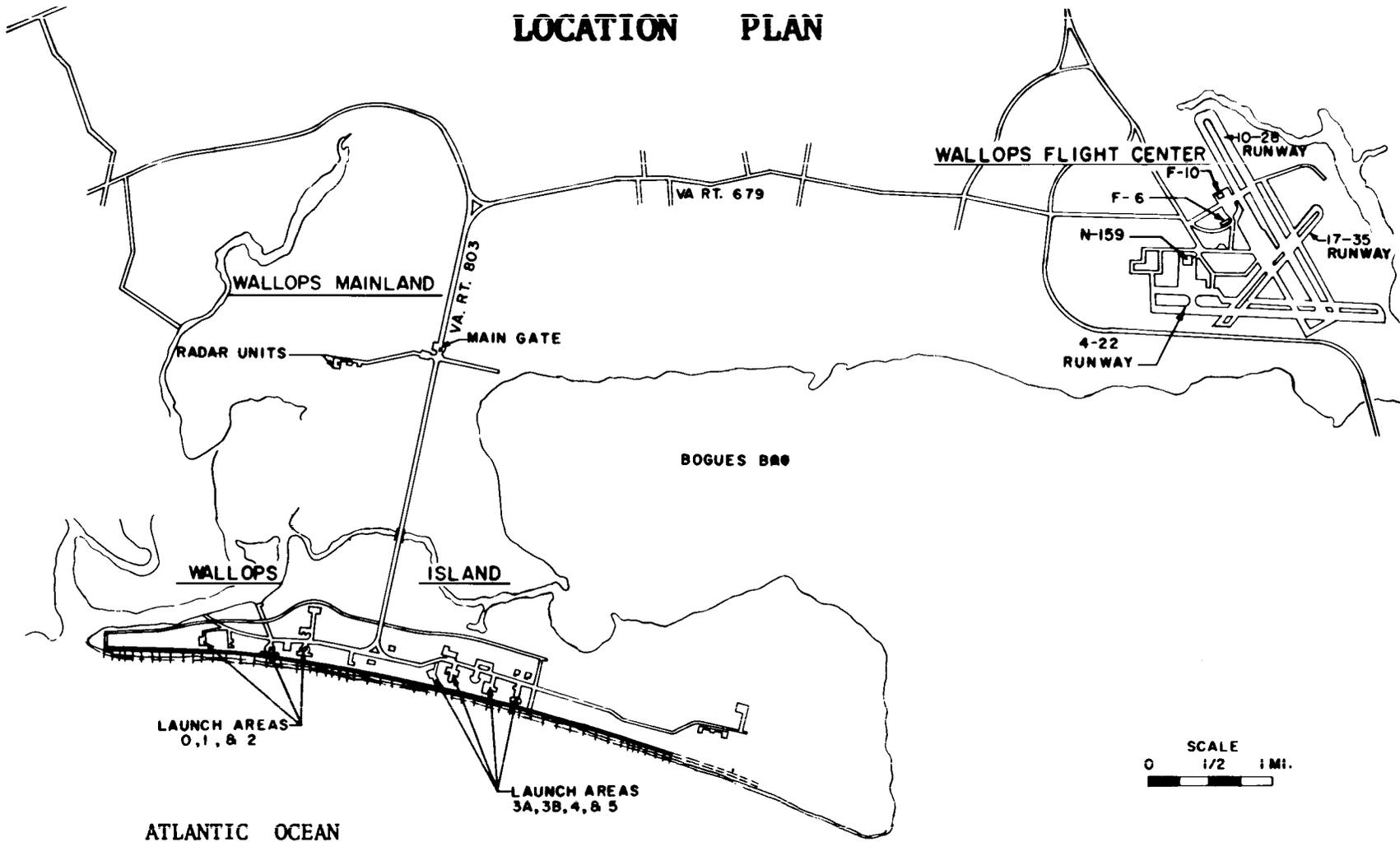
APPLIED SCIENCE DIRECTORATE		
	<u>CY</u>	<u>BY</u>
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	8	8
All Other GS	9	9
Wage Grade	0	0
Total Permanent	18	18

—WALLOPS— FLIGHT CENTER LOCATION



WALLOPS FLIGHT CENTER
FISCAL YEAR 1978 ESTIMATES

LOCATION PLAN



WALLOPS FLIGHT CENTER



WALLEYS FLIGHT CENTER



WALLOPS FLIGHT CENTER



RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

AMES RESEARCH CENTER

DESCRIPTION

The Ames Research Center is located on 421 acres at the southern end of San Francisco Bay on land contiguous to the U.S. Naval Air Station, Moffett Field, California. Certain 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 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 September 30, 1976, was \$337,192,000.

MISSION

The programs at the Ames Research Center involve research and development in the fields of aeronautics, space science, life science, and space technology, as well as application to national needs of the new science and technology growing out of the aerospace program. Specifically, the Center's major program responsibilities are concentrated in these areas: short haul aircraft technology, helicopter technology, flight simulation, computational fluid mechanics, planetary entry, airborne sciences and applications, and aeronautical and space life sciences. In addition to these major program responsibilities, the Center provides support for military programs, the Space Shuttle program, and various civil aviation projects.

The aeronautical research program at Ames is the largest research and development effort at the Center with emphasis placed on theoretical analysis as a basis for the prediction and understanding of fluid flows and on the development of short-haul aircraft technology. The emphasis in computational fluid mechanics will lead to a much stronger role for the computer in the design of future aeronautical vehicles. The ILLIAC IV computer located at Ames is providing the expanded computational capability needed to support this research. The short-haul research involves systematic analytical studies and wind tunnel investigations to define and evaluate concepts, simulation studies of the flight characteristics of the concept using flight simulators, and finally, verification with experimental flight vehicles of the technological advances indicated in the research program. These activities are important to the future of both civil and military short-haul aviation, where success will depend on efficient flight and upon the ability to land and take off quickly and precisely from small areas with safety and regularity under all weather conditions.

Ames is also responsible for Pioneer-Venus missions. On one mission a multi-probe system will give us our first detailed in situ measurement of the Venusian atmosphere, the other mission will gather scientific data while orbiting Venus. Ames is also responsible for the development of a instrument-bearing probe for the Jupiter Orbiter/Probe mission. This assignment recognizes the ARC role involving the development of thermal protection systems for planetary atmosphere entry.

Research in Life Sciences is directed toward the search for life elsewhere in the universe, toward understanding the effects of space upon humans and other forms of life and the effect of aeronautical flight upon humans, and toward providing environments and equipment in spacecraft and aircraft that will permit crews and passengers to exist safely and perform effectively. A major portion of this effort is directed toward understanding the physiological changes that have been observed in manned space flight. The Center's search for extraterrestrial life focuses on such questions as: How did life originate? What chemical events occurred on primitive planets that culminated in organic matter necessary for the appearance of life? Under what extremes of planetary environments can life survive and grow? Answers to all of these questions are relevant to the broader questions of what life forms might be found on other planets and aid in developing spacecraft instrumentation for detecting and characterizing these life forms.

SUMMARY OF RESOURCES REQUIREMENTS

	<u>FUNDS</u>				
	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Current <u>Estimate</u> <u>Estimate</u>		1978 Budget <u>Estimate</u>
			(Thousands of Dollars)		
I. Personnel and Related Costs.....	42,421	10,850	41,409	44,460	44,197
II. Travel.....	1,227	346	1,080	1,060	1,071
III. Facilities.....	4,751	1,296	5,489	5,362	5,573
IV. Technical Services.....	593	165	569	595	565
V. Administrative Support.....	<u>1,972</u>	<u>628</u>	<u>1,971</u>	<u>2,196</u>	<u>2,300</u>
Total, fund requirements.....	<u>50,964</u>	<u>13,285</u>	<u>50,518</u>	<u>53,673</u>	<u>53,706</u>

Distribution of Permanent Positions by Program

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977 <u>Budget Estimate</u>	1977 <u>Current Estimate</u>	1978 <u>Budget Estimate</u>
<u>Direct Positions</u>					
<u>Space Flight</u>	8	8	7	8	6
Space flight operations.....	8	8	7	8	6
<u>Space Science</u>	371	371	356	371	379
Physics and astronomy.....	89	89	66	98	100
Lunar and planetary exploration.....	138	138	186	129	135
Life sciences.....	144	144	104	144	144
<u>Space Applications</u>	76	76	63	70	50
<u>Aeronautics and Space Technology</u>	769	769	756	741	748
Aeronautical research and technology.....	591	591	584	561	574
Space research and technology.....	178	178	172	180	174
<u>Technology Utilization</u>	11	11	11	8	8
<u>Energy Technology Applications</u>	2	2	---	1	1
Subtotal, direct positions.....	1,237	1,237	1,193	1,199	1,192
<u>Indirect Positions</u>	439	439	420	414	409
<u>Total, permanent positions</u>	1,676	1,676	1,613	1,613	1,601

PERSONNEL AND RELATED COSTS

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
	(Thousands of Dollars)				
I. <u>PERSONNEL AND RELATED COSTS</u>	42,421	10,850	41,409	44,460	44,197
<u>Basis of Fund Requirements</u>					
A. <u>Compensation and Benefits</u>					
1. <u>Compensation</u>					
a. Permanent positions.....	37,245	9,388	36,532	39,014	38,695
b. Nonpermanent.....	662	257	566	657	642
c. Reimbursable detailees.....	229	50	297	237	237
d. Overtime and other compensation.....	<u>378</u>	<u>92</u>	<u>405</u>	<u>399</u>	<u>413</u>
Subtotal, Compensation.....	38,514	9,787	37,800	40,307	39,987
2. <u>Benefits</u>	<u>3,651</u>	<u>989</u>	<u>3,341</u>	<u>3,912</u>	<u>3,950</u>
Subtotal, Compensation and Benefits.....	<u>42,165</u>	<u>10,776</u>	<u>41,141</u>	<u>44,219</u>	<u>43,937</u>
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	26	5	77	46	50
2. Personnel training.....	<u>230</u>	<u>69</u>	<u>191</u>	<u>195</u>	<u>210</u>
Subtotal, Supporting Costs.....	<u>256</u>	<u>74</u>	<u>268</u>	<u>241</u>	<u>260</u>
Total, Personnel and Related Costs.....	<u>42,421</u>	<u>10,850</u>	<u>41,409</u>	<u>44,460</u>	<u>44,197</u>

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
(Thousands of Dollars)					
A. <u>Compensation and Benefits</u>	<u>42,165</u>	<u>10,776</u>	<u>41,141</u>	<u>44,219</u>	<u>43,937</u>
1. <u>Compensation</u>	<u>38,514</u>	<u>9,787</u>	<u>37,800</u>	<u>40,307</u>	<u>39,987</u>
a. Permanent positions.....	37,245	9,388	36,532	39,014	38,695

In 1978 the cost of permanent positions will be \$38,695, a decrease of \$319 from 1977. This decrease results as follows:

Cost of permanent positions in 1977.....	39,014
Cost of increases in 1978.....	+770
Within grade advances and career development:	
Full year effect of 1977 actions.....	+302
Partial year effect of 1978 actions.....	+353
Full year effect of October 1976 pay raise.....	+115
Cost decreases in 1978.....	-1,089
Turn over savings and abolished positions:	
Full year effect of 1977 actions.....	-484
Partial year effect of 1978 actions.....	-341
One less pay day.....	-152
1978 manpower reductions.....	-112
Cost of permanent positions in 1978.....	<u>38,695</u>

b. Nonpermanent positions

1. Cost.....	\$662	\$257	\$566	\$657	\$642
2. Number of manyears.....	86	37	77	95	95

The 1977 and 1978 effort will be managed at a dollar level below the 1976 experience. The increase from the 1977 budget to the current estimate is the result of the October 1976 pay raise, Public Law 94-37 on reemployed annuitants, and an increase in the summer employment program. The decrease in 1978 is due to a change in the skill mix of the temporary employees to be used in the 1978 programs.

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>
College cooperative training.....	20
Summer employment.....	15
Opportunity programs.....	33
Other temporary employment.....	<u>27</u>
 Total.....	 <u>95</u>

	1976	Transition	<u>1977</u>		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
	(Thousands of Dollars)				
c. Reimbursable detailees.....	229	50	297	237	237

The change from the 1977 budget estimate to the current estimate reflects a 3 position reduction partially offset by the October 1976 pay raise. Reimbursable detailees include seven military officers and five civilians and is planned at this level through FY 1978.

d. Overtime and other compensation.....	378	92	405	399	413
---	-----	----	-----	-----	-----

Overtime and night differential are used primarily for off-shift operation of major wind tunnel facilities such as the Unitary Plan Wind Tunnel System, the 40- by 80-Foot Subsonic Wind Tunnel, and the 6- by 6-Foot Supersonic Wind Tunnel. The gradual increase through 1978 is due to the full year effect of the October 1976 pay increase. Operating levels are approximately the same from year to year.

2. <u>Benefits</u>	<u>3,651</u>	<u>989</u>	<u>3,341</u>	<u>3,912</u>	<u>3,950</u>
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The increase in FY 1977 and FY 1978 reflect the October 1976 pay raise effects modified by decreases in the permanent personnel complement.

In the 1977 budget, the entire cost of workmen's compensation was included in the Headquarters budget. The 1978 budget reflects the Center's cost for this item.

1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
		Budget <u>Estimate</u>	Current <u>Estimate</u>	

(Thousands of Dollars)

The following table indicates the cost of personnel benefits by category:

<u>Category of Costs</u>					
Contribution to the Civil Service					
Retirement Fund.....	2,615	662	2,532	2,731	2,713
Contribution for employee life insurance	162	44	159	170	169
Contribution for employee health insurance.....	678	197	619	694	719
FICA.....	20	9	15	20	19
Incentive awards.....	11	5	16	16	15
Workman's compensation.....	145	43	---	171	205
Severance pay.....	---	15	---	100	100
Other.....	<u>20</u>	<u>14</u>	<u>---</u>	<u>10</u>	<u>10</u>
Total.....	<u>3,651</u>	<u>989</u>	<u>3,341</u>	<u>3,912</u>	<u>3,950</u>
B. <u>Supporting Costs</u>	<u>256</u>	<u>74</u>	<u>268</u>	<u>241</u>	<u>260</u>
1. Transfer of personnel.....	26	5	77	46	50

The current estimate for 1977 is decreased due to a rephasing in the planned transfers. 1978 will be at essentially the same level with some slight cost increases for permanent change of station transfers.

2. Personnel training.....	230	69	191	195	210
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The 1977 training costs will be below the 1976 level due to the reduction in the personnel level. The slight increase in the current estimate and the 1978 estimate is due to increased tuition and related costs.

TRAVEL

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
	(Thousands of Dollars)				
II. TRAVEL.....	<u>1,227</u>	<u>346</u>	<u>1,080</u>	<u>1,060</u>	<u>1,071</u>

Basis of Fund Requirements

Summary of Travel by Major Category

A. <u>Program Travel</u>	807	249	788	686	686
B. <u>Meetings and Technical Seminars</u>	166	42	144	139	139
C. <u>Administrative Travel</u>	<u>254</u>	<u>55</u>	<u>148</u>	<u>235</u>	<u>246</u>
Total, Travel.....	<u>1,227</u>	<u>346</u>	<u>1,080</u>	<u>1,060</u>	<u>1,071</u>
A. <u>Program Travel</u>	<u>807</u>	<u>249</u>	<u>788</u>	<u>686</u>	<u>686</u>

Program travel is required for the accomplishment of the Center's mission. It is the largest part of the travel function and accounts for 64% of travel for 1978.

Travel for program purposes is required in the continuing efforts in Space Research and other activities at the Center, such as Aircraft Technology, Flight Simulation, Fluid Mechanics, Airborne Science and Applications, and Space Life Sciences.

The decrease of the 1977 current estimate from the budget estimate is in line with the level of planned program activity at the Center. 1978 program travel requirements will be at the same level as 1977.

B. <u>Meetings and Seminars Travel</u>	<u>166</u>	<u>42</u>	<u>144</u>	<u>139</u>	<u>139</u>
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Travel to meetings and technical seminars permits employees to participate in meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to technological advances outside ARC, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the meetings are made up of working panels convened to solve certain problems for the benefit of the Government. The decrease in 1977 from the budget estimate is the result of reduced travel requirements for meetings.

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Estimate	Current Estimate	1978 Budget Estimate
			(Thousands of Dollars)		
C. <u>Administrative Travel</u>	<u>254</u>	<u>55</u>	<u>148</u>	<u>235</u>	<u>246</u>

Administrative travel is 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 and travel of the Center's top management to NASA Headquarters, other NASA Centers, and contractor plants.

The increase in 1977 from the budget estimate to the current estimate is necessary to accomplish required administrative travel. The increase in 1978 is due to mandatory increases in local transportation costs.

FACILITIES SERVICES

III. <u>FACILITIES SERVICES</u>	<u>4,751</u>	<u>1,296</u>	<u>5,489</u>	<u>5,362</u>	<u>5,573</u>
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Basis of Fund Requirements

Summary of Facilities Services

A. Maintenance and Related Services

1. Maintenance, repair and alterations of buildings and grounds.....	174	103	289	151	148
2. Custodial services.....	991	347	1,034	1,207	1,006
3. Maintenance of equipment.....	<u>120</u>	<u>21</u>	<u>64</u>	<u>103</u>	<u>110</u>
Subtotal.....	<u>1,285</u>	<u>471</u>	<u>1,387</u>	<u>1,461</u>	<u>1,264</u>

B. Operation of Facilities

1. Utilities.....	3,252	732	3,942	3,693	4,099
2. Supplies and equipment.....	<u>214</u>	<u>93</u>	<u>160</u>	<u>208</u>	<u>210</u>
Subtotal.....	<u>3,466</u>	<u>825</u>	<u>4,102</u>	<u>3,901</u>	<u>4,309</u>
Total, Facilities Services.....	<u>4,751</u>	<u>1,296</u>	<u>5,489</u>	<u>5,362</u>	<u>5,573</u>

	1976 Actual	Transition Quarter Actual	1977		1978
			Budget Estimate	Current Estimate	Budget Estimate
(Thousands of Dollars)					
A. <u>Maintenance and Related Services</u>	<u>1,285</u>	<u>471</u>	<u>1,387</u>	<u>1,461</u>	<u>1,264</u>
1. Maintenance, repair, and alteration of buildings and grounds.....	174	103	289	151	148

Buildings maintenance and repair expenditures cover seven institutional buildings having 251,900 square feet and containing no special purpose equipment other than normal heating and ventilating systems. The year-round workload for landscaping care requires six manyears of effort to care for 421.4 acres. This maintenance includes repairs for roads, walks, aircraft taxiway, as well as recurring roofing, painting, and electrical repairs. The current estimates in 1977 and the budget estimate in 1978 provide primarily for emergency repairs and maintenance.

2. Custodial services.....	991	347	1,034	1,207	1,006
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Security, fire protection, janitorial and pest control services are provided for 69 buildings, 52 trailers, 13 NASA-owned aircraft, and supply and equipment inventories. Much of this equipment is highly sensitive computer and research equipment.

Three support service contracts (two of which will be with the Small Business Administration (SBA) Sec. 8(a) Minority Business Program) and the U.S. Navy services comprise 82% of the total custodial services. Increases in estimates for 1977 reflect price increases of the SBA 8(a) contracts, and the cost of additional services to be provided by the U.S. Navy for security and fire protection of Ames recently developed research facilities at the USNAS Crows Landing, California. The planned decrease in 1978 is necessary to provide funds for mandatory increased costs in other functions.

3. Maintenance of equipment.....	120	21	64	103	110
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Maintenance of equipment is provided on an as-needed repair basis. Calls are made generally to local contractors either against blanket purchase agreements or purchase orders with fixed labor rates plus current market price for parts. The increase in the 1977 current estimate and the 1978 estimate increase over 1977 budget estimate are necessary because of new equipment acquired through lease purchase options.

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u> <u>Actual</u>	<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	<u>Budget</u> <u>Estimate</u>
			(Thousands of Dollars)		
B. <u>Operation of Facilities</u>	<u>3,466</u>	<u>825</u>	<u>4,102</u>	<u>3,901</u>	<u>4,309</u>
1. Utilities.....	3,252	732	3,942	3,693	4,099

Approximately 80% of electric power cost is consumed in the operation of high power demand research facilities such as the Unitary Plan Wind Tunnel System, the 40- by 80-Foot Subsonic Wind Tunnel, the 3.5-Foot Hypersonic Tunnel, the 14-Foot Transonic Wind Tunnel, and in the operation of simulators and smaller wind tunnels.

The 1977 current estimate and the 1978 estimate reflect a reduction in the planned usage of electrical power and heating fuel oil in order to conform with the agency plan of reducing utility consumption.

The 1978 increase results from rate increases approved by the California Public Utilities Commission for the Pacific Gas and Electric Company, and from rate increases the U.S. Bureau of Reclamation, Department of the Interior has scheduled to be effective January 1, 1977.

2. Supplies and equipment.....	214	93	160	208	210
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Supply and equipment purchases include essential building, shop, and electrical items, fuels, lubricants and general maintenance and replacement equipment needed for maintenance and repair of facilities. The increase in the 1977 current estimate reflects mandatory price increases and a higher equipment replacement rate than previously estimated. The estimate for 1978 reflects the continuing effect of higher prices partially offset by lower consumption.

TECHNICAL SERVICES

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
	(Thousands of Dollars)				
IV. <u>TECHNICAL SERVICES</u>	593	165	569	595	565

Basis of Fund Requirements

Summary of Technical Services

A. <u>Automatic Data Processing</u>					
1. Programming and operations.....	189	103	292	199	215
Subtotal.....	189	103	292	199	215
B. <u>Engineering Services</u>	15	6	15	10	15
C. <u>Scientific and Technical Information and Programs</u>					
1. Educational/informational programs.....	389	56	262	386	335
Subtotal.....	389	56	262	386	335
Total, Technical Services.....	593	165	569	595	565
A. <u>Automatic Data Processing</u>	189	103	292	199	215

Obligations for administrative ADP operations and programming reflects that portion of the ADP central facility operating costs which are incurred by administrative organizations. These costs are incurred through a system whereby user organizations are charged for actual usage of the ADP central facility's equipment and services. The decrease in the 1977 current estimate reflects a reduction in requirements. The increase in 1978 is required because of negotiated support contractor wage rates increases.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
	(Thousands of Dollars)				
B. <u>Engineering Services</u>	15	6	15	10	15

The estimated obligation represents Ames' proportionate share of the costs DoD incurs in representing the Federal agencies before the State Public Utilities Commission in connection with public utility rate hearings.

C. <u>Scientific and Technical Information and Educational Programs</u>	389	56	262	386	335
1. Educational/information programs.....	389	56	262	386	335

Obligations for this function include a support service contract at a level of 11 man-years to perform public information services (e.g., tour guide), media development (e.g., public exhibits, etc.) and educational programs. The increase in the 1977 current estimate is primarily due to negotiated support contractor wage rates. The decrease in 1978 is due to a decreased requirement for exhibits.

ADMINISTRATIVE SUPPORT

V. <u>ADMINISTRATIVE SUPPORT</u>	1,972	628	1,971	2,196	2,300
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Basis of Fund Requirements

Summary of Administrative Support

A. <u>Communications</u>					
1. Leased lines and long distance.....	299	71	340	323	352
2. Local telephone service.....	383	98	446	413	449
3. Other communications.....	4	2	12	4	4
Subtotal, Communications.....	686	171	798	740	805

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget Estimate	Current Estimate	
	(Thousands of Dollars)				
B. <u>Administrative Printing</u>	<u>95</u>	<u>36</u>	<u>65</u>	<u>86</u>	<u>91</u>
C. <u>Supplies, Materials and Equipment</u>	<u>263</u>	<u>96</u>	<u>211</u>	<u>241</u>	<u>253</u>
D. <u>Transportation</u>					
1. Center operations.....	25	6	59	37	41
2. Common carrier.....	<u>38</u>	<u>8</u>	<u>42</u>	<u>55</u>	<u>55</u>
Subtotal, Transportation.....	<u>63</u>	<u>14</u>	<u>101</u>	<u>92</u>	<u>96</u>
E. <u>Administrative Support Services</u>					
1. Installation support services.....	646	100	564	845	850
2. Occupational medicine and environmental health.....	<u>219</u>	<u>211</u>	<u>232</u>	<u>192</u>	<u>205</u>
Subtotal, Administrative Support Services	<u>865</u>	<u>311</u>	<u>796</u>	<u>1,037</u>	<u>1,055</u>
Total, Administrative Support.....	<u>1,972</u>	<u>628</u>	<u>1,971</u>	<u>2,196</u>	<u>2,300</u>
A. <u>Communications</u>	<u>686</u>	<u>171</u>	<u>798</u>	<u>740</u>	<u>805</u>

Communication services are provided by GSA (for FTS) and the Pacific Telephone and Telegraph Company (PT&T). Other communications consist of teletype equipment and services provided by Western Union. The decrease in the 1977 current estimate reflects a reduction in requirements. The increase in obligations for 1978 reflects the full year effect of rate increases.

B. <u>Administrative Printing</u>	<u>95</u>	<u>36</u>	<u>65</u>	<u>86</u>	<u>91</u>
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Obligations for administrative printing reflect that portion of the Printing and Reproduction Facility operating costs which are incurred by administrative organizations. The 1977 current estimate reflects essentially a constant level of requirements at current rates. The increase in 1978 over 1977 reflects the full year effect of mandatory price increases.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget</u> Estimate	<u>Current</u> Estimate	
(Thousands of Dollars)					
C. <u>Supplies, Materials and Equipment</u>	<u>263</u>	<u>96</u>	<u>211</u>	<u>241</u>	<u>253</u>

This item includes office supplies and materials, and office equipment. The 1977 current estimate has been increased over the 1977 budget estimate based on increased unit costs. The nominal increase from 1977 current estimate to 1978 is predicated on the full year effect of current prices.

D. <u>Transportation</u>	<u>63</u>	<u>14</u>	<u>101</u>	<u>92</u>	<u>96</u>
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Obligations include rentals of GSA vehicles (other than passenger-carrying vehicles), vehicle fuel, oil and parts, and repair and maintenance. Common carrier costs include freight charges, local drayage, parcel post and air freights. Decrease of 1977 current estimate below 1977 budget reflects the imposition of constraints placed on transportation requirements to accommodate the mandatory increases in other functions. The increase in 1978 reflects the higher unit cost of vehicle maintenance.

E. <u>Administrative Support Services</u>	<u>865</u>	<u>311</u>	<u>796</u>	<u>1,037</u>	<u>1,055</u>
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Administrative support services consists predominantly of the support service contract which provides supply management, mail, and pickup/delivery services. This is an SBA contract in the Minority Business Enterprise (Sec. 8a) program where labor costs are guided by the Department of Labor's "Wage Determinations". Also in this function are the costs for occupational medicine and environmental health services, including laboratory services, and clinic supplies and equipment. The increase of 1977 current estimate over the 1977 budget estimate reflects the rephrasing of the contract obligation in the 1976, TQ and 1977 to coincide with the new fiscal year cycle. The increase in 1978 is to provide for negotiated support contractor wage rates.

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING CHART
AMES RESEARCH CENTER**

CENTER TOTAL	
EXCEPTED	22 28
GS 16	4 25
GS 15	128 105
GS 14	14 24
ALL OTHER GS	116 111
WAGE GRADE	167 131
TOTAL PERMANENT	432 402

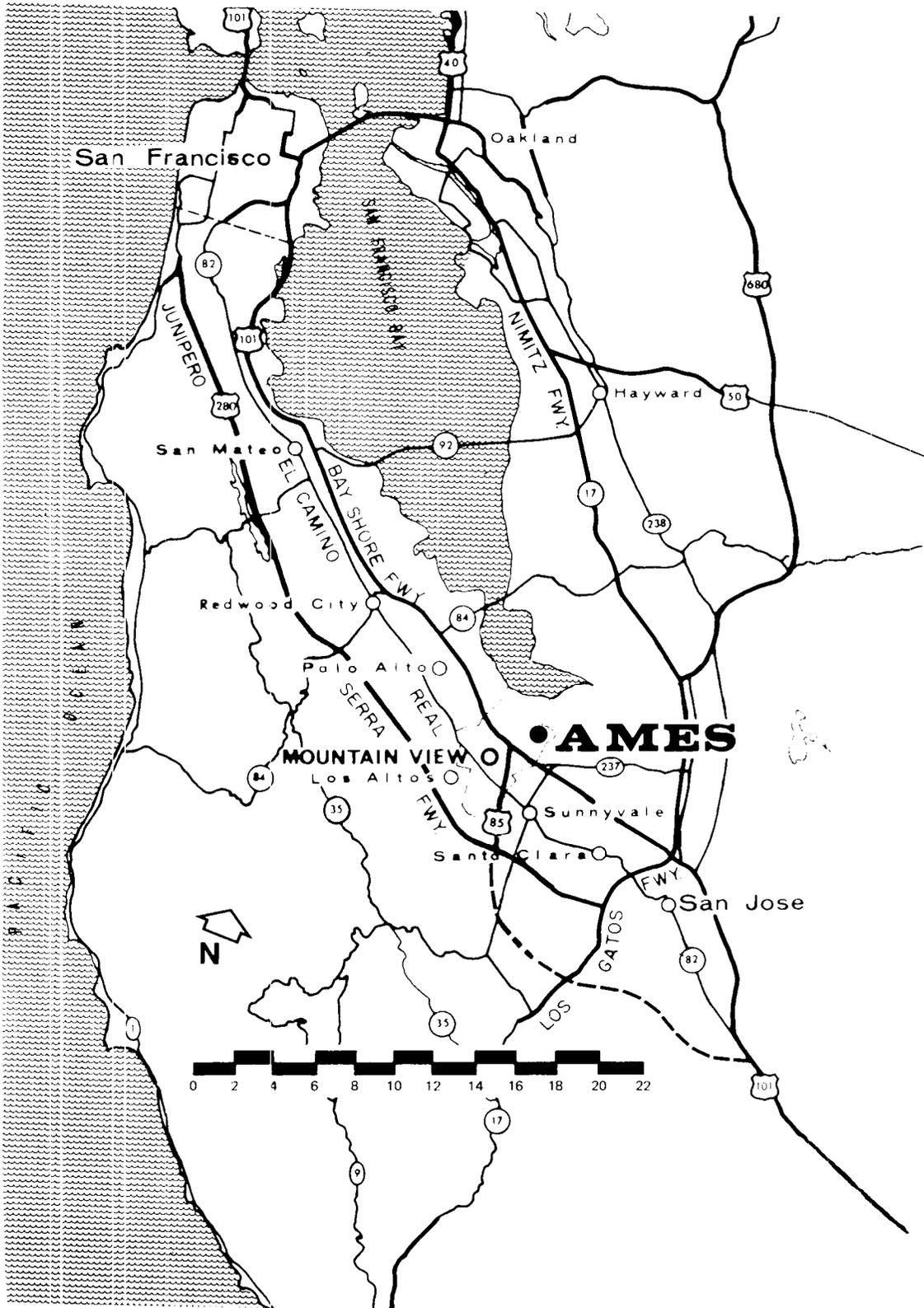
DIRECTOR	
EXCEPTED	1 8
GS 16	1 1
GS 15	1 2
ALL OTHER GS	1 1
WAGE GRADE	1 2
TOTAL PERMANENT	15 12

PUBLIC AFFAIRS OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	PATENT COUNSEL EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	HEALTH AND SAFETY OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	CHIEF COUNSEL EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	EQUAL OPPORTUNITY PROGRAMS OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	PLANNING AND ANALYSIS OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT
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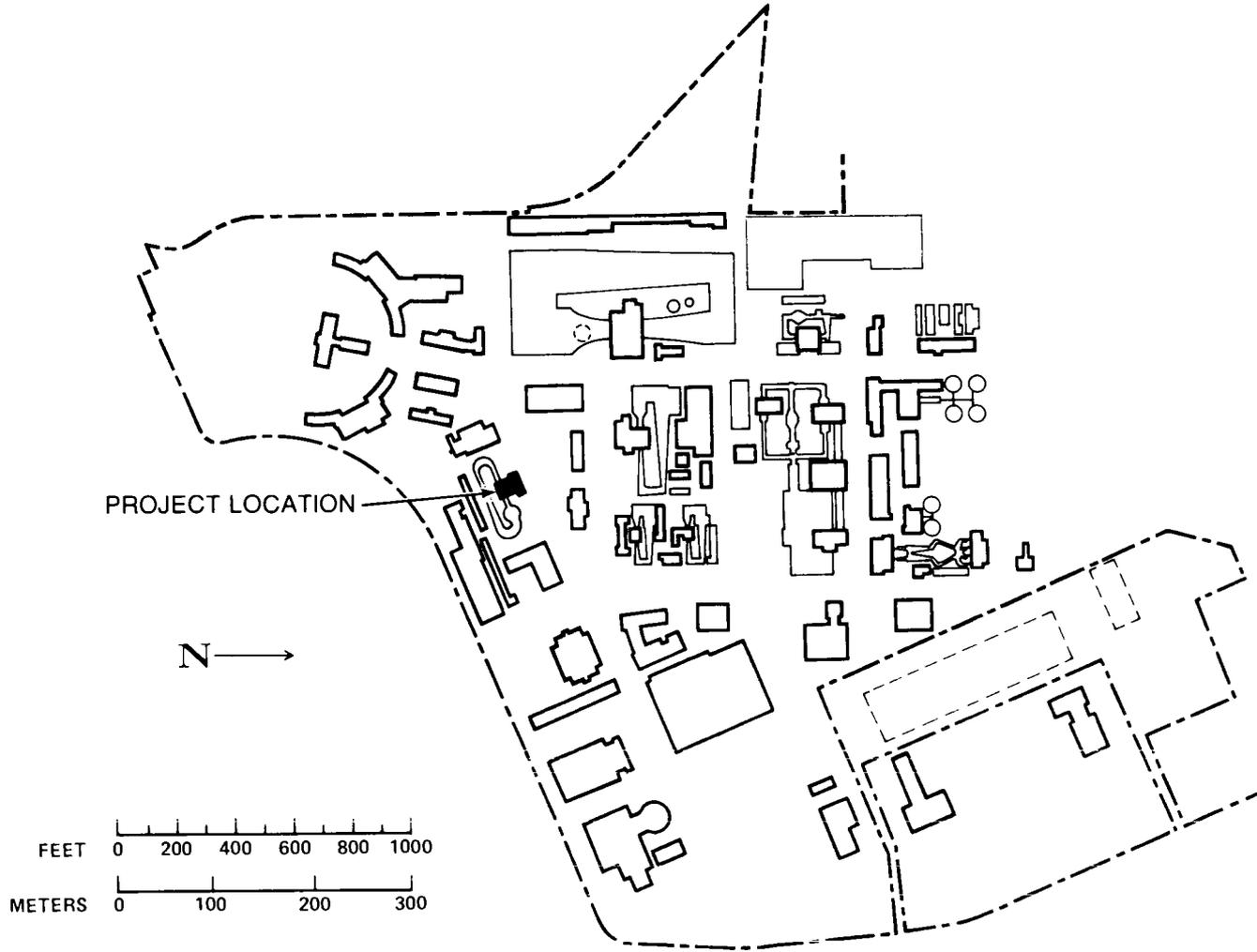
DIRECTOR OF AERONAUTICS & FLIGHT SYSTEMS EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	DIRECTOR OF ASTRONAUTICS EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	DIRECTOR OF LIFE SCIENCES EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	DIRECTOR OF RESEARCH SUPPORT EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	DIRECTOR OF ADMINISTRATION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT
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AERODYNAMICS DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	SPACE SCIENCE DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	PROJECT PIONEER EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	BIOMEDICAL RESEARCH DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	COMPUTATION DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	FINANCIAL MANAGEMENT DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	TECHNICAL INFORMATION DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT
FLIGHT SYSTEMS RESEARCH DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	THERMO AND GAS DYNAMICS DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	CHEMICAL RESEARCH PROJECTS OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	MAN-VEHICLE SYSTEMS RESEARCH DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	INSTITUTE FOR ADVANCED COMPUTATION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	PERSONNEL DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	RESOURCES MANAGEMENT OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT
SIMULATION SCIENCES DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	SPACE PROJECTS DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	EXTRATERRESTRIAL BIOLOGY DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	BIOSYSTEMS DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	RESEARCH FACILITIES & INSTRUMENTATION DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	PROCUREMENT DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	TECHNOLOGY UTILIZATION OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT
AIRCRAFT OPERATIONS DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	AIRBORNE MISSIONS AND APPLICATIONS DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	RESEARCH AIRCRAFT PROJECTS OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	RELIABILITY AND QUALITY ASSURANCE OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	TECHNICAL SERVICES DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	SERVICES & SUPPLY DIVISION EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT	UNIVERSITY AFFAIRS OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT
			FACILITIES MAINTENANCE AND ADMINISTRATIVE MANAGEMENT OFFICE EXCEPTED GS 16 GS 15 GS 14 ALL OTHER GS WAGE GRADE TOTAL PERMANENT			

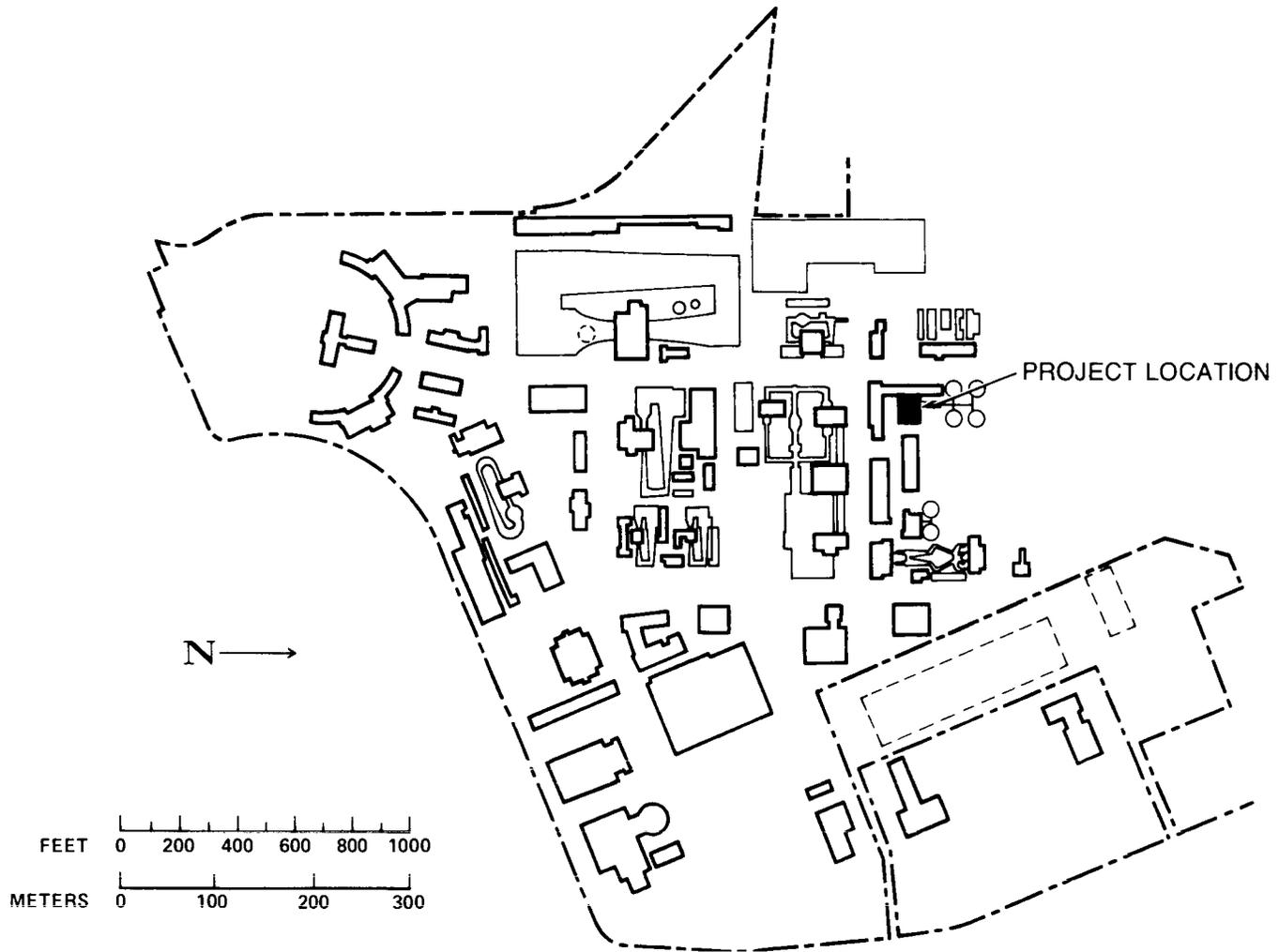
LOCATION MAP



AMES RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES
**MODIFICATION OF 12-FT PRESSURE WIND TUNNEL
LOCATION PLAN**

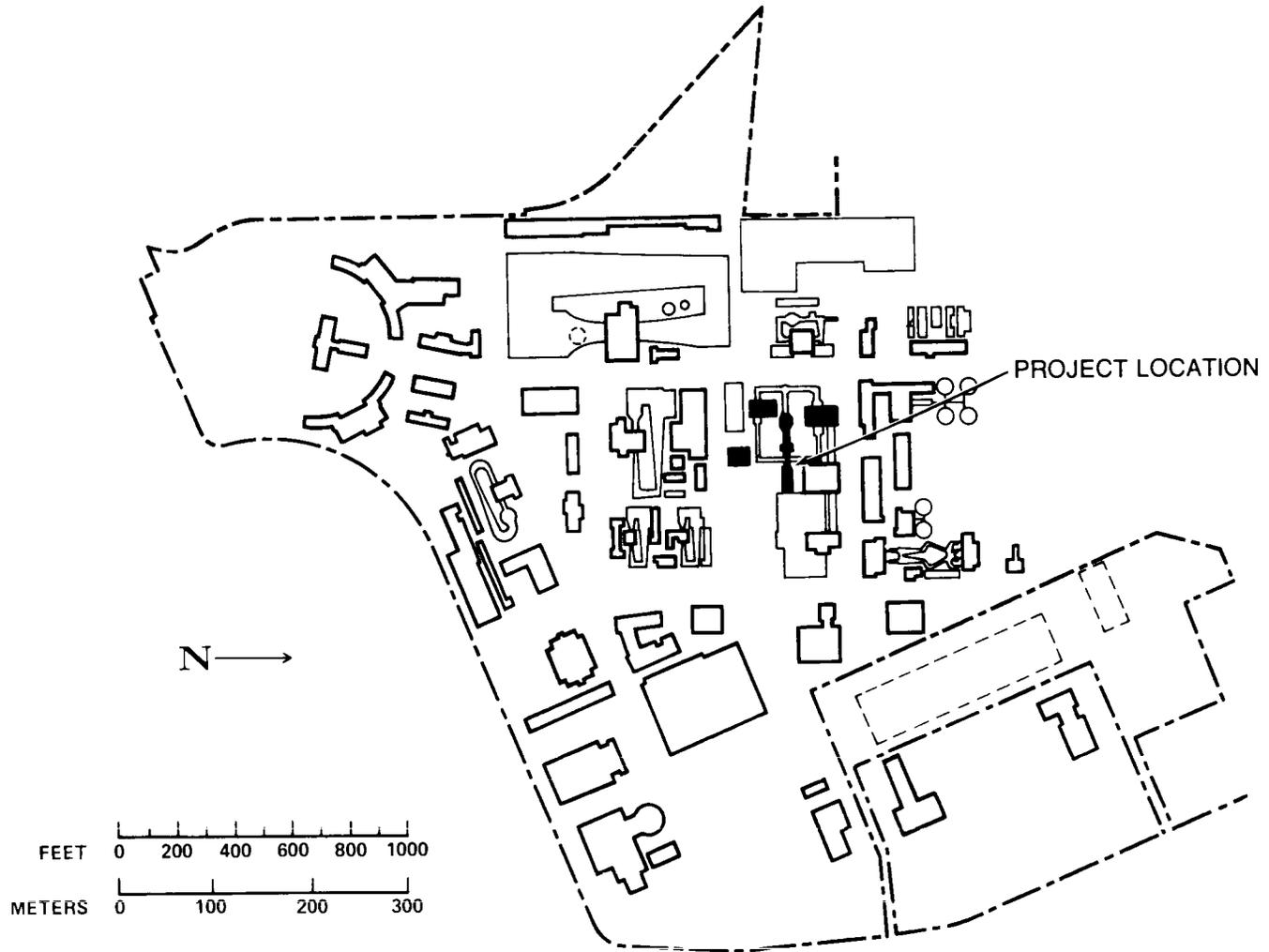


AMES RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES
**MODIFICATION OF 3.5-FT WIND TUNNEL
LOCATION PLAN**



AMES RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

**MODIFICATION OF UNITARY PLAN WIND TUNNEL
LOCATION PLAN**





RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

HUGH L. DRYDEN FLIGHT RESEARCH CENTER

DESCRIPTION

The Hugh L. Dryden 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 and occupies 521 acres of land under a permit 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, a calibration hangar, a flight loads research facility, and an integrated support facility. Special Shuttle support facilities include the orbiter hangar and the orbiter mating-demating facility. Auxiliary buildings include warehouses, an auxiliary power system building, an aircraft maintenance dock and a hangar. The aerodynamic test range is operated with sites at Edwards, California, and Ely, Nevada. The total capital investment of the Dryden Flight Research Center, including fixed assets in progress and contractor-held facilities at various locations, as of September 30, 1976, was \$77,667,000.

MISSION

The primary mission of the Dryden Flight Research Center, established in 1947, is the conduct of flight research in support of military and civil national needs. This includes planning and conducting test flights, and analyzing and reporting results for the purpose of verification of predicted characteristics and the identification of unexpected problems in actual flight.

The current and projected program at the Center involves the following types of general activities: investigation of new design concepts and new flight regimes; flight safety and public acceptance of aircraft operations; applied control technology and improved cost-effective methods of conducting flight research. The Shuttle Carrier Aircraft (SCA) tests and the Shuttle Approach and Landing Tests (ALT) will be conducted at Dryden. The assignment as host Center to the ALT team includes responsibilities for: the development of the test support facilities, the institutional support of the ALT operations, and flight and industrial safety for ALT operations.

A variety of test aircraft, and special facilities and equipment are available for conducting programs at the Dryden Flight Research Center. The aircraft range from low speed general aviation aircraft to high speed aircraft used in control systems investigations having application to both civil and military aviation. Special purpose vehicles include the F-8 Digital Fly-by-Wire aircraft and unmanned Remotely Piloted Research Vehicles. Specialized laboratory facilities have been developed 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. The Aerodynamic Test Range operates to support the flight activity.

SUMMARY OF RESOURCES REQUIREMENTS

	<u>FUNDS</u>				
	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
(Thousands of Dollars)					
I. Personnel and Related Costs.....	11,694	3,136	11,821	13,432	13,477
II. Travel.....	301	86	262	372	399
III. Facilities Services.....	1,871	1,782	2,735	2,435	2,166
IV. Technical Services.....	76	14	78	78	82
V. Administrative Support.....	<u>570</u>	<u>301</u>	<u>936</u>	<u>950</u>	<u>910</u>
Total, fund requirement.....	<u>14,512</u>	<u>5,319</u>	<u>15,832</u>	<u>17,267</u>	<u>17,034</u>

Distribution of Permanent Positions by Program

	<u>1976</u>	Transition	<u>1977</u>		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
<u>Direct Positions</u>					
<u>Space Flight</u>	<u>56</u>	<u>56</u>	<u>87</u>	<u>62</u>	<u>62</u>
Space Shuttle.....	56	56	87	62	62
<u>Space Science</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Life sciences.....	1	1	1	1	1
<u>Aeronautics and Space Technology</u>	<u>313</u>	<u>313</u>	<u>286</u>	<u>326</u>	<u>326</u>
Aeronautical research and technology.....	313	313	286	326	326
<u>Tracking and Data Acquisition</u>	<u>30</u>	<u>30</u>	<u>28</u>	<u>30</u>	<u>30</u>
<u>Technology Utilization</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
Subtotal, direct positions.....	401	401	403	420	420
<u>Indirect Positions</u>	<u>97</u>	<u>97</u>	<u>94</u>	<u>100</u>	<u>100</u>
Total, permanent positions.....	<u>498</u>	<u>498</u>	<u>497</u>	<u>520</u>	<u>520</u>

PERSONNEL AND RELATED COSTS

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
			(Thousands of Dollars)		
I. <u>PERSONNEL AND RELATED COSTS</u>	<u>11,694</u>	<u>3,136</u>	<u>11,821</u>	<u>13,432</u>	<u>13,477</u>
		<u>Basis of Fund Requirements</u>			
A. <u>Compensation and Benefits</u>					
1. <u>Compensation</u>					
a. Permanent positions.....	9,989	2,604	10,144	11,315	11,428
b. Nonpermanent.....	439	162	424	533	487
c. Reimbursable detailees.....	44	4	117	69	126
d. Overtime and other compensation.....	<u>90</u>	<u>32</u>	<u>100</u>	<u>239</u>	<u>160</u>
Subtotal, Compensation.....	10,562	2,802	10,785	12,156	12,201
2. <u>Benefits</u>	<u>1,039</u>	<u>274</u>	<u>986</u>	<u>1,196</u>	<u>1,190</u>
Subtotal, Compensation and Benefits.....	<u>11,601</u>	<u>3,076</u>	<u>11,771</u>	<u>13,352</u>	<u>13,391</u>
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	41	42	10	20	20
2. Personnel training.....	<u>52</u>	<u>18</u>	<u>40</u>	<u>60</u>	<u>66</u>
Subtotal, Supporting Costs.....	<u>93</u>	<u>60</u>	<u>50</u>	<u>80</u>	<u>86</u>
Total, Personnel and Related Costs.....	<u>11,694</u>	<u>3,136</u>	<u>11,821</u>	<u>13,432</u>	<u>13,477</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
A. <u>Compensation and Benefits</u>	<u>11,601</u>	<u>3,076</u>	<u>11,771</u>	<u>13,352</u>	<u>13,391</u>
1. <u>Compensation</u>	<u>10,562</u>	<u>2,802</u>	<u>10,785</u>	<u>12,156</u>	<u>12,201</u>
a. Permanent Positions.....	9,989	2,604	10,144	11,315	11,428

The authorized complement is 520 for 1977 and 1978. The current estimate for 1977 is increased from the 1977 budget estimate to reflect the cost of the October 1976 pay raise plus the cost of the permanent ceiling increase of 23 positions. The increase in 1978 reflects the full year cost of these actions.

Basis of Cost of Permanent Positions

The estimate for compensation in 1978 is based upon 520 permanent positions at the beginning and end of year, modified by turnover, promotions and within grade advances.

In 1978, the cost of permanent positions will be \$11,428 derived from the following calculations:

Cost of permanent positions in 1977.....	11,315
Cost of increases in 1978.....	+301
Within grade advances and career development:	
Full year effect of 1977 actions.....	+132
Partial year effect of 1978 actions.....	+137
Full year effect of October 1976 pay raise.....	+14
Full year effect of 1977 new positions.....	+18
Cost decreases in 1978.....	-188
Turnover savings and abolished positions:	
Full year effect of 1977 actions.....	-83
Partial year effect of 1978 actions.....	-65
One less paid day in 1978.....	-40
Cost of permanent positions in 1978.....	<u>11,428</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	

(Thousands of Dollars)

b. Nonpermanent positions

1. Cost.....	\$439	\$162	\$424	\$533	\$487
2. Manyears.....	61	21	60	70	70

The current estimate for 1977 increases from the 1977 budget estimate due to the October 1976 pay raise and for an increase in manyears to support the Space Shuttle. The reduction in 1978 reflects a planned change in the mix of personnel between programs. The 1978 plan includes 70 nonpermanent manyears which will be used to support the following programs at the level indicated below.

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>
College cooperative training.....	40
Opportunity programs.....	20
Summer employment.....	6
Other temporary employment.....	<u>4</u>
Total.....	<u>70</u>

c. Reimbursable detailees.....	44	4	117	69	126
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The services of a small group of military officers are utilized in the Center's programs where such assignments are of mutual benefit to NASA and the respective service. Under the existing agreements, the parent organization is reimbursed for salaries and related costs. DFRC plans for nine such detailees in 1978, an increase of four from 1977.

The current estimates for 1977 are decreased from the 1977 budget estimates due to anticipated unfilled vacancies. In 1978, funding increases in anticipation of the full complement of 9 detailee positions and the full year effect of the October 1976 pay raise.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
d. Overtime and other compensation.....	90	32	100	239	160

Overtime is restricted to emergency repairs and abnormal temporary workload. A substantial portion is used to prepare for test flights. The 1977 current estimate increases over the 1977 budget estimate due to overtime requirements in support of Space Shuttle activities and the October 1976 pay raise. In 1978, overtime requirements decrease due to reduced Shuttle activity at Dryden.

2. <u>Benefits</u>	<u>1,039</u>	<u>274</u>	<u>986</u>	<u>1,196</u>	<u>1,190</u>
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The current estimates for 1977 increase over the 1977 budget estimate due to the additional 23 permanent positions, the October 1976 pay raise, higher premiums for employee health benefits, the new incentive awards rates which were effective March 29, 1976, offset by the assignment of benefits related to personnel transfers to the supporting personnel costs function. The 1978 estimates remain at approximately the same level as 1977.

In the 1977 budget, the entire cost of workmen's compensation was included in the Headquarters budget estimate. The 1978 budget estimate reflects the Center's cost for this item.

Category of Cost

Civil Service Retirement.....	718	186	728	813	823
Federal Employee Group Life Insurance.....	45	12	46	50	50
Federal Employee Health Program.....	213	55	185	246	256
FICA.....	6	3	10	12	10
Incentive Awards.....	11	4	7	20	20
Workman's Compensation.....	46	14	--	55	31
Other Benefits.....	--	--	10	--	--
Total.....	<u>1,039</u>	<u>274</u>	<u>986</u>	<u>1,196</u>	<u>1,190</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
B. <u>Supporting Costs</u>	<u>93</u>	<u>60</u>	<u>50</u>	<u>80</u>	<u>86</u>
1. Transfer of personnel.....	41	42	10	20	20

The transfer of personnel expenses include movement of household goods and expenses related to change of duty station for transferred employees. The 1976 and Transition Quarter costs were higher than normal due to filling several key positions at the Center involving high moving costs. The 1977 current estimate exceeds the 1977 budget estimate due to the transfer of funds from benefits to supporting costs. The estimate for 1978 represents a consistent level of expense for transfer of personnel.

2. Personnel training.....	52	18	40	60	66
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Training funds provide for the maintenance and expansion of skills which are essential in carrying out the agency's many complex technical programs. The cost reflects tuition and related fees at a number of government and nongovernment institutions. The current 1977 estimate exceeds the 1977 budget estimate due to increased emphasis on the training of personnel and the higher tuition costs associated with training. The 1978 estimates exceed the 1977 estimates due to requirements for long term training.

TRAVEL

II. <u>TRAVEL</u>	<u>301</u>	<u>86</u>	<u>262</u>	<u>372</u>	<u>399</u>
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Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Travel.....	192	49	157	202	218
B. Meetings and Technical Seminars.....	24	6	72	23	24
C. Administrative Travel.....	<u>85</u>	<u>31</u>	<u>33</u>	<u>147</u>	<u>157</u>
Total, Travel.....	<u>301</u>	<u>86</u>	<u>262</u>	<u>372</u>	<u>399</u>

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
(Thousands of Dollars)					
A. <u>Program Travel</u>	<u>192</u>	<u>49</u>	<u>157</u>	<u>202</u>	<u>218</u>

Over half of Dryden's travel funds are utilized in support of the Center's R&D programs. In the program related travel area, the 1977 current estimate is increased over the 1977 budget estimate due to increased travel associated with the Shuttle ALT activities. The 1978 increase is to cover follow-on requirements involving the Center after the Approach and Landing Test.

B. <u>Meetings and Technical Seminars</u>	<u>24</u>	<u>6</u>	<u>72</u>	<u>23</u>	<u>24</u>
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The current estimate for Meetings and Technical Seminars is reduced from the 1977 budget estimate to provide for higher priority program travel. The current planning emphasizes program related and training travel with an effort to reduce the number of meetings.

C. <u>Administrative Travel</u>	<u>85</u>	<u>31</u>	<u>33</u>	<u>147</u>	<u>157</u>
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In the Administrative Travel area, the 1977 current estimate exceeds the 1977 budget estimate due to increased travel associated with training and GSA vehicle lease costs in support of the Shuttle ALT.

FACILITIES SERVICES

III. <u>FACILITIES SERVICES</u>	<u>1,871</u>	<u>1,782</u>	<u>2,735</u>	<u>2,435</u>	<u>2,166</u>
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Basis of Fund Requirements

Summary of Facilities Services

A. <u>Rental of Real Property</u>	<u>--</u>	<u>7</u>	<u>72</u>	<u>72</u>	<u>54</u>
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	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977 <u>Budget</u> <u>Current</u> <u>Estimate</u> <u>Estimate</u>		1978 <u>Budget</u> <u>Estimate</u>
			(Thousands of Dollars)		
B. <u>Maintenance and Related Services</u>					
1. Maintenance, repair and alterations of buildings and grounds.....	897	757	1,230	911	1,010
2. Custodial services.....	605	844	978	1,022	701
3. Maintenance of equipment.....	<u>116</u>	<u>76</u>	<u>108</u>	<u>80</u>	<u>94</u>
Subtotal.....	<u>1,618</u>	<u>1,677</u>	<u>2,316</u>	<u>2,013</u>	<u>1,805</u>
C. <u>Operation of Facilities</u>					
1. Utilities.....	189	51	232	235	246
2. Supplies and equipment.....	<u>64</u>	<u>47</u>	<u>115</u>	<u>115</u>	<u>61</u>
Subtotal.....	<u>253</u>	<u>98</u>	<u>347</u>	<u>350</u>	<u>307</u>
Total, Facilities Services.....	<u>1,871</u>	<u>1,782</u>	<u>2,735</u>	<u>2,435</u>	<u>2,166</u>
A. <u>Rental of Real Property</u>	<u>--</u>	<u>7</u>	<u>72</u>	<u>72</u>	<u>54</u>

Provides for short term rental of trailers to provide office, shop, laboratory and storage space in support of the Space Shuttle Approach and Landing Test.

B. <u>Maintenance and Related Services</u>	<u>1,618</u>	<u>1,677</u>	<u>2,316</u>	<u>2,013</u>	<u>1,805</u>
1. Maintenance, repair and alterations of buildings and grounds.....	897	757	1,230	911	1,010

Buildings and grounds maintenance is performed primarily by a support service contractor. The contractor will provide the normal DFRC facility maintenance, plus Air Force facilities used by the Shuttle, the Shuttle hangar, approximately 32 office trailers, and additional tracking and communication facilities. The decrease in 1977 from the budget estimate reflects a reduction to the minimum obligation required in 1977 in order to provide for mandatory price increases in other areas. The increase in 1978 over 1977 is due to negotiated support contractor wage increases.

	<u>1976 Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		<u>1978 Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
2. Custodial services.....	605	844	978	1,022	701

Included in this category are support contract services which provide for security, janitorial, fire protection, refuse handling and laundry services. The increase from 1976 to the 1977 current estimate is a result of additional manyears of custodial and security guard services necessary for the Shuttle ALT program. The 1977 current estimate increase over the 1977 budget estimate is due to support contractor wage increases. In 1978, guard services and custodial effort is decreased due to reduced Shuttle ALT support services.

3. Maintenance of equipment.....	116	76	108	80	94
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This estimate is based on maintaining over 300 pieces of office, shop, laboratory and facilities equipment through a support service contractor and on-call service maintenance contracts. The decrease in the 1977 current estimate reflects a reduction to the minimum obligation required in order to provide for mandatory cost increases in other areas. The 1978 increase from 1977 is due to support contractor wage increases.

C. <u>Operation of Facilities</u>	<u>253</u>	<u>98</u>	<u>347</u>	<u>350</u>	<u>307</u>
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1. Utilities.....	189	51	232	235	246
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Electricity and water are obtained from the Air Force and natural gas is obtained from a commercial source. The increases in 1977 and 1978 over the 1976 level are to provide for utility requirements in the Shuttle facilities during the Approach and Landing Tests.

The 1977 current estimate and the 1978 estimate reflect a leveling in the planned usage of electric power in order to conform with the agency plan of reducing utility consumption.

2. Supplies and equipment.....	64	47	115	115	61
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The supplies and equipment used in the operation of the Center are budgeted for in this subcategory. The majority of the items consist of air conditioning, heating and plumbing materials, hand tools, brushes, scalers, and hardware items to maintain the facilities. The increase from 1976 to the 1977 current estimate is to provide one-time items to support the Shuttle ALT effort. In 1978 supply requirements decrease to the normal level due to the reduced ALT Shuttle effort. The major items of decreased support are building supplies, electrical and electronic supplies, and general operating materials.

TECHNICAL SERVICES

	<u>1976</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978
	<u>Actual</u>	<u>Actual</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
			<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
			(Thousands of Dollars)		
IV. <u>TECHNICAL SERVICES</u>	<u>76</u>	<u>14</u>	<u>78</u>	<u>78</u>	<u>82</u>
<u>Basis of Fund Requirements</u>					
<u>Summary of Technical Services</u>					
A. <u>Automatic Data Processing</u>					
1. Programming and operation.....	<u>16</u>	<u>--</u>	<u>16</u>	<u>16</u>	<u>17</u>
B. <u>Engineering Services</u>	<u>6</u>	<u>--</u>	<u>6</u>	<u>6</u>	<u>6</u>
C. <u>Scientific and Technical Information and</u> <u>Educational Programs</u>					
1. Operation of NASA technical library.....	12	3	12	12	13
2. Educational/informational programs.....	28	6	30	30	31
3. Scientific and technical information.....	<u>14</u>	<u>5</u>	<u>14</u>	<u>14</u>	<u>15</u>
Subtotal.....	<u>54</u>	<u>14</u>	<u>56</u>	<u>56</u>	<u>59</u>
Total, Technical Services.....	<u>76</u>	<u>14</u>	<u>78</u>	<u>78</u>	<u>82</u>

	<u>1976</u> Actual	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					

A. Automatic Data Processing..... 16 -- 16 16 17

This estimate covers the contractor support required for administrative keypunch operations at the Center.

B. Engineering Services..... 6 -- 6 6 6

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 and engineering consulting services.

C. Scientific and Technical Information and
Educational Programs..... 54 14 56 56 59

1. Operation of NASA technical libraries..... 12 3 12 12 13

Books and periodicals for the DFRC research library are funded from this category.

2. Educational/informational programs..... 28 6 30 30 31

The educational/informational 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 school 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.

3. Scientific and technical information..... 14 5 14 14 15

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 the 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.

ADMINISTRATIVE SUPPORT

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Current <u>Estimate</u> <u>Estimate</u>		1978 Budget <u>Estimate</u>
			(Thousands of Dollars)		
V. <u>ADMINISTRATIVE SUPPORT</u>	<u>570</u>	<u>301</u>	<u>936</u>	<u>950</u>	<u>910</u>

Basis of Fund Requirements

Summary of Administrative Support

A. Communications

1. Leased lines and long distance.....	55	16	61	57	70
2. Local telephone service.....	133	41	83	153	141
3. Other communications.....	<u>67</u>	<u>41</u>	<u>109</u>	<u>91</u>	<u>102</u>
Subtotal, Communications.....	<u>255</u>	<u>98</u>	<u>253</u>	<u>301</u>	<u>313</u>

B. Administrative Printing.....

	<u>16</u>	<u>--</u>	<u>21</u>	<u>21</u>	<u>23</u>
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C. Supplies, Materials and Equipment.....

	<u>172</u>	<u>76</u>	<u>314</u>	<u>314</u>	<u>268</u>
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D. Transportation

1. Center operations.....	92	76	272	115	129
2. Common carrier.....	<u>21</u>	<u>16</u>	<u>21</u>	<u>24</u>	<u>25</u>
Subtotal, Transportation.....	<u>113</u>	<u>92</u>	<u>293</u>	<u>139</u>	<u>154</u>

	<u>1976 Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		<u>1978 Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
<u>E. Administrative Support Services</u>					
1. Installation support services.....	2	23	43	163	140
2. Occupational medicine and environmental health.....	<u>12</u>	<u>12</u>	<u>12</u>	<u>12</u>	<u>12</u>
Subtotal, Administrative Support Services..	<u>14</u>	<u>35</u>	<u>55</u>	<u>175</u>	<u>152</u>
Total, Administrative Support.....	<u>570</u>	<u>301</u>	<u>936</u>	<u>950</u>	<u>910</u>
<u>A. Communications.....</u>	<u>255</u>	<u>98</u>	<u>253</u>	<u>301</u>	<u>313</u>

This category includes estimates for postage, federal telephone systems circuits, local telephone and exchange service, rental of TWX equipment and telephone operators provided under a support service contract.

Telephone estimates increase from 1976 to the 1977 current estimate due to additional telephone operators in support of Shuttle and local service for installation and relocation of telephone instruments to support the Shuttle program. The 1977 current estimate is higher than the 1977 budget estimate to cover installing and providing telephone instruments for Shuttle ALT personnel. The 1978 change is to cover increased long distance calls.

<u>B. Administrative Printing.....</u>	<u>16</u>	<u>--</u>	<u>21</u>	<u>21</u>	<u>23</u>
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Administrative printing includes the contractual publication of information and materials such as in-house organ weekly and the related composition and binding operations. All common processes of duplication, including photostating, blueprinting, and microfilming are included.

<u>C. Supplies, Materials, and Equipment.....</u>	<u>172</u>	<u>76</u>	<u>314</u>	<u>314</u>	<u>268</u>
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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 for administrative support. The increases in 1977 and 1978 over the 1976 level are due to the Shuttle ALT program. In 1978, requirements decrease due to reduced Shuttle support.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			<u>Budget</u> Estimate	<u>Current</u> Estimate	
(Thousands of Dollars)					
D. <u>Transportation</u>	<u>113</u>	<u>92</u>	<u>293</u>	<u>139</u>	<u>154</u>

Estimates in this area are to fund government bills of lading issued to common carriers to move freight by rail, truck, water, and air and to fund shipments by United Parcel Service. Contractor maintenance of the Center's general purpose vehicles is included herein as are the services of two drivers and service station attendants to support the Shuttle program. The increase from 1976 to the 1977 current estimates reflect additional contract support services to support the Shuttle ALT program.

The FY 1977 current estimate is decreased from the 1977 budget estimate in order to provide funding for higher priority items. The increase in 1978 is due to increased support contractor wage rates.

E. <u>Administrative Support Services</u>	<u>14</u>	<u>35</u>	<u>55</u>	<u>175</u>	<u>152</u>
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This category provides for physical examinations for DFRC pilots, reimbursement to the Air Force Flight Test Center for Shuttle ALT support and general administrative contract services for the Shuttle program.

The increase from the 1977 budget to the 1977 current estimate is to reimburse the Air Force Flight Test Center for miscellaneous Shuttle ALT services, including cleaning and decontamination, flight line security, and fire/crash support. The 1978 requirements decrease because of reduced Shuttle support.

National Aeronautics and Space Administration
Hugh L. Dryden Flight Research Center

SUMMARY STAFFING		
	77	78
Excepted	12	12
GS-16	2	2
GS-15	20	20
GS-14	40	40
All Other GS	444	444
Wage Board	2	2
Total Permanent	520	520

OFFICE OF THE DIRECTOR		
	77	78
Excepted	4	4
GS-16	1	1
GS-15	2	2
GS-14	1	1
All Other GS	30	30
Wage Board	-	-
Total Permanent	38	38

DIRECTOR OF RESEARCH		
	77	78
Excepted	2	2
GS-16	-	-
GS-15	4	4
GS-14	14	14
All Other GS	64	64
Wage Board	-	-
Total Permanent	84	84

DIRECTOR OF DATA SYSTEMS		
	77	78
Excepted	1	1
GS-16	-	-
GS-15	4	4
GS-14	8	8
All Other GS	124	124
Wage Board	-	-
Total Permanent	137	137

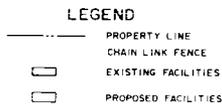
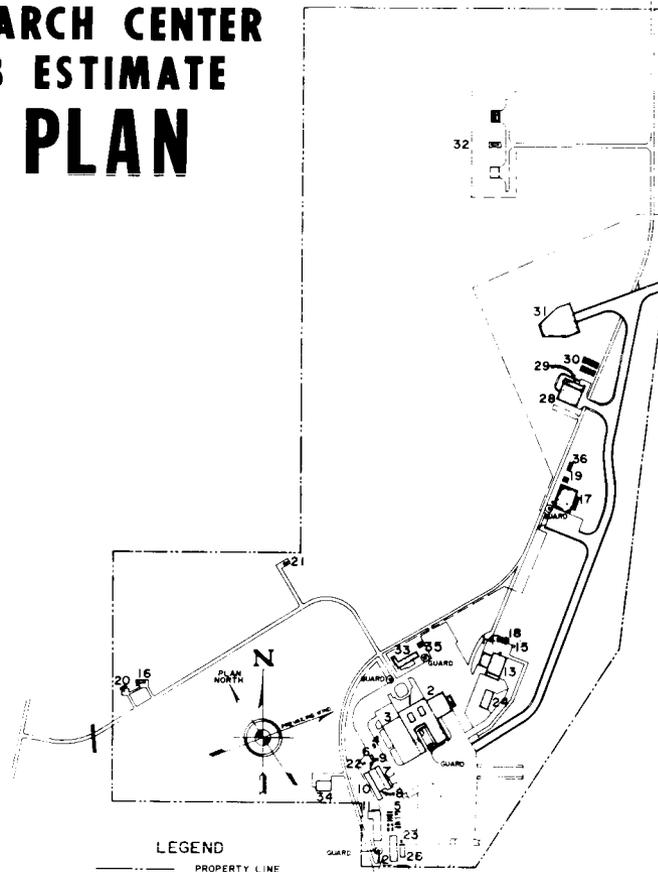
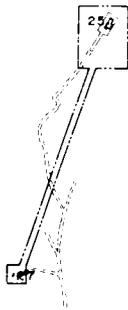
DIRECTOR OF FLIGHT OPERATIONS		
	77	78
Excepted	2	2
GS-16	1	1
GS-15	6	6
GS-14	5	5
All Other GS	141	141
Wage Board	-	-
Total Permanent	155	155

DIRECTOR OF ADMINISTRATION AND MANAGEMENT SUPPORT		
	77	78
Excepted	1	1
GS-16	-	-
GS-15	2	2
GS-14	4	4
All Other GS	67	67
Wage Board	2	2
Total Permanent	76	76

DIRECTOR OF AERONAUTICAL PROJECTS		
	77	78
Excepted	1	1
GS-16	-	-
GS-15	-	-
GS-14	8	8
All Other GS	11	11
Wage Board	-	-
Total Permanent	20	20

DIRECTOR OF SHUTTLE OPERATIONS		
	77	78
Excepted	1	1
GS-16	-	-
GS-15	2	2
GS-14	-	-
All Other GS	7	7
Wage Board	-	-
Total Permanent	10	10

DRYDEN FLIGHT RESEARCH CENTER FISCAL YEAR 1978 ESTIMATE LOCATION PLAN



EXISTING FACILITIES

- 1 LABORATORY BUILDING (4800)
- 2 AIRCRAFT CONSTRUCTION AND MODIFICATION HANGAR (4801)
- 3 MAIN HANGAR (4802)
- 4 AIRCRAFT TIRE REPAIR SHOP (4803)
- 5 TRAILER PARK AND MODULAR BLDGS
- 6 BOILER HOUSE (4886)
- 7 SHOPS (A.G.E., MODEL, BATTERY GARAGE) (4806)
- 8 STORAGE BUILDING (4807A)
- 9 PHYSIOLOGY STRESS LAB (4807B)
- 10 WAREHOUSE N^o 2 (4808)
- 11 WAREHOUSE N^o 3 (4809)
- 12 WAREHOUSE N^o 4 (4810)
- 13 FLIGHT LOADS RESEARCH FACILITY (4820)
- 14 PAINT SPRAY BUILDING (4821)
- 15 PAINT STORAGE BUILDING (4822)
- 16 COMMUNICATIONS BUILDING (4824)
- 17 MAINTENANCE DOCK (4826)
- 18 WOOD SHOP (4830)
- 19 WAREHOUSE N^o 5 (4831)
- 20 RADAR BUILDING (4870)
- 21 100FT. TOWER, BORESIGHT TARGET ASSEMBLY AND EQUIP. BLDG (4887)
- 22 CENTRAL STANDBY ELECTRICAL POWER FACILITY (4889)
- 23 STORAGE BUILDING (4804)
- 24 AIRCRAFT SERVICING DOCK (4823)
- 25 FPS-16 RADAR FACILITY (4982)
- 26 WAREHOUSE N^o 6 (4827)
- 27 100FT. TOWER, BORESIGHT TARGET ASSEMBLY AND EQUIP. BLDG (4981)
- 28 SHUTTLE HANGAR (4833)
- 29 SHUTTLE SHOP (4834)
- 30 SHOP TRAILER COMPLEX (4854)
- 31 SHUTTLE MATING STRUCTURE (4860)
- 32 PROPELLANT FUEL AND OXIDIZER STORAGE AREA (4855)
- 33 INTEGRATED SUPPORT FACILITY (4825)
- 34 WAREHOUSE N^o 7 (4832)
- 35 PAO TRAILERS
- 36 PUMP STATION N^o 1 (4853)

HUGH L. DRYDEN FLIGHT RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES



RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

LANGLEY RESEARCH CENTER

DESCRIPTION

The Langley Research Center is located at Hampton, Virginia. It is situated between Norfolk and Williamsburg, Virginia, in the tidewater area of Hampton Roads. The Center utilizes 810 acres of Government-owned land, divided into two areas by the runway facilities of Langley Air Force Base. The West Area consists of 787 acres, all owned by NASA. 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, and 3,276 acres under permit from the Department of Interior. The total acreage presently owned, under permit, or leased, is 4,196. The total capital investment of the Langley Research Center, including fixed assets in progress and contractor-held facilities at various locations, as of September 30, 1976, was \$492,240,000.

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. Examples of major activities at Langley include management of the Scout and Viking projects; development of 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 in the development of advanced concepts and technology for future long haul aircraft, with particular emphasis on fuel conservation, environmental effects, performance, range, safety, and economy. Examples of this research involve supercritical wings, laminar flow control technology, composite structures and materials, and automatic flight control systems. Work continues in the development of technology for avionic systems for reliable operations in terminal areas for the future.

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 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 to improve crashworthiness, 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 propulsion is being studied.

Other aeronautical research at Langley focuses on critical problems in acoustics and aircraft noise reduction, alleviation of trailing vortices, increased traction and control of landing gear, and improved physical comfort in aircraft.

Langley has project management responsibility for NASA's Viking, the first spacecraft that successfully landed on Mars. Viking is currently conducting a detailed study of Martian geophysics, atmospheric characteristics, and surface properties in addition to the experiments searching for life on the planet.

Langley supports unmanned spacecraft programs by the development of experiments and sensors for such missions as Nimbus-G and SEASAT. These programs include the remote sensing of water and air pollution, and the application of space technology to measure various physical phenomena ranging from ocean wave heights to upper atmospheric composition.

Scout launch vehicle procurement is also a Langley responsibility.

Langley has a lead roll in the development and management of technology experimental payloads to be carried on future Space Shuttle missions. In addition, analytical and experimental research is conducted for the development of technology required for future advanced aerospace transportation systems.

Research programs at Langley also include the investigation of effects on space vehicles of heat, vibration, vacuum, and noise; the development and use of advance composite and polymeric materials on structures and thermal control systems; and improved technology for antennas, advanced microelectric devices and solid state data recording.

SUMMARY OF RESOURCES REQUIREMENTS

FUNDS

	1976	Transition	1977		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
I. Personnel and Related Costs.....	77,181	19,599	76,283	80,423	79,986
II. Travel.....	2,218	600	1,952	2,040	2,066
III. Facilities Services.....	6,919	2,031	7,960	7,031	6,553
IV. Technical Services.....	1,794	429	1,635	1,488	1,615
V. Administrative Support.....	<u>5,057</u>	<u>1,528</u>	<u>3,861</u>	<u>4,432</u>	<u>5,191</u>
Total, fund requirements.....	<u>93,169</u>	<u>24,187</u>	<u>91,691</u>	<u>95,414</u>	<u>95,411</u>

Distribution of Permanent Positions by Program

Direct Positions

<u>Space Flight</u>	<u>76</u>	<u>76</u>	<u>60</u>	<u>63</u>	<u>53</u>
Space Shuttle.....	---	---	15	15	7
Space flight operations.....	30	30	1	2	---
Expendable launch vehicles.....	46	46	44	46	46
<u>Space Science</u>	<u>199</u>	<u>199</u>	<u>71</u>	<u>64</u>	<u>47</u>
Physics and astronomy.....	36	36	13	8	8
Lunar and planetary exploration.....	163	163	58	56	39

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
<u>Space Applications</u>	<u>249</u>	<u>249</u>	<u>245</u>	<u>242</u>	<u>240</u>
<u>Aeronautics and Space Technology</u>	<u>2,027</u>	<u>2,027</u>	<u>2,119</u>	<u>2,026</u>	<u>2,056</u>
Aeronautical research and technology.....	1,415	1,415	1,505	1,433	1,462
Space research and technology.....	612	612	614	593	594
<u>Technology Utilization</u>	<u>8</u>	<u>8</u>	<u>8</u>	<u>15</u>	<u>15</u>
Subtotal, direct positions.....	<u>2,559</u>	<u>2,559</u>	<u>2,503</u>	<u>2,410</u>	<u>2,411</u>
Indirect Positions.....	<u>762</u>	<u>762</u>	<u>669</u>	<u>762</u>	<u>754</u>
Total, permanent positions.....	<u>3,321</u>	<u>3,321</u>	<u>3,172</u>	<u>3,172</u>	<u>3,165</u>

PERSONNEL AND RELATED COSTS

	(Thousands of Dollars)				
I. <u>PERSONNEL AND RELATED COSTS</u>	<u>77,181</u>	<u>19,599</u>	<u>76,283</u>	<u>80,423</u>	<u>79,986</u>

Basis of Fund Requirements

A. Compensation and Benefits

1. Compensation

a. Permanent positions.....	68,312	17,251	67,112	71,099	70,498
b. Nonpermanent.....	1,055	371	1,029	1,125	1,187
c. Reimbursable detailees.....	27	6	35	32	32
d. Overtime and other compensation.....	<u>453</u>	<u>110</u>	<u>616</u>	<u>509</u>	<u>510</u>
Subtotal, Compensation.....	<u>69,847</u>	<u>17,738</u>	<u>68,792</u>	<u>72,765</u>	<u>72,227</u>

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
	(Thousands of Dollars)				
2. <u>Benefits</u>	<u>6,689</u>	<u>1,731</u>	<u>6,932</u>	<u>7,078</u>	<u>7,166</u>
Subtotal, Compensation and Benefits.....	<u>76,536</u>	<u>19,469</u>	<u>75,724</u>	<u>79,843</u>	<u>79,393</u>
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	62	---	89	85	89
2. Personnel training.....	<u>583</u>	<u>130</u>	<u>470</u>	<u>495</u>	<u>504</u>
Subtotal, Supporting Costs.....	<u>645</u>	<u>130</u>	<u>559</u>	<u>580</u>	<u>593</u>
Total, Personnel and Related Costs.....	<u>77,181</u>	<u>19,599</u>	<u>76,283</u>	<u>80,423</u>	<u>79,986</u>
A. <u>Compensation and Benefits</u>	<u>76,536</u>	<u>19,469</u>	<u>75,724</u>	<u>79,843</u>	<u>79,393</u>
1. <u>Compensation</u>	<u>69,847</u>	<u>17,738</u>	<u>68,792</u>	<u>72,765</u>	<u>72,227</u>
a. Permanent positions.....	68,312	17,251	67,112	71,099	70,498

The increased cost between the FY 1977 budget estimate and the FY 1977 current estimate is the cost of the October 1976 pay raise.

The decrease between the FY 1977 current estimate and the FY 1978 budget estimate reflects a reduction in permanent positions from 3,172 to 3,165. In addition, there is one less work day in FY 1978.

Basis of Cost for Permanent Positions

In FY 1978 the cost of permanent positions will be \$70,498, a decrease of \$601 from FY 1977. This decrease results as follows:

Cost of permanent positions in 1977.....	71,099
Cost of increase in 1978.....	+1,223
Within grade advances and career development:	
Full year effect of 1977 actions.....	+549
Partial year effect of 1978 actions.....	+586
Full year effect of October 1976 pay raise.....	+88
Cost of decreases in 1978.....	-1,824
Turnover savings and abolished positions:	
Full year effect of 1977 actions.....	-820
Partial year effect of 1978 actions.....	-732
One less paid day in 1978.....	-272
Cost of permanent positions in 1978.....	<u>70,498</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
			(Thousands of Dollars)		

b. Nonpermanent

1. Cost.....	\$1,055	\$371	\$1,029	\$1,125	\$1,187
2. Manyears.....	136	47	144	144	144

The FY 1978 program includes 144 manyears to support the following programs:

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>
College cooperative training.....	69
Summer employment.....	28
Opportunity program.....	35
Other temporary employment.....	<u>12</u>
 Total.....	 <u>144</u>

The increase from the 1977 budget estimate to the 1977 current estimate is a combination of the cost of the October 1976 pay raise, a redistribution of nonpermanent manyears by program, and the implementation of Public Law 94-397 which increases the cost of reemployed annuitants. The change in 1978 is due to the full year effect of the October 1976 pay raise and the increased use of reemployed annuitants in the first part of the year.

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
	(Thousands of Dollars)				
c. Reimbursable detailees.....	27	6	35	32	32

The current estimate for 1978 includes funding for the services of one experienced Navy test pilot who will participate in experimental flight programs including spin tests on military aircraft and flights of terminal configured vehicles. In 1978 it is planned that these flight programs will continue at the same level as 1977, and therefore no increase in the level of effort will be required.

d. Overtime and other compensation.....	453	110	616	509	510
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The use of overtime 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 to take advantage of off peak rates

The 1977 current estimate and the 1978 budget estimate reflect a concentrated effort by the Langley Research Center to reduce the requirements for overtime and other compensation below the 1977 budget estimate. The 1977 current estimate and the 1978 budget estimate also reflect the cost of the October 1976 pay raise.

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
(Thousands of Dollars)					
2. <u>Benefits</u>	<u>6,689</u>	<u>1,731</u>	<u>6,932</u>	<u>7,078</u>	<u>7,166</u>

The distribution of these costs by major categories is as follows:

Category of Cost

Contribution to the Civil Service					
Retirement Fund.....	4,798	1,214	4,746	5,007	4,971
Contribution of employee life					
insurance.....	315	79	320	338	335
Contribution for employee health					
insurance.....	1,329	353	1,280	1,440	1,507
Contribution to FICA.....	24	13	31	32	32
Incentive awards.....	43	19	50	45	45
Workman's compensation.....	180	53	---	215	275
Other personnel benefits.....	---	---	1	1	1
Severance pay.....	---	---	504	---	---
 Total.....	 <u>6,689</u>	 <u>1,731</u>	 <u>6,932</u>	 <u>7,078</u>	 <u>7,166</u>

The increase between the 1977 budget estimate and the current estimate is the net result of the following:

1. The 1977 current estimate reflects the revised plan of the Langley Research Center to accomplish its complement reduction by attrition rather than a reduction in force, thereby eliminating the need for severance pay.

2. The savings caused by the elimination of the need for severance pay, was, however, more than offset by the following increases:

a. The increase in the premiums for employees health insurance.

b. Increased benefits costs associated with the October 1976 pay raise.

c. In the 1977 budget, the entire cost of workman's compensation was included in the Headquarters budget. The 1978 budget reflects the Center's cost for this item.

The increase shown in the 1978 budget estimate reflects an increase in workman's compensation, and the full year effect of employee health insurance premium increases partially offset by a cost decrease as a result of the reduction in manpower scheduled to occur during 1978.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
	(Thousands of Dollars)				
B. <u>Supporting Costs</u>	645	130	559	580	593
1. Transfer of personnel.....	62	---	89	85	89
<p>Transfer of personnel costs include actual expenses involved in the temporary storage of employees' household goods, subsistence and temporary expenses, real estate costs and miscellaneous moving expenses. The 1977 and 1978 estimates reflect such costs predicated on a historical hiring pattern.</p>					
2. Personnel training.....	583	130	470	495	504

Training expenses include fees, tuition, and related costs for off-site training and the costs of seminars and workshops. The estimated increase in cost from the 1977 budget estimate to the 1977 current estimate and the 1978 estimate reflects increased fees for tuition and related training expenses.

TRAVEL

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		<u>1978</u> <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
			(Thousands of Dollars)		
II. <u>TRAVEL</u>	<u>2,218</u>	<u>600</u>	<u>1,952</u>	<u>2,040</u>	<u>2,066</u>

Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Travel.....	1,695	453	1,465	1,539	1,539
B. Meetings and Technical Seminars.....	156	56	130	113	113
C. Administrative Travel.....	<u>367</u>	<u>91</u>	<u>357</u>	<u>388</u>	<u>414</u>
Total, Travel.....	<u>2,218</u>	<u>600</u>	<u>1,952</u>	<u>2,040</u>	<u>2,066</u>
A. <u>Program Travel</u>	<u>1,695</u>	<u>453</u>	<u>1,465</u>	<u>1,539</u>	<u>1,539</u>

Program travel is directly related to accomplishment of the Center's mission. It is the largest part of the travel function and accounts for 74% of travel for 1978.

Travel for program purposes reflects the continuing efforts in space research and other activities at the Center such as Aircraft Technology, Flight Simulation, Fluid Mechanics, Airborne Science and Applications, and Space Life Sciences. The increase of the 1977 current estimate over the budget estimate is in line with program activity at the Center and reflects increased per diem rates. 1978 requirements are estimated to remain at the same level as 1977.

B. <u>Meetings and Seminars Travel</u>	<u>156</u>	<u>56</u>	<u>130</u>	<u>113</u>	<u>113</u>
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Travel to meetings and technical seminars permits employees to participate in meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to technological advances outside LaRC as well as allowing personnel to present both accomplishments and problems to their associates. Many of the meetings are working panels convened to solve certain problems for the benefit of the Government. The decrease in 1977 from the budget estimates is to provide for higher priority program travel.

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
(Thousands of Dollars)					
C. <u>Administrative Travel</u>	<u>367</u>	<u>91</u>	<u>357</u>	<u>388</u>	<u>414</u>

Administrative travel is 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 the Center's top management to NASA Headquarters and other NASA Centers, and local transportation. The increase in the 1977 current estimate and 1978 budget estimate is due primarily to mandatory rate increases in the local transportation contract.

FACILITIES SERVICES

III. <u>FACILITIES SERVICES</u>	<u>6,919</u>	<u>2,031</u>	<u>7,960</u>	<u>7,031</u>	<u>6,553</u>
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Basis of Fund Requirements

Summary of Facilities Services

A. Maintenance and Related Services

1. Maintenance, repair and alterations of buildings and grounds.....	385	181	371	420	421
2. Custodial services.....	1,242	555	1,468	1,715	1,261
3. Maintenance of equipment.....	<u>125</u>	<u>51</u>	<u>155</u>	<u>140</u>	<u>150</u>
Subtotal.....	<u>1,752</u>	<u>787</u>	<u>1,994</u>	<u>2,275</u>	<u>1,832</u>

B. Operation of Facilities

1. Utilities.....	4,959	1,086	5,740	4,629	4,584
2. Supplies and equipment.....	<u>208</u>	<u>158</u>	<u>226</u>	<u>127</u>	<u>137</u>
Subtotal.....	<u>5,167</u>	<u>1,244</u>	<u>5,966</u>	<u>4,756</u>	<u>4,721</u>
Total, Facilities Services.....	<u>6,919</u>	<u>2,031</u>	<u>7,960</u>	<u>7,031</u>	<u>6,553</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
A. <u>Maintenance and Related Services</u>	<u>1,752</u>	<u>787</u>	<u>1,994</u>	<u>2,275</u>	<u>1,832</u>
1. Maintenance, repair, and alterations of buildings and grounds.....	385	181	371	420	421
<p>The increase in the 1977 current estimate is a result of negotiated support contractor wage increases for grounds maintenance services. These services are planned at essentially the same level for 1978 as in 1977.</p>					
2. Custodial services.....	1,242	555	1,468	1,715	1,261
<p>The 1977 current estimate provides for mandatory increases in support service contractor costs for custodial and security guard services. These estimates also reflect an increase of six manyears for security guard services to man the main NASA entrance gate. This service was formerly provided by the Air Force under an interagency agreement. The decrease from 1977 to 1978 reflects a reduction to the minimum obligation required in 1978 in order to provide funds for increased costs in other areas.</p>					
3. Maintenance of equipment.....	125	51	155	140	150
<p>The decrease in the 1977 current estimate is due to a planned reduction in requirements for office equipment maintenance. The 1978 estimate provides for mandatory increases in the cost of current maintenance contracts.</p>					
B. <u>Operation of Facilities</u>	<u>5,167</u>	<u>1,244</u>	<u>5,966</u>	<u>4,756</u>	<u>4,721</u>
1. Utilities.....	4,959	1,086	5,740	4,629	4,584
<p>The 1977 current estimate and the 1978 estimate reflect a planned reduction in the requirements for electrical power and heating fuel oil in order to conform with the agency plan of reducing utility consumption.</p>					
2. Supplies and equipment.....	208	158	226	127	137
<p>The decrease in the 1977 budget to the current estimate is a result of reductions in the planned procurement of motor vehicle and facilities equipment. The 1978 estimate provides for a small increase in the inventory.</p>					

TECHNICAL SERVICES

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
	(Thousands of Dollars)				
IV. <u>TECHNICAL SERVICES</u>	1,794	<u>429</u>	1,635	1,488	1,615
<u>Basis of Fund Requirements</u>					
<u>Summary of Technical Services</u>					
A. <u>Automatic Data Processing</u>					
1. Equipment.....	292	18	153	25	28
2. Programming and operation.....	1,088	<u>337</u>	1,119	1,094	1,191
Subtotal.....	1,380	<u>355</u>	1,272	1,119	1,219
B. <u>Scientific and Technical Information and Programs</u>					
1. Operation of NASA technical library.....	49	13	52	58	64
2. Educational/informational programs.....	325	51	272	272	289
3. Scientific and technical information.....	<u>40</u>	<u>10</u>	<u>39</u>	<u>39</u>	<u>43</u>
Subtotal.....	414	<u>74</u>	363	369	396
Total, Technical Services.....	1,794	<u>429</u>	1,635	1,488	1,615
A. <u>Automatic Data Processing</u>	1,380	<u>355</u>	1,272	1,119	1,219

The decrease in the 1977 current estimate reflects a reduction in the planned procurement of equipment. The increase in 1978 reflects mandatory contractor wage rate increases for the same level of service provided in 1977.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	

(Thousands of Dollars)

B. <u>Scientific and Technical Information and Educational Programs</u>	<u>414</u>	<u>74</u>	<u>363</u>	<u>369</u>	<u>396</u>
1. Library services.....	49	13	52	58	64

The 1977 current estimate and the 1978 estimate provide for mandatory increased contract rates for library services.

2. Educational programs.....	325	51	272	272	289
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The increase in the 1978 estimate reflects negotiated increases in the contractor and supply costs for educational programs.

3. Scientific and technical information.....	40	10	39	39	43
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The 1978 estimate provides for increased costs of documentation services.

ADMINISTRATIVE SUPPORT

V. <u>ADMINISTRATIVE SUPPORT</u>	<u>5,057</u>	<u>1,528</u>	<u>3,861</u>	<u>4,432</u>	<u>5,191</u>
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Basis of Fund Requirements

Summary of Administrative Support

A. <u>Communications</u>					
1. Leased lines and long distance.....	444	92	381	367	404
2. Local telephone service.....	804	201	800	810	891
3. Other communications.....	<u>708</u>	<u>175</u>	<u>16</u>	<u>750</u>	<u>805</u>
Subtotal, Communications.....	<u>1,956</u>	<u>468</u>	<u>1,197</u>	<u>1,927</u>	<u>2,100</u>

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
(Thousands of Dollars)					
B. <u>Administrative Printing</u>	<u>42</u>	<u>---</u>	<u>3</u>	<u>---</u>	<u>---</u>
C. <u>Supplies, Materials and Equipment</u>	<u>947</u>	<u>215</u>	<u>673</u>	<u>644</u>	<u>688</u>
D. <u>Transportation</u>					
1. Center operations.....	775	225	491	677	729
2. Common carrier.....	<u>25</u>	<u>5</u>	<u>30</u>	<u>27</u>	<u>31</u>
Subtotal, Transportation.....	<u>800</u>	<u>230</u>	<u>521</u>	<u>704</u>	<u>760</u>
E. <u>Administrative Support Services</u>					
1. Installation support services.....	1,129	360	1,219	1,157	1,236
2. Occupational medicine and environmental health.....	<u>183</u>	<u>255</u>	<u>248</u>	<u>---</u>	<u>407</u>
Subtotal, Administrative Support Services	<u>1,312</u>	<u>615</u>	<u>1,467</u>	<u>1,157</u>	<u>1,643</u>
Total, Administrative Support.....	<u>5,057</u>	<u>1,528</u>	<u>3,861</u>	<u>4,432</u>	<u>5,191</u>
A. <u>Communications</u>	<u>1,956</u>	<u>468</u>	<u>1,197</u>	<u>1,927</u>	<u>2,100</u>

The current estimate for 1977 reflects the inclusion of estimates for postage in this function. These funds were formerly included in Headquarters' budget. The 1978 estimate provides for mandatory contractor rate increases for communications services.

B. <u>Administrative Printing</u>	<u>42</u>	<u>---</u>	<u>3</u>	<u>---</u>	<u>---</u>
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No administrative contracted printing is anticipated in 1977 or 1978.

	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
			(Thousands of Dollars)		
C. <u>Supplies, Materials and Equipment</u>	<u>947</u>	<u>215</u>	<u>673</u>	<u>644</u>	<u>688</u>

The decrease in the current 1977 estimate reflects a reduction in inventory to provide funds for mandatory increases in other areas. The 1978 increase reflects a return to a normal inventory level.

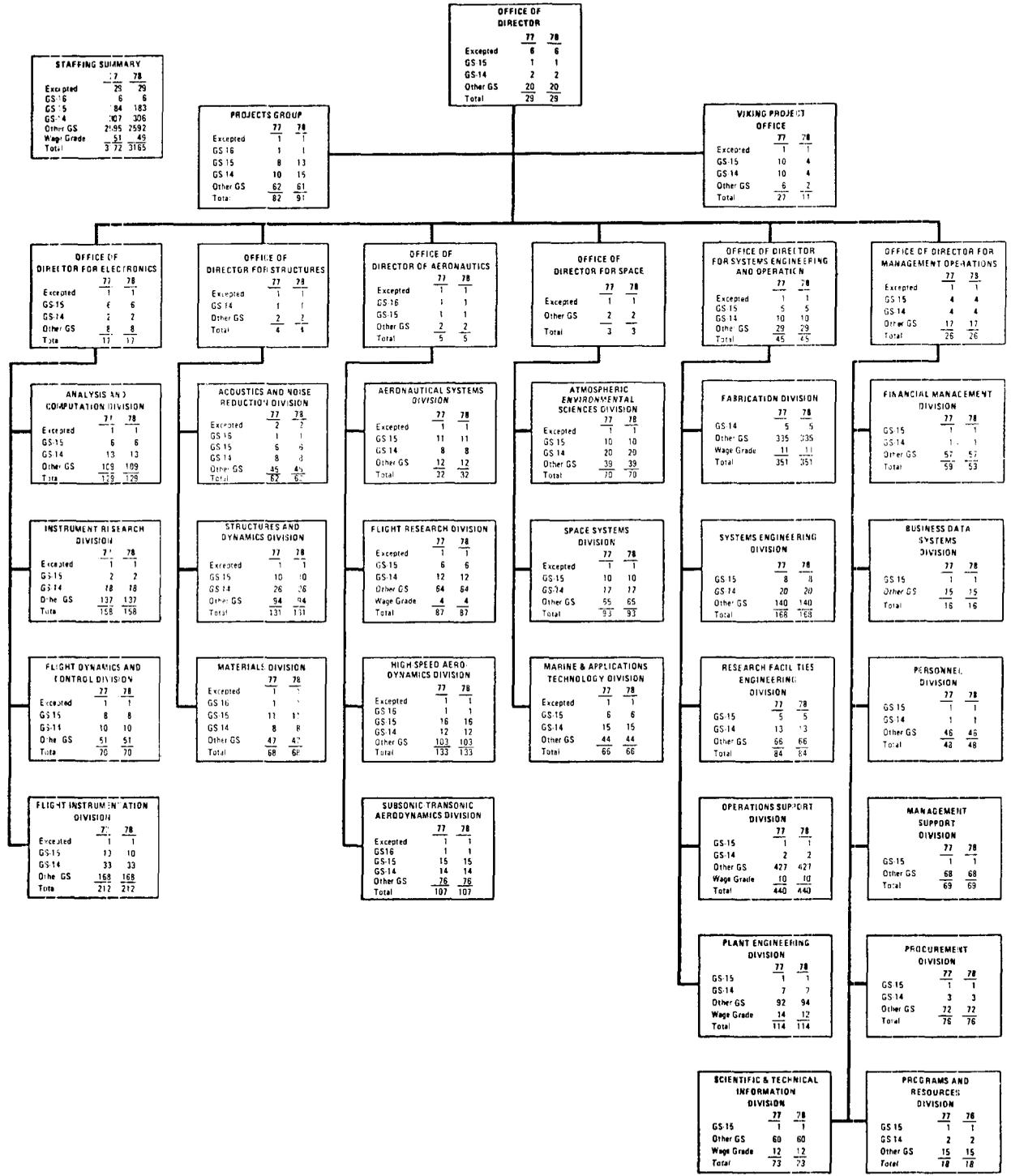
D. <u>Transportation</u>	<u>800</u>	<u>230</u>	<u>521</u>	<u>704</u>	<u>760</u>
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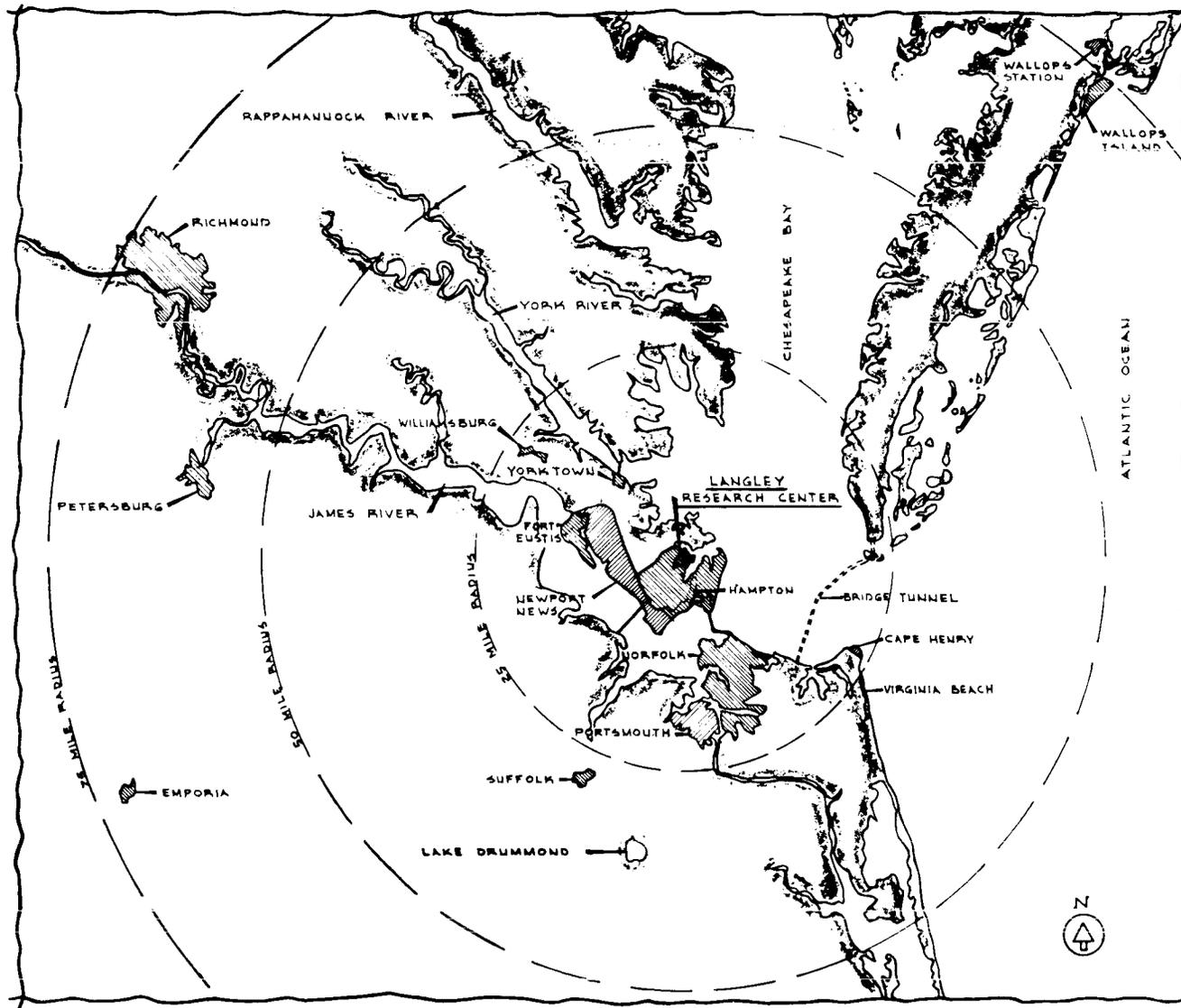
The current 1977 estimate reflects increased costs in the transportation and the NASA-1 Gulfstream aircraft contracts that have occurred since the 1977 budget estimates were submitted. The 1978 estimate reflects an increase in the contractor cost for operation and maintenance of the Gulfstream aircraft.

E. <u>Administrative Support Services</u>	<u>1,312</u>	<u>615</u>	<u>1,467</u>	<u>1,157</u>	<u>1,643</u>
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The reduction in current 1977 estimate is a result of changed phasing of costs for medical services in the Transition Quarter and FY 1977. The increase in 1978 is a result of wage increase for contracted services and full year funding for medical services.

LANGLEY RESEARCH CENTER



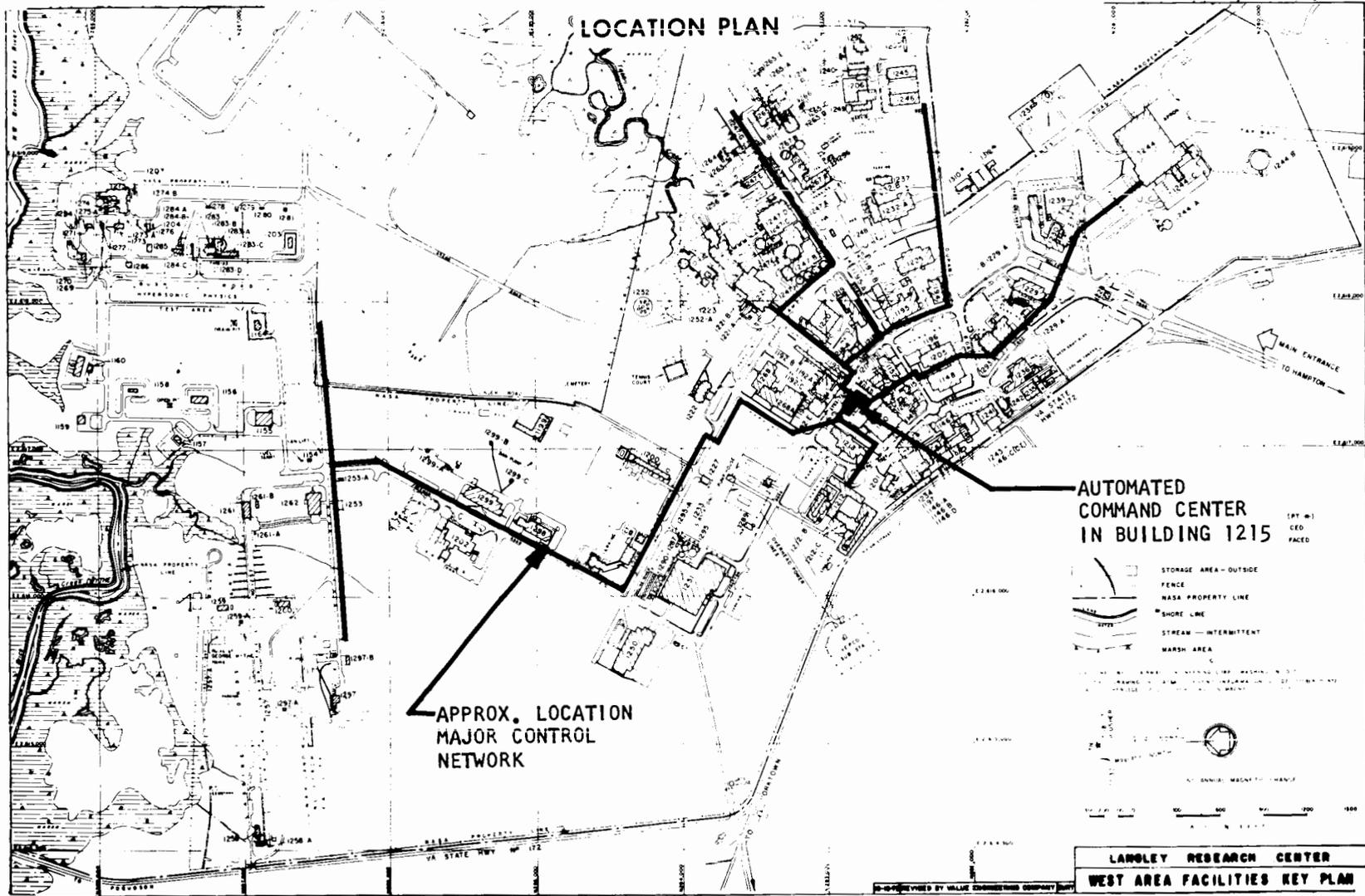


LANGLEY RESEARCH CENTER AND VICINITY

1" = 8 MILES

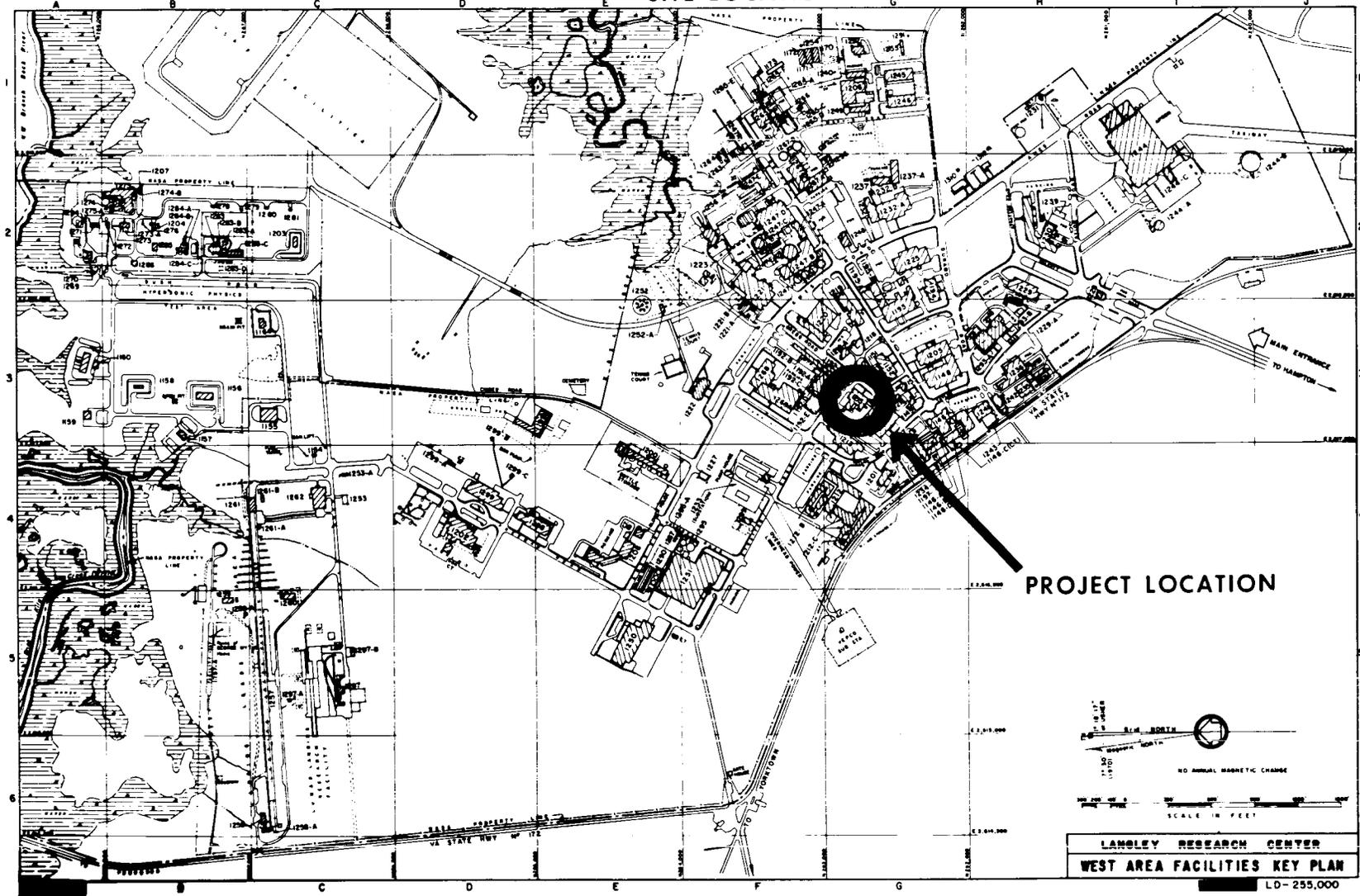
LANGLEY RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

MODIFICATION OF UTILITY SYSTEM FOR CENTRAL CONTROL



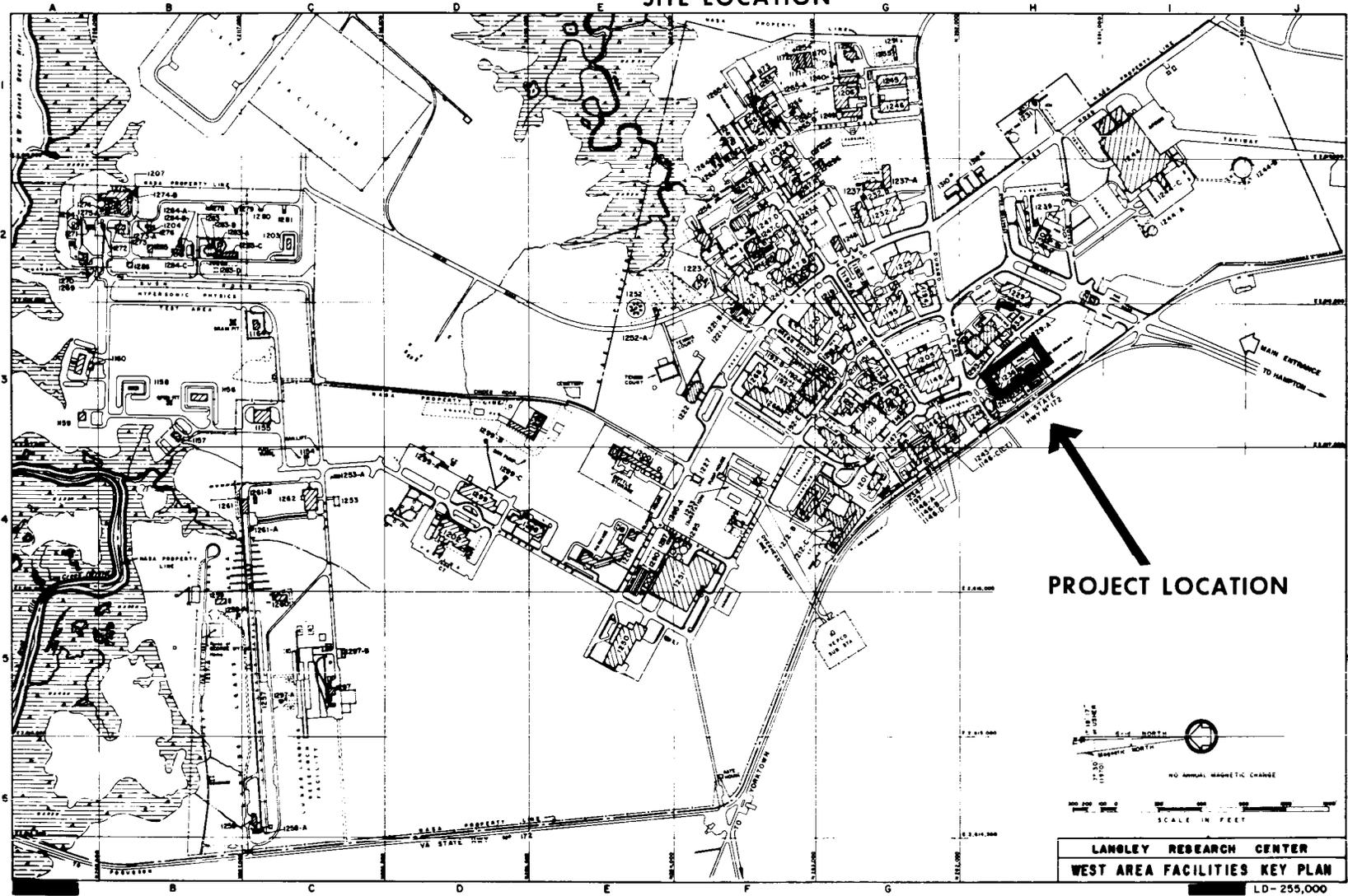
LANGLEY RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

REHABILITATION OF WEST HEATING PLANT, BUILDING 1215
SITE LOCATION



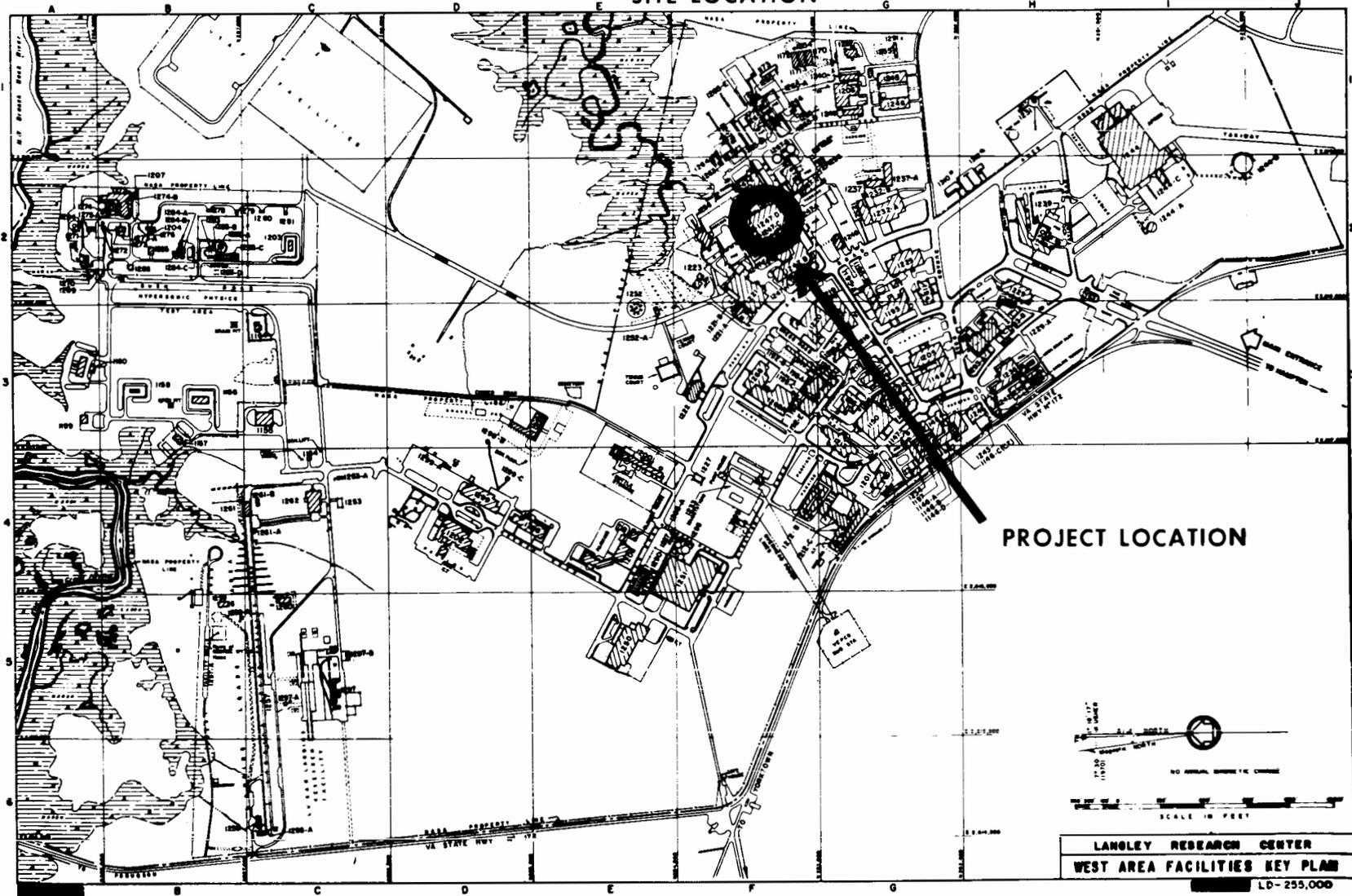
LANGLEY RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

CONSTRUCTION OF NATIONAL TRANSONIC FACILITY
SITE LOCATION



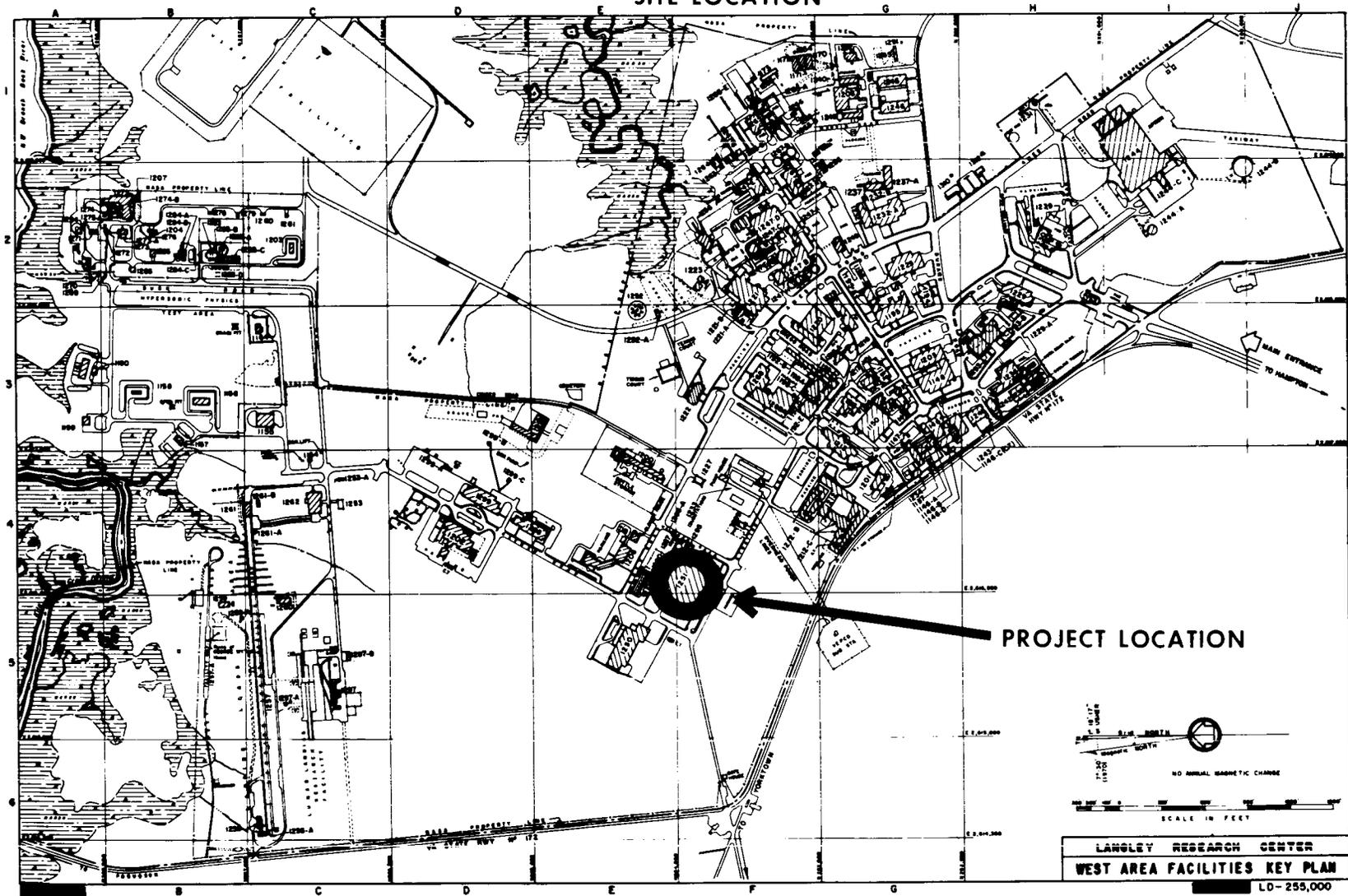
LANGLEY RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

CONSTRUCTION 0.5 METER MACH 5 QUIET TUNNEL
SITE LOCATION

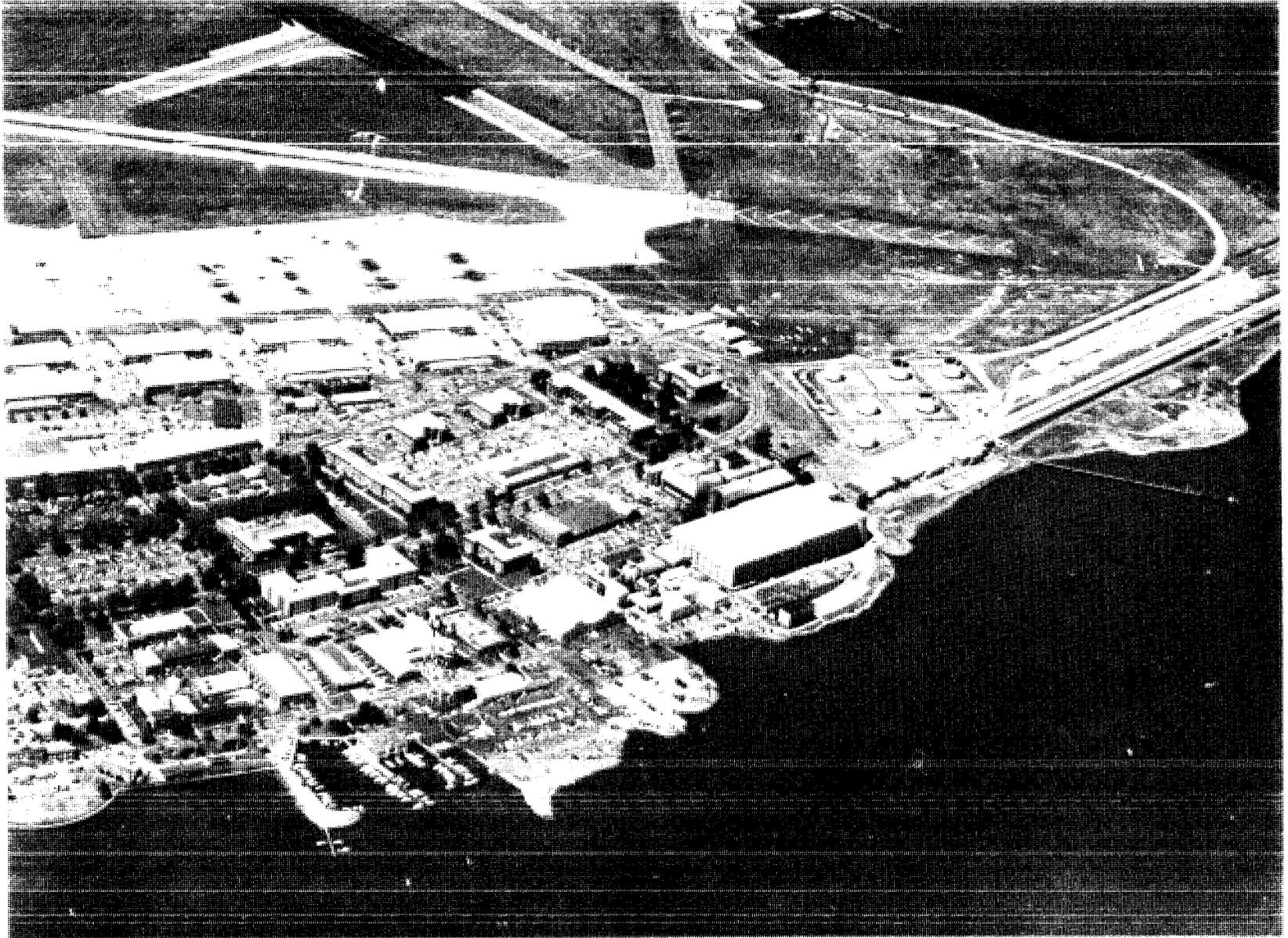


LANGLEY RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

REHABILITATION OF UNITARY PLAN WIND TUNNEL, BUILDING 1251
SITE LOCATION







RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

LEWIS RESEARCH CENTER

DESCRIPTION

The Lewis Research Center is located on two sites in north central Ohio. The older one, established in 1941 adjacent to the Cleveland-Hopkins International Airport, has 366 acres including 14 acres leased from the City of Cleveland. There are over 100 buildings, including wind tunnels, test chambers, laboratories and other research facilities.

The Plum Brook Station established in 1956, is located south of Sandusky, Ohio, about fifty miles west of Cleveland, on land formerly occupied by the Plum Brook Ordnance works. There are 8,051 acres including 46 acres in easements at Plum Brook with 83 buildings and 99 concrete storage bunkers. A 100 kW Electric Wind Turbine Generator Facility designed to be operated remotely is in operation for a program jointly sponsored by the Energy Research and Development Administration and NASA. During the second half of 1975, consistent with our future research and technology needs, the principal facilities were placed in a standby mode.

The capital investment at Lewis Research Center including fixed assets in progress and contractor-held facilities at various locations as of September 30, 1976, was \$416,916,000.

MISSION

In the field of aeronautics, the general goals of Lewis are to provide the advanced technology base for developing high performance civil and military aeronautical propulsion systems which are economical, fuel-conservative, and reliable, and which operate with minimum environmental impact (i.e., they are clean and quiet insofar as they meet community standards).

Lewis' major responsibility within aeronautics is aeronautical propulsion. In aeronautical propulsion, Lewis research supports the determination of the capabilities and limitations of full-scale engines over their complete range of operation and the reduction of aircraft noise. Aircraft engines for future subsonic and supersonic aircraft with high compressor pressure ratios and high turbine inlet temperatures are being investigated. High flight Mach number aircraft engine inlets, combustion nozzles, and systems are being investigated. Major emphasis is placed on energy efficiency in propulsion systems.

A flight test program is being conducted with an F-106 airplane to determine the interactions of engine inlets and exhaust nozzles with wings and fuselage at transonic speeds. An experimental flight program is being implemented utilizing the YF-12 aircraft in cooperation with the Dryden Flight Research Center. Propulsion control techniques are being developed to increase compatibility of engine/inlet propulsion interactions with airframe and aircraft and aircraft end-use requirements.

Lewis is also responsible for the management of the Atlas/Centaur and Titan/Centaur launch vehicles. This includes procurement of these vehicles and provision of launch service for missions utilizing them.

The space propulsion programs include chemical and electrical propulsion technology and component and systems development. Chemical propulsion programs are providing the technology for an advanced high performance reusable hydrogen-oxygen upper stage space propulsion system for near-earth space missions. Both primary and auxiliary electric thrusters of the electron bombardment type are being developed for foreseeable applications.

The Center has a substantial materials research effort aimed at raising the capability of materials to allow the improvement of component and system performance of propulsion and power generation systems, launch vehicles, and spacecraft. Materials being investigated include composites, titanium alloys, superalloys of nickel and cobalt base, refractory metals, dispersion strengthened metals, and ceramics.

Lewis developed the transmitter and power tube for the Cooperative Applications Satellite (CAS-C) and is responsible for mission support after its successful launch. Lewis is also developing the technology of advanced high power transmitters for space communications.

Lewis energy research efforts include electric power generation technology which encompasses photovoltaic, electrochemical, and mechanical systems for both space and ground power applications. Solar and ground terrestrial power programs are being conducted jointly with the Energy Research and Development Administration (ERDA).

SUMMARY OF RESOURCES REQUIREMENTS FUNDS

FUNDS

	1976	Transition	1977		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
			(Thousands of Dollars)		
I. Personnel and Related Costs.....	69,845	18,257	73,324	74,670	76,745
II. Travel.....	1,079	333	905	1,046	1,105
III. Facilities Services.....	7,493	2,501	9,609	9,026	8,424
IV. Technical Services.....	612	185	458	702	496
V. Administrative Support.....	<u>1,648</u>	<u>938</u>	<u>1,443</u>	<u>2,094</u>	<u>1,936</u>
Total, fund requirement.....	<u>80,677</u>	<u>22,214</u>	<u>85,739</u>	<u>87,538</u>	<u>88,706</u>

Distribution of Permanent Positions by Program

Direct Positions

<u>Space Flight</u>	<u>214</u>	<u>214</u>	<u>214</u>	<u>204</u>	<u>170</u>
Space shuttle.....	10	10	---	---	---
Expendable launch vehicles.....	204	204	214	204	170
<u>Space Science</u>	<u>31</u>	<u>31</u>	<u>29</u>	<u>29</u>	<u>29</u>
Physics and astronomy.....	31	31	29	29	29
<u>Space Applications</u>	<u>116</u>	<u>116</u>	<u>106</u>	<u>106</u>	<u>107</u>

	1976 Actual	Transition Quarter Actual	1977		1976 Budget Estimate
			Budget Estimate	Current Estimate	Budget Estimate
<u>Aeronautics and Space Technology</u>	<u>1,822</u>	<u>1,822</u>	<u>2,080</u>	<u>1,827</u>	<u>1,827</u>
Aeronautical research and technology.....	1,308	1,308	1,309	1,313	1,313
Space research and technology.....	514	514	771	514	514
<u>Energy Technology Applications</u>	<u>245</u>	<u>245</u>	<u>---</u>	<u>262</u>	<u>295</u>
<u>Technology Utilization</u>	<u>7</u>	<u>7</u>	<u>6</u>	<u>7</u>	<u>7</u>
Subtotal, direct positions.....	2,435	2,435	2,435	2,435	2,435
<u>Indirect Positions</u>	<u>590</u>	<u>590</u>	<u>590</u>	<u>590</u>	<u>590</u>
Total, permanent positions.....	<u>3,025</u>	<u>3,025</u>	<u>3,025</u>	<u>3,025</u>	<u>3,025</u>

PERSONNEL AND RELATED COSTS

(Thousands of Dollars)

I. <u>PERSONNEL AND RELATED COSTS</u>	<u>69,845</u>	<u>18,257</u>	<u>73,324</u>	<u>74,670</u>	<u>76,745</u>
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Basis of Fund Requirements

A. Compensation and Benefits

1. Compensation

a. Permanent positions.....	62,007	15,998	65,392	66,134	67,772
b. Nonpermanent positions.....	666	274	648	676	683
c. Overtime and other compensation.....	<u>839</u>	<u>272</u>	<u>877</u>	<u>904</u>	<u>968</u>
Subtotal, Compensation.....	63,512	16,544	66,917	67,714	69,423

2. <u>Benefits</u>	<u>6,044</u>	<u>1,621</u>	<u>6,148</u>	<u>6,591</u>	<u>6,957</u>
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Subtotal, Compensation and Benefits.....	<u>69,556</u>	<u>18,165</u>	<u>73,065</u>	<u>74,305</u>	<u>76,380</u>
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	<u>1976</u> <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	
(Thousands of Dollars)					
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	25	7	34	55	55
2. Personnel training.....	<u>264</u>	<u>85</u>	<u>225</u>	<u>310</u>	<u>310</u>
Subtotal, Supporting Costs.....	<u>289</u>	<u>92</u>	<u>259</u>	<u>365</u>	<u>365</u>
Total, Personnel and Related Costs.....	<u>69,845</u>	<u>18,257</u>	<u>73,324</u>	<u>74,670</u>	<u>76,745</u>
A. <u>Compensation and Benefits</u>					
1. <u>Compensation</u>	63,512	16,544	66,917	67,714	69,423
a. Permanent positions.....	62,007	15,998	65,392	66,134	67,772

Basis of Cost for Permanent Positions

In 1978 the cost of permanent positions will be \$67,772,000, an increase of \$1,638,000 from 1977. This increase results as follows:

Cost of permanent positions in 1977.....	66,134
Cost increases.....	+2,414
Within-grade advances and career development:	
Full year effect of 1977 actions.....	+1,475
Partial year effect of 1978 actions.....	+869
Full year effect of October 1976 pay raise.....	+70
Cost decreases.....	-776
Turnover savings:	
Full year effect of 1977 actions.....	-144
Partial year effect of 1978 actions.....	-367
One less paid day in 1978.....	-265
Cost of permanent positions in 1978.....	<u>67,772</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	

(Thousands of Dollars)

b. Nonpermanent positions

1. Cost.....	\$666	\$274	\$648	\$676	\$683
2. Manyears.....	98	43	100	98	98

The temporary employment program for 1978 is planned at the same manyear level as 1977. The 1977 current estimate and 1978 budget estimate reflect cost increases due to implementation of Public Law 94-397 (Reemployed Annuitants) and the October 1976 pay raise. The 1978 program includes 98 manyears to support the following programs:

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>
College cooperative training.....	32
Summer employment.....	22
Opportunity programs.....	17
Other temporary employment.....	<u>27</u>
Total.....	<u>98</u>

c. Overtime and other compensation.....	839	272	877	904	968
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The increase in the 1977 current estimate from the 1977 budget estimate reflects the October 1976 pay raise.

The 1978 estimates reflect an increase in overtime and night differential costs due to the full year effect of the October 1976 pay increase and scheduled launch related requirements.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
2. <u>Benefits</u>	6.044	1,621	6,148	6,591	6,957

In the 1977 current estimate and the 1978 budget, benefits increase as a result of the October 1976 pay raise, increased costs for employee health insurance and workman's compensation.

In the 1977 budget, the entire cost of workman's compensation was included as a Headquarter's cost. The 1978 budget reflects the Center's cost for this item.

The following table indicates the costs of personnel benefits by major categories:

<u>Category of Costs</u>					
Contribution for life insurance.....	264	69	275	274	278
Contribution for employee health insurance.....	1,271	353	1,248	1,470	1,618
Contribution to Civil Service Retirement Fund.....	4,328	1,139	4,555	4,634	4,755
Contribution to FICA.....	26	12	35	35	35
Workman's compensation.....	112	33	---	133	226
Incentive awards.....	39	6	30	40	40
Other personnel benefits.....	<u>4</u>	<u>9</u>	<u>5</u>	<u>5</u>	<u>5</u>
Total.....	<u>6,044</u>	<u>1,621</u>	<u>6,148</u>	<u>6,591</u>	<u>6,957</u>
B. <u>Supporting Costs</u>	<u>289</u>	<u>92</u>	<u>259</u>	<u>365</u>	<u>365</u>
1. Transfer of personnel.....	25	7	34	55	55

The increase in the 1977 current estimate over the 1977 budget estimate reflects the transfer of Plum Brook personnel to Cleveland which was deferred from 1976. The 1978 estimate of transfers remains at the current level.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget</u> <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
	(Thousands of Dollars)				
2. <u>Personnel training</u>	<u>264</u>	<u>85</u>	<u>225</u>	<u>310</u>	<u>310</u>

Approximately 38% of the training activity supports technically oriented training. Another 33% is provided specifically in the scientific and engineering fields. The remaining 29% supports administrative and clerical programs. The 1977 current estimate was increased over the 1977 budget estimate to reflect the increase in training fees and tuition costs. Tuition increases are expected in 1978. A decrease in the number of hours of training scheduled for 1978 is planned to hold costs in 1978 at the 1977 level.

TRAVEL

II. <u>TRAVEL</u>	<u>1,079</u>	<u>333</u>	<u>905</u>	<u>1,046</u>	<u>1,105</u>
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Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Travel.....	868	264	725	836	876
B. Meetings and Technical Seminars.....	102	28	130	93	96
C. Administrative Travel.....	<u>109</u>	<u>41</u>	<u>50</u>	<u>117</u>	<u>133</u>
Total, Travel.....	<u>1,079</u>	<u>333</u>	<u>905</u>	<u>1,046</u>	<u>1,105</u>
A. <u>Program Travel</u>	<u>868</u>	<u>264</u>	<u>725</u>	<u>836</u>	<u>876</u>

Program travel is required to accomplish the Center's mission. It is the largest part of the travel function and accounts for 79% of travel costs in 1978.

Program travel is necessary to carry out the ongoing activities at the Center including aeronautical research, space propulsion, materials research and launch vehicle procurement and management. The increases from the 1977 budget estimate to the current estimate and from 1977 to 1978 are due to per diem and air fare increases and increased priority program travel respectively.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					
B. <u>Meetings and Seminars Travel</u>	102	28	130	93	96

Travel to meetings and technical seminars permits employees to participate in meetings and technical seminars with other representatives of the aerospace community. This participation allows personnel to benefit from exposure to technological advances outside LeRC, as well as allowing personnel to present both accomplishments and problems to their associates. Many of the meetings are made up of working panels convened to solve certain problems for the benefit of the Government. The decrease in 1977 from the budget estimate is necessary to provide for higher priority program travel.

C. <u>Administrative Travel</u>	109	41	50	117	133
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Administrative travel is for the direction and coordination of general management matters. It includes travel by managers in such areas as personnel, financial management and procurement activities and travel of the Center's top management to NASA Headquarters and other NASA Centers. The increase in 1977 from the budget estimate to the current estimate follows the review of 1976 experience and allows for the increased per diem rates. The increase in 1978 allows for modest increases in management travel.

FACILITIES SERVICES

III. <u>FACILITIES SERVICES</u>	7,493	2,501	9,609	9,026	8,424
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Basis of Fund Requirements

Summary of Facilities Services

A. Maintenance and Related Services

1. Maintenance, repair and alterations of buildings and grounds.....	812	527	621	715	460
2. Custodial services.....	1,420	371	1,881	1,943	2,031
3. Maintenance of equipment.....	64	47	36	70	40
Subtotal.....	2,296	945	2,538	2,728	2,531

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Estimate Current Estimate		1978 Budget <u>Estimate</u>
			(Thousands of Dollars)		
<u>B. Operation of Facilities</u>					
1. Utilities.....	4,396	987	6,986	5,575	5,658
2. Supplies and equipment.....	<u>801</u>	<u>569</u>	<u>85</u>	<u>723</u>	<u>235</u>
Subtotal.....	<u>5,197</u>	<u>1,556</u>	<u>7,071</u>	<u>6,298</u>	<u>5,893</u>
Total, Facilities Services.....	<u>7,493</u>	<u>2,501</u>	<u>9,609</u>	<u>9,026</u>	<u>8,424</u>
<u>A. Maintenance and Related Services.....</u>					
1. Maintenance, repair and alterations of buildings and grounds.....	812	527	621	715	460

Lewis Research Center has to maintain over 100 buildings at Cleveland, with 2,207,019 gross square feet, and 83 buildings at Plum Brook with 951,228 gross square feet.

At Cleveland there are 366 acres including 14 acres leased from the City of Cleveland and at Plum Brook there are 8,051 acres including 46 acres in easements to be maintained.

This function covers primarily support service contracts and non recurring one-time maintenance and alteration projects. The major service contracts include grounds maintenance and landscaping.

The increase from the 1977 budget to the current estimate is based on unanticipated contract cost increases (and maintenance requirements) experienced in 1976 and the inclusion of some one-time maintenance and repair projects. A concerted effort was made during the transition quarter to perform maintenance deferred in prior periods. Accomplishing deferred maintenance in the transition quarter and the one-time projects in 1977 allows a reduction in 1978.

2. Custodial services.....	1,420	371	1,881	1,943	2,031
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Major services include security, janitorial, and fire protection at both Cleveland and Plum Brook Stations which are accomplished through support service contracts. The increase from the 1977 budget to the current estimate is because of negotiated support service contractor wage rates. The full year effect of these rates cause the 1978 increase with no change in the level of effort.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u>		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
			(Thousands of Dollars)		
3. Maintenance of equipment.....	64	47	36	70	40
<p>The cost of equipment maintenance increases from the 1977 budget to the current estimate due to the inclusion of required one-time projects. The 1978 estimate decreases to a normal level.</p>					
B. <u>Operation of Facilities</u>	<u>5,197</u>	<u>1,556</u>	<u>7,071</u>	<u>6,298</u>	<u>5,893</u>
1. Utilities.....	4,396	987	6,986	5,575	5,658

The estimate of utilities is based on known and anticipated consumption and utility rates. The 1977 current estimate and the 1978 estimate reflect a reduction in the planned usage of electrical power and heating fuel oil in order to conform with the agency plan for reduced utility consumption.

A new coal storage area will be completed in 1977. Some of the costs estimated in 1977 are for stocking the new coal storage area. In 1978, coal is projected as the primary heating fuel. The 1978 increase is caused by the full-year effect of the new rate structure.

2. Supplies, materials and equipment.....	801	569	85	723	235
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The items contained in this category are supplies, material and equipment necessary for the routine operation of Center facilities. Changed phasing in acquisition of supplies and materials for inventories in the Transition Quarter and 1977 will result in decreased expenditures in 1978.

TECHNICAL SERVICES

	<u>1976</u>	Transition	<u>1977</u>		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
IV. <u>TECHNICAL SERVICES</u>	<u>612</u>	<u>185</u>	<u>458</u>	<u>702</u>	<u>496</u>
<u>Basis of Fund Requirements</u>					
<u>Summary of Technical Services</u>					
A. <u>Automatic Data Processing</u>	<u>97</u>	<u>32</u>	<u>198</u>	<u>213</u>	<u>182</u>
B. <u>Engineering Services</u>	<u>148</u>	<u>52</u>	<u>35</u>	<u>36</u>	<u>39</u>
C. <u>Scientific and Technical Information and</u> <u>Educational Programs</u>					
1. Operation of NASA technical library.....	26	---	25	25	28
2. Educational/informational programs.....	317	96	180	380	197
3. Scientific and technical information.....	<u>24</u>	<u>5</u>	<u>20</u>	<u>48</u>	<u>50</u>
Subtotal.....	<u>367</u>	<u>101</u>	<u>225</u>	<u>453</u>	<u>275</u>
Total, Technical Services.....	<u>612</u>	<u>185</u>	<u>458</u>	<u>702</u>	<u>496</u>
A. <u>Automatic Data Processing</u>	<u>97</u>	<u>32</u>	<u>198</u>	<u>213</u>	<u>182</u>

The costs budgeted in this function include equipment rental and maintenance, an on-site keypunch support contract, and some one-time administrative systems software development support. The increase in the 1977 current estimate from the budget reflects increased support contractor wage rates. The 1978 decrease is the result of lower equipment rental requirements, partially offset by negotiated support contractor wage rate increases.

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977 <u>Budget</u> <u>Current</u> <u>Estimate</u> <u>Estimate</u>		1978 <u>Budget</u> <u>Estimate</u>
	(Thousands of Dollars)				
B. <u>Engineering Services</u>	148	52	35	36	39

This includes the engineering services necessary to monitor the water and air around the reactor at the Plum Brook Station to determine the detectable radioactive level. This effort will be a continuing service and is projected at a relatively constant level with provision for negotiated support contractor wage rate increases.

C. <u>Scientific and Technical Information and</u> <u>Educational Programs</u>	367	101	225	453	275
1. Technical libraries.....	26	---	25	25	28

The cost of library services will remain essentially at the 1976 and 1977 level with an increase in 1978 to provide for mandatory price changes.

2. Educational/information programs.....	317	96	180	380	197
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Public Affairs costs are reflected under this function, including operation and tours of the Visitor Information Center, film distribution, and mail answering service. The increase from the 1977 budget to the current estimate is for the procurement of exhibit displays within the Visitor Information Center. The decrease in 1978 is because of the completion of the one-time purchase of exhibits in 1977.

3. Scientific and technical information.....	24	5	20	48	50
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Includes miscellaneous items for brochures and pamphlets for use in connection with technical and management meetings which are scheduled to increase in 1977 and are estimated to be at the same level of requirements in 1978.

ADMINISTRATIVE SUPPORT

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 <u>Budget Estimate</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	
(Thousands of Dollars)					
V. <u>ADMINISTRATIVE SUPPORT</u>	<u>1,648</u>	<u>938</u>	<u>1,443</u>	<u>2,094</u>	<u>1,936</u>

Basis of Fund Requirements

Summary of Administrative Support

A. Communications

1. Leased lines and long distance.....	354	83	335	345	350
2. Local telephone service.....	185	51	210	200	239
3. Other communications.....	<u>26</u>	<u>7</u>	<u>52</u>	<u>25</u>	<u>27</u>
Subtotal, Communications.....	<u>565</u>	<u>141</u>	<u>597</u>	<u>570</u>	<u>616</u>

B. <u>Administrative Printing</u>	<u>37</u>	---	<u>68</u>	<u>68</u>	<u>75</u>
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C. <u>Supplies, Materials and Equipment</u>	<u>377</u>	<u>166</u>	<u>125</u>	<u>290</u>	<u>229</u>
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D. Transportation

1. Center operations.....	122	221	108	182	215
2. Common carrier.....	<u>17</u>	<u>7</u>	<u>30</u>	<u>18</u>	<u>19</u>
Subtotal, Transportation.....	<u>139</u>	<u>228</u>	<u>138</u>	<u>200</u>	<u>234</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	<u>Budget</u> <u>Estimate</u>
	(Thousands of Dollars)				
<u>E. Administrative Support Services</u>					
1. Installation support services.....	485	391	470	468	379
2. Occupational medicine and environmental health.....	<u>45</u>	<u>12</u>	<u>45</u>	<u>498</u>	<u>403</u>
Subtotal, Administrative Support Services.	<u>530</u>	<u>403</u>	<u>515</u>	<u>966</u>	<u>782</u>
Total, Administrative Support.....	<u>1,648</u>	<u>938</u>	<u>1,443</u>	<u>2,094</u>	<u>1,936</u>

A. Communications..... 565 141 597 570 616

Communication costs reflect general rate increases partially offset by a reduction of FTS costs at the Plum Brook Station. The increase in 1978 is due primarily to local telephone rate increases.

B. Administrative Printing..... 37 --- 68 68 75

This function includes general printing services and printing of the Lewis News. Increases projected for 1978 are related to support contract wage increases and the general price increases of printing supplies.

C. Supplies, Materials, and Equipment..... 377 166 125 290 229

This item includes office equipment, and general office supplies. The increase of the 1977 current estimate over the budget estimate is based on current minimum requirements. 1978 costs will be held to a lower value than 1977 by rephasing inventory utilization.

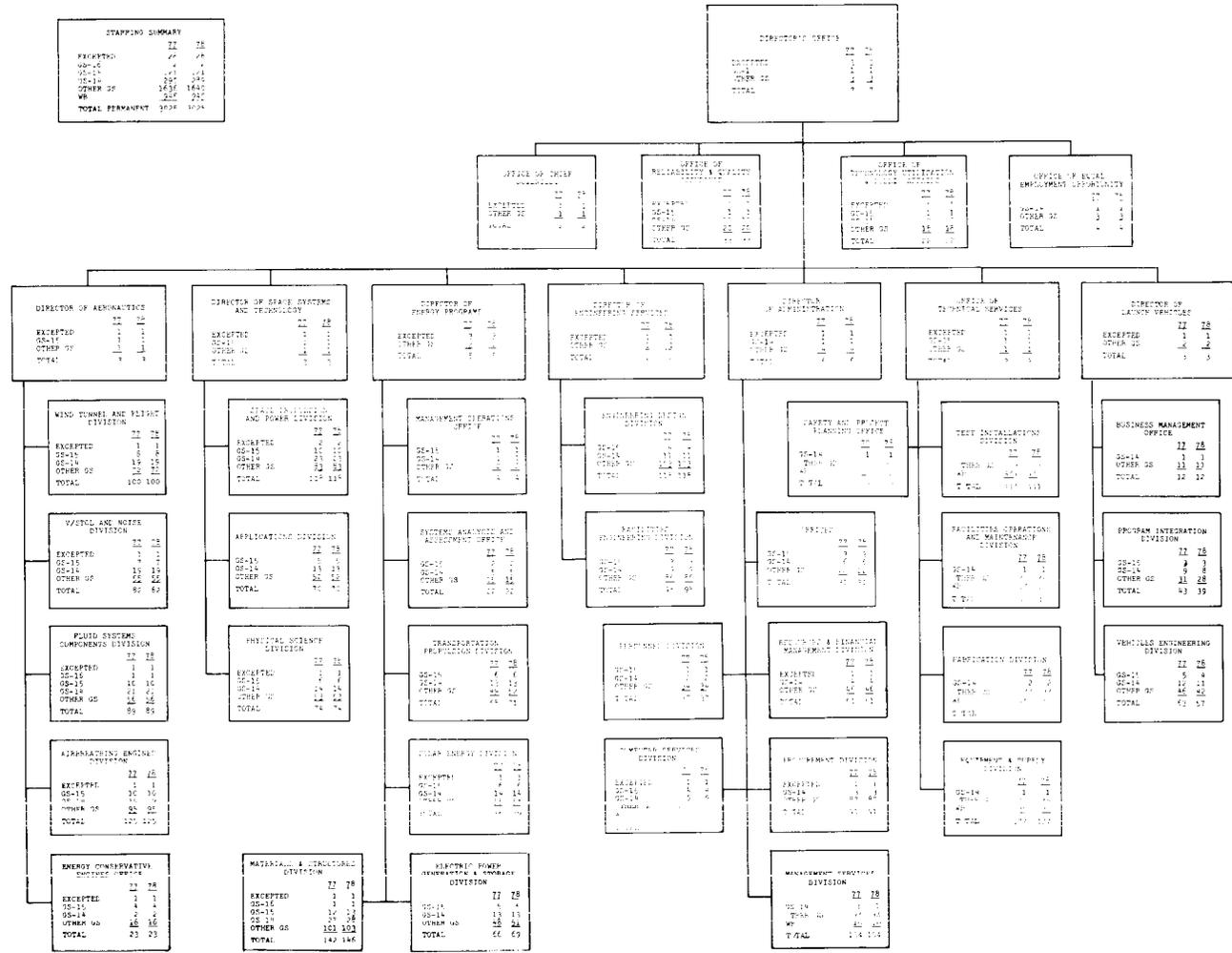
D. Transportation..... 139 228 138 200 234

This function includes services for moving and hauling, packing and crating, Plum Brook vehicle maintenance, and motor vehicle equipment maintenance. The Transition Quarter was higher than 1976 due to the purchase of transportation equipment previously deferred. The 1977 current estimate was increased over the 1977 budget estimate to reflect the required level of activity. 1978 is expected to increase over 1977 due to the net effect of vehicle purchases plus increases in the average purchase cost per unit.

	1976	Transition	1977		1978
	Actual	Quarter	Budget	Current	Budget
		Actual	Estimate	Estimate	Estimate
		(Thousands of Dollars)			
E. <u>Administrative Support Services</u>	<u>530</u>	<u>403</u>	<u>515</u>	<u>966</u>	<u>782</u>

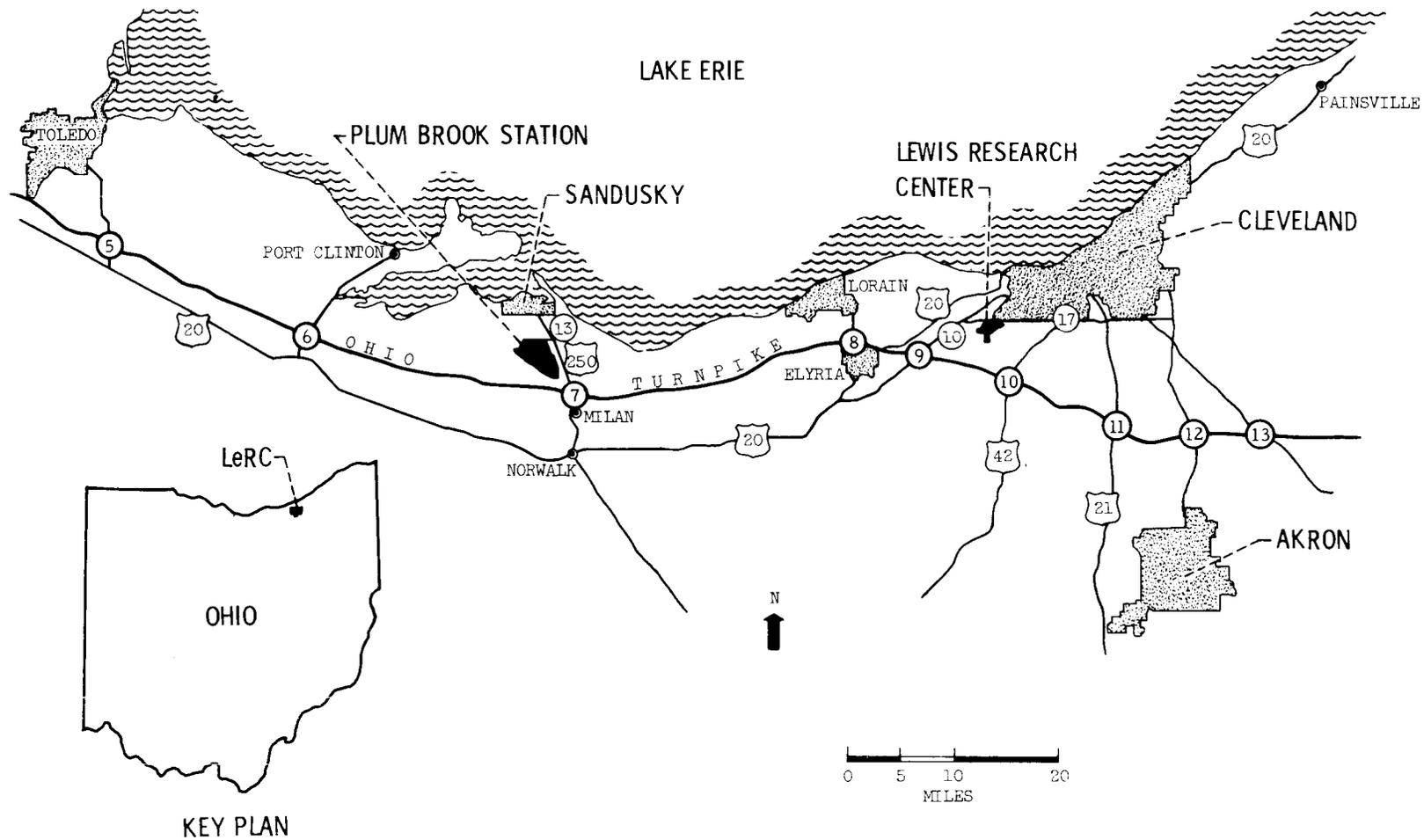
This function includes service contracts for bus, mail and package, supply management and medical services. The change from the 1977 budget to the 1977 current estimate is due to increased medical services which are necessary to provide more complete health services for Lewis Research employees. A new Health Physical Survey and Evaluation Facility is being established to comply with the NASA Occupational Medicine Program in 1977. The decrease in 1978 is because of the completion of the one-time costs associated with the facility in 1977.

National Aeronautics and Space Administration Organization and Staffing Chart LEWIS RESEARCH CENTER Cleveland, Ohio

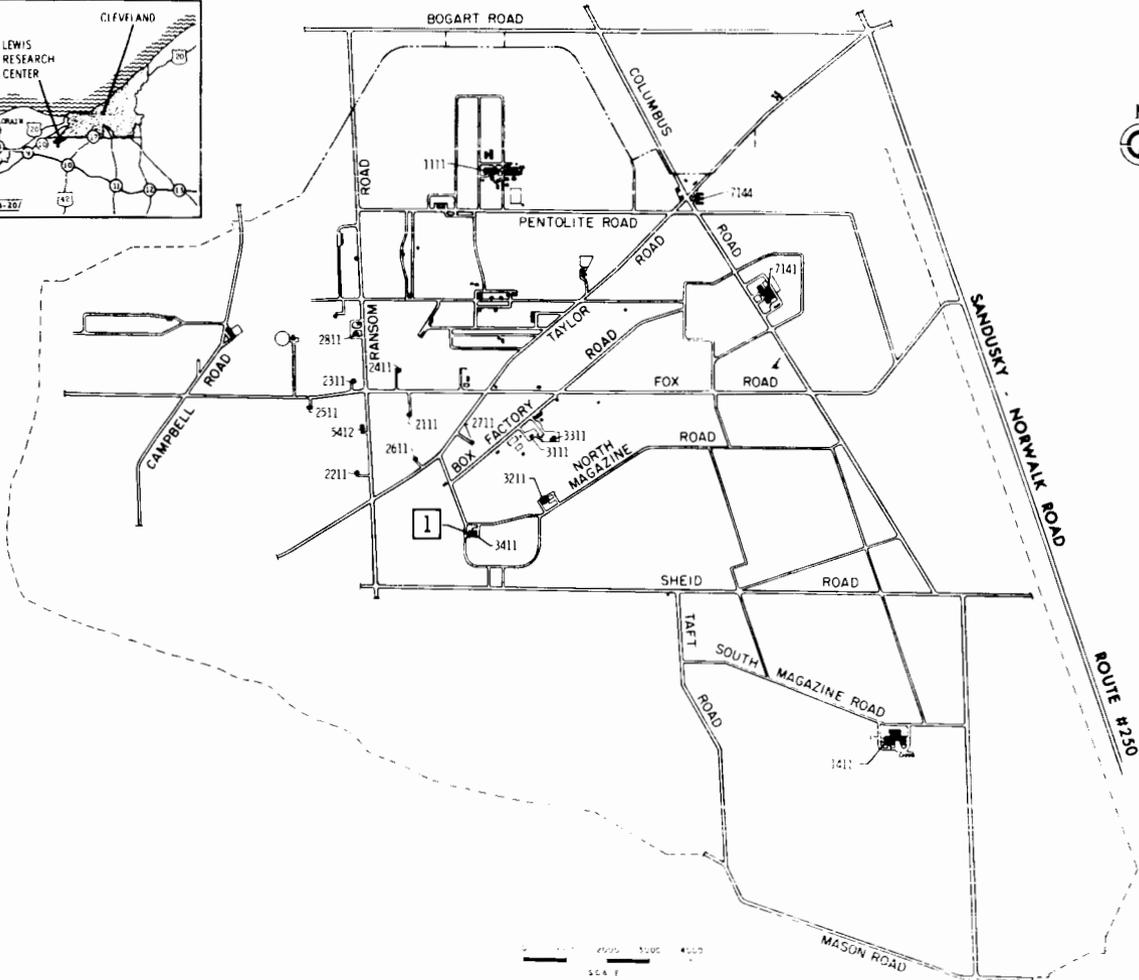
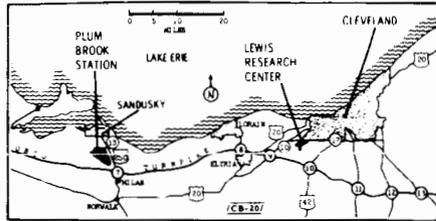


LEWIS RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

AREA MAP



LEWIS RESEARCH CENTER
 PLUM BROOK STATION
 FISCAL YEAR 1978 ESTIMATES
 LOCATION PLAN



LEWIS RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

CLEVELAND FACILITIES



LEWIS RESEARCH CENTER
FISCAL YEAR 1978 ESTIMATES

PLUM BROOK FACILITIES



RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

NASA HEADQUARTERS

DESCRIPTION

NASA Headquarters is located at 400 Maryland Avenue, SW, Washington, DC, 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.

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. These objectives are to:

1. Extend our knowledge of the Earth, its environment, the solar system, and the universe;
2. Expand practical applications of space technology;
3. Develop, operate, and improve manned and unmanned space vehicles;
4. Improve the civil and military usefulness of aeronautical vehicles, while minimizing their environmental effects and energy consumption.
5. Disseminate pertinent findings to potential users; and
6. Promote international cooperation in peaceful activities in space.

The following offices at Headquarters assist management in carrying out the technical aspects of the mission:

Office of Space Flight - Responsible for the research, development, and operations of space flight programs including the Space Shuttle, the essential element of the Space Transportation System that will be used to conduct the space operations of the 1980's. The Space Transportation System consists of the shuttle, a reusable manned vehicle; the Spacelab, an experiments payload carrier being developed by the Europeans; and upper stages required for high energy missions beyond the basic Shuttle capabilities. The Office of Space Flight also has program responsibility for expendable launch vehicles.

Office of Space Science - Responsible for scientific research and development effort utilizing a variety of flight system and ground-based observations to increase man's knowledge of the universe. The Earth, Sun, Moon, the planets, interplanetary space, other stars and galaxies, and the interaction among these bodies and systems are all objects of these investigations. The Life Sciences program is also under the direction of the Office of Space Science.

Office of Applications - Responsible for research and development activities leading to programs providing beneficial applications of space systems, and space related or derived technology. Programs involved include earth resources detection and monitoring, earth dynamics monitoring and forecasting, ocean condition monitoring and forecasting, environmental quality monitoring, weather and climate observation and forecasting and communications.

Office of Aeronautics and Space Technology - Responsible for the aeronautical and space research and technology programs. The aeronautics program develops the technology needed to assure safer, more efficient, economical and environmentally acceptable air transportation systems which are responsive to national needs. The Space research and technology program provides a technology base to support current and future space activities. This office is also responsible for coordinating the agency's total program of supporting research and technology related to carrying out specific flight missions to insure an integrated and balanced agency research program.

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 support of all NASA flight missions. This office also provides centralized planning and systems management for the administrative communications of NASA installations.

SUMMARY OF RESOURCS REQUIREMENTS

	<u>FUNDS</u>				
	<u>1976</u>	<u>Transition</u>	<u>1977</u>		<u>1978</u>
			<u>Actual</u>	<u>Quarter</u>	
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
	(Thousands of Dollars)				
I. Personnel and Related Costs.....	44,865	11,542	48,599	48,626	49,155
II. Travel.....	2,429	605	2,458	2,388	2,389
III. Facilities Services.....	4,137	994	4,379	4,380	5,248
IV. Technical Services.....	10,959	5,397	11,682	12,374	12,620
V. Administrative Support.....	<u>5,777</u>	<u>1,782</u>	<u>7,451</u>	<u>6,102</u>	<u>6,004</u>
Total, fund requirements.....	<u>68,167</u>	<u>20,320</u>	<u>74,569</u>	<u>73,870</u>	<u>75,416</u>

Distribution of Permanent Positions by Program

Direct Positions

<u>Space Flight</u>	<u>202</u>	<u>202</u>	<u>196</u>	<u>191</u>	<u>191</u>
Space shuttle.....	83	83	77	77	77
Space flight operations.....	110	110	101	103	103
Expendable launch vehicles.....	9	9	18	11	11
<u>Space Science</u>	<u>97</u>	<u>97</u>	<u>104</u>	<u>109</u>	<u>109</u>
Physics and astronomy.....	35	35	36	39	39
Lunar and planetary exploration.....	45	45	48	51	51
Life sciences.....	17	17	20	19	19
<u>Aeronautics and Space Technology</u>	<u>131</u>	<u>131</u>	<u>161</u>	<u>139</u>	<u>139</u>
Aeronautical research and technology.....	76	76	81	81	81
Space research and technology.....	55	55	80	58	58

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
<u>Space Applications</u>	<u>94</u>	<u>94</u>	<u>97</u>	<u>97</u>	<u>97</u>
<u>Energy Technology Applications</u>	<u>21</u>	<u>21</u>	<u>---</u>	<u>22</u>	<u>22</u>
<u>Tracking and Data Acquisition</u>	<u>45</u>	<u>45</u>	<u>42</u>	<u>42</u>	<u>42</u>
<u>Technology Utilization</u>	<u>19</u>	<u>19</u>	<u>19</u>	<u>19</u>	<u>19</u>
Subtotal, direct positions.....	609	609	619	619	619
<u>Indirect Positions</u>	<u>963</u>	<u>963</u>	<u>934</u>	<u>926</u>	<u>917</u>
Total, permanent positions.....	<u>1,572</u>	<u>1,572</u>	<u>1,553</u>	<u>1,545</u>	<u>1,536</u>

PERSONNEL AND RELATED COSTS

(Thousands of Dollars)

I. <u>PERSONNEL AND RELATED COSTS</u>	<u>44,865</u>	<u>11,542</u>	<u>48,599</u>	<u>48,626</u>	<u>49,155</u>
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Basis of Fund Requirements

A. Compensation and Benefits

1. Compensation

a. Permanent positions.....	38,903	9,981	40,461	41,954	42,367
b. Nonpermanent.....	1,135	357	1,022	1,150	1,110
c. Reimbursable detailees.....	242	52	289	257	258
d. Overtime and other compensation.....	<u>220</u>	<u>64</u>	<u>216</u>	<u>275</u>	<u>258</u>

Subtotal, Compensation.....	40,500	10,454	41,988	43,636	43,993
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2. <u>Benefits</u>	<u>3,729</u>	<u>939</u>	<u>5,888</u>	<u>4,015</u>	<u>4,227</u>
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Subtotal, Compensation and Benefits.....	<u>44,229</u>	<u>11,393</u>	<u>47,876</u>	<u>47,651</u>	<u>48,220</u>
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	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977 <u>Budget</u> <u>Current</u> Estimate Estimate		1978 <u>Budget</u> Estimate
	(Thousands of Dollars)				
B. <u>Supporting Costs</u>					
1. Transfer of personnel.....	200	51	240	205	206
2. Civil Service Commission Services.....	132	15	132	132	132
3. Personnel training.....	<u>304</u>	<u>83</u>	<u>351</u>	<u>638</u>	<u>597</u>
Subtotal, Supporting Costs.....	<u>636</u>	<u>149</u>	<u>723</u>	<u>975</u>	<u>935</u>
Total, Personnel and Related Costs.....	<u>44,865</u>	<u>11,542</u>	<u>48,599</u>	<u>48,626</u>	<u>49,155</u>
A. <u>Compensation and Benefits</u>	<u>44,229</u>	<u>11,393</u>	<u>47,876</u>	<u>47,651</u>	<u>48,220</u>
1. <u>Compensation</u>	<u>40,500</u>	<u>10,454</u>	<u>41,988</u>	<u>43,636</u>	<u>43,993</u>
a. Permanent positions.....	38,903	9,981	40,461	41,954	42,367

The cost for permanent positions is the largest part of personnel and related costs. The funds shown above will support 1,545 permanent positions in 1977 and 1,536 in 1978; a reduction of seventeen from the 1977 budget estimate.

Basis of Cost for Permanent Positions

The estimate for permanent compensation (starting from prior year cost) 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, and the October 1976 pay increase. 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 as follows:

Cost of permanent positions in 1977.....	41,954
Cost of increases in 1978.....	+1,187
Within grade advances and career development:	
Full year effect of 1977 actions.....	+468
Partial year effect of 1978 actions.....	+637
Full year effect of October 1976 pay raise.....	+82
Cost decreases in 1978.....	-774
Turnover savings:	
Full year effect of 1977 actions.....	-365
Partial year effect of 1978 actions.....	-249
One less paid day in 1978.....	-160
Cost of permanent positions in 1978.....	<u>42,367</u>

	1976	Transition	1977		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
			(Thousands of Dollars)		

b. Nonpermanent

1. Cost.....	\$1,135	\$357	\$1,022	\$1,150	\$1,110
2. Number of manyears.....	92	38	101	96	91

The increase in the 1977 current estimate over the budget estimate is due to the effect of Public Law 94-37 on the cost to the agency for reemployed annuitants, and the effect of the October 1976 pay raise, partially offset by a decrease of 5 manyears. The change in 1978 reflects a 5 manyear reduction in other temporary employment.

The 1978 plan includes 91 nonpermanent manyears, which will be used to support the following programs at the levels indicated below.

Distribution of Nonpermanent Manyears by Program

<u>Program</u>	<u>Manyears</u>
College cooperative training.....	12
Summer program (excluding disadvantaged youth).....	17
Disadvantaged youth program.....	25
Other temporaries.....	<u>37</u>
 Total.....	 <u>91</u>

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
	(Thousands of Dollars)				
c. Reimbursable detailees.....	242	52	289	257	258

The services of a small group of military offices and civilian detailees from other Government agencies are utilized by NASA Headquarters where such assignments are of mutual benefit. The number of personnel detailed varies from seven to 16, all of whom are assigned to Headquarters program offices with the exception of four that are assigned to the Office of Facilities. The estimate for 1978 is about the same as 1977 and will cover the cost of nine manyears. The 1977 current estimate and the 1978 estimate are reduced from the 1977 budget estimate to reflect a reduction of two manyears, partially offset by the cost of the October 1976 pay raise.

d. Overtime and other compensation.....	220	64	216	275	258
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The estimate for overtime compensation for 1978 is less than for 1977. The increase in the 1977 current estimate over the budget estimate reflects increased activity associated with key program milestones and events within various management and operating offices and the October 1976 pay raise, and is consistent with the Transition Quarter experience. The 1978 estimate represents a return to prior levels.

2. <u>Benefits</u>	<u>3,729</u>	<u>939</u>	<u>5,888</u>	<u>4,015</u>	<u>4,227</u>
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In addition to compensation, NASA makes an employer's contribution to personnel benefits as authorized and required by law. The decrease in the 1977 current estimate and 1978 budget estimate from the 1977 budget estimate reflects an adjustment in the Headquarters accounting for reimbursement to the Labor Department for Workman's Compensation, from that of reflecting the entire agency requirement to one of reflecting only the Headquarters share of the cost for this item. This reduction is partially offset by the cost of the October 1976 pay raise and the January 1977 increase in health premiums. The following table indicates the costs of personnel benefits by the various cost categories:

<u>Category of Cost</u>	<u>1976</u> <u>Actual</u>	<u>Transition</u> <u>Quarter</u> <u>Actual</u>	<u>1977</u>		<u>1978</u>
			<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	<u>Budget</u> <u>Estimate</u>
			(Thousands of Dollars)		
Contribution to the Civil Service Retirement Fund.....	2,706	690	2,829	2,893	2,968
Contribution for employees life insurance...	180	45	182	189	194
Contribution for employees health insurance.	575	147	535	630	722
Contribution to FICA.....	51	16	61	63	95
Incentive awards.....	75	10	76	83	90
Workmen's compensation.....	106	31	2,205	124	125
Severance pay.....	<u>36</u>	<u>---</u>	<u>---</u>	<u>33</u>	<u>33</u>
Total.....	<u>3,729</u>	<u>939</u>	<u>5,888</u>	<u>4,015</u>	<u>4,227</u>
B. <u>Supporting Costs</u>	<u>636</u>	<u>149</u>	<u>723</u>	<u>975</u>	<u>935</u>

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:

1. Transfer of personnel.....	200	51	240	205	206
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Legislation enacted in 1966 provided that the Government would pay for certain relocation costs which are budgeted in this category, such as the expenses of selling and buying a home, and the cost of family relocations. The estimated costs for 1977 and 1978 are based on the number, and historical average cost of relocations estimated at Headquarters. These costs are in line with the actual experience in 1976 and the Transition Quarter and the number of new hires anticipated.

2. Civil Service Commission services.....	132	15	132	132	132
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Headquarters reimburses the Civil Service Commission and others for investigation of new hires and EEO complaints for the entire agency. The cost of investigation is a function of two variables, the number of investigations to be conducted, and the unit charge made by the Civil Service Commission or other agency. There is also a payment to the Commission for Federal wage system surveys and any requested investigation of formal discrimination complaints.

	1976	Transition	1977		1978
	<u>Actual</u>	Quarter	Budget	Current	Budget
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
			(Thousands of Dollars)		
3. Personnel training.....	304	83	351	638	597

The maintenance and expansion of the skills 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 costs are for tuition, fees and related costs for training at colleges, universities, technical institutions, and for the cost of seminars and workshops in which groups of Headquarters and Field Center employees receive training in subjects of agencywide interest. Such training is used to maintain and expand employee skills. The increase between the FY 1977 budget estimate and the FY 1977 current estimate reflects increased training for mid-level management as well as increased activity in specialized training to meet functional requirements of the agency. The 1978 estimate reflects a continuation of the 1977 training program, with a reduction in costs consistent with the reduction in permanent positions planned by end year 1978.

TRAVEL

II. <u>TRAVEL</u>	<u>2,429</u>	<u>605</u>	<u>2,458</u>	<u>2,388</u>	<u>2,389</u>
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Basis of Fund Requirements

Summary of Travel by Major Category

A. Program Travel.....	907	229	862	975	1,075
B. Meetings and Technical Seminars.....	441	88	772	264	277
C. Administrative Travel.....	<u>1,081</u>	<u>288</u>	<u>824</u>	<u>1,149</u>	<u>1,037</u>
Total, Travel.....	<u>2,429</u>	<u>605</u>	<u>2,458</u>	<u>2,388</u>	<u>2,389</u>

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
			Budget <u>Estimate</u>	Current <u>Estimate</u>	
(Thousands of Dollars)					

A. Program Travel..... 707 229 862 975 1,075

Program travel funds are used in support of NASA's research and development programs, such as the Space Shuttle, Aeronautics and other direct R&D projects. This category represents approximately 44% of the Headquarters travel requirements for 1978. The increases in 1977 and 1978 are required primarily to support the Space Shuttle program requirements.

B. Meetings and Technical Seminars..... 441 88 772 264 277

Travel to meetings and technical seminars permits employees engaged in program activities to participate at both Government-sponsored and nongovernment-sponsored meetings and technical seminars with representatives of the aerospace community. This participation allows personnel to benefit from exposure to technological 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 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. The decrease between the 1977 budget estimate and the current estimate reflects management efforts to reduce travel in this area as well as a reassessment of the type of travel being performed.

C. Administrative Travel..... 1,081 288 824 1,149 1,037

Administrative travel is for the direction and coordination of general management matters, travel by senior officials to review Center requirements and operations, travel by functional managers in such areas as personnel, financial management, and procurement to assure agency policies and procedures are being implemented properly throughout the agency. Also included is cost to initial duty station, permanent change of assignment, and family travel expenses, local travel, vehicle rental, unpaid committee members and Congressional travel. The increase in the 1977 current estimate over the budget estimate reflects more active management activity in the center operations areas and also reassessment of the type of travel being performed. The decrease in 1978 is to provide for higher priority program travel.

FACILITIES SERVICES

	<u>1976</u>	<u>Transition</u>	<u>1977</u>		<u>1978</u>
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		(Thousands of Dollars)			
III. <u>FACILITIES SERVICES</u>	4,137	994	4,379	4,380	5,248
<u>Basis of Fund Requirements</u>					
<u>Summary of Facilities Services</u>					
A. <u>Rental of Real Property</u>	3,252	816	3,824	3,596	4,464
B. <u>Maintenance and Related Services</u>					
1. Maintenance, repair and alterations of buildings and grounds.....	721	138	340	616	616
2. Custodial services.....	147	37	205	150	150
3. Maintenance of equipment.....	3	1	6	3	3
Subtotal.....	871	176	551	769	769
C. <u>Operation of Facilities</u>					
1. Supplies and equipment.....	14	2	4	15	15
Subtotal.....	14	2	4	15	15
Total, Facilities Services.....	4,137	994	4,379	4,380	5,248
A. <u>Rental of Real Property</u>	3,252	816	3,824	3,596	4,464

Public Law 92-313 requires that agencies be charged for space and related services provided by the General Services Administration (GSA) at approximate commercial equivalent rates. The amounts provided here cover the cost of office and warehouse space utilized by NASA Headquarters personnel. The decrease

1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978 Budget <u>Estimate</u>
		Budget <u>Estimate</u>	Current <u>Estimate</u>	

(Thousands of Dollars)

between 1977 budget and the current estimate is based on rates prescribed by GSA which reflected a reduction of approximately 6% in the Standard Level User Charge costs for current leased space. The increase in 1978 is also based on current information from GSA. The amount of space to be leased in 1978 has not substantially changed from the 1977 current estimate.

B. <u>Maintenance and Related Services</u>	<u>871</u>	<u>176</u>	<u>551</u>	<u>769</u>	<u>769</u>
1. Maintenance of buildings and grounds.....	721	138	340	616	616

This estimate includes alterations such as partition changes, telephone changes and general buildings maintenance. The increase in the current 1977 estimate reflects mandatory price increases and the requirement for better quality maintenance. No increases are anticipated for 1978.

2. Custodial Services.....	147	37	205	150	150
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These funds cover security guard service in the various Headquarters buildings. The decrease between 1977 budget and current estimate is due to a reduction in the number of security guards required. It is estimated that the 1978 requirements will be at the same level as the 1977 current estimate.

3. Maintenance of Equipment.....	3	1	6	3	3
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This estimate includes reimbursement to GSA for the installation and maintenance of the security alarm systems and equipment in the NASA Headquarters buildings. Estimates for 1977 and 1978 are consistent with the costs experienced in 1976 and the Transition Quarter.

C. <u>Operation of Facilities</u>	<u>14</u>	<u>2</u>	<u>4</u>	<u>15</u>	<u>15</u>
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This function provides funds for the purchase of medical equipment required for the operation of the Headquarters Occupational Medicine and Environmental Health Unit. The increase in the 1977 current estimate over the 1977 budget estimate is due to plans to purchase additional and replacement equipment needed, such as a cardiac rescue litter, ultra sound therapy device and additional physical health devices.

TECHNICAL SERVICES

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	<u>1977</u> Budget Current <u>Estimate Estimate</u>		1978 Budget <u>Estimate</u>
			(Thousands of Dollars)		
IV. <u>TECHNICAL SERVICES</u>	10,959	5,397	11,682	12,374	12,620

Basis of Fund Requirements

Summary of Technical Services

A. Automatic Data Processing

1. Equipment.....	1,631	2,774	1,850	1,508	1,508
2. Programming and operation.....	<u>1,747</u>	<u>516</u>	<u>2,018</u>	<u>2,782</u>	<u>2,915</u>
Subtotal.....	<u>3,378</u>	<u>3,290</u>	<u>3,868</u>	<u>4,290</u>	<u>4,423</u>

B. <u>Engineering Services</u>	<u>116</u>	<u>7</u>	<u>179</u>	<u>175</u>	<u>175</u>
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C. Scientific and Technical Information and Programs

1. Operation of NASA technical library.....	97	16	116	112	106
2. Educational/informational programs.....	1,930	668	1,992	2,057	2,120
3. Scientific and technical information.....	<u>5,438</u>	<u>1,416</u>	<u>5,527</u>	<u>5,740</u>	<u>5,796</u>
Subtotal.....	<u>7,465</u>	<u>2,100</u>	<u>7,635</u>	<u>7,909</u>	<u>8,022</u>

Total, Technical Services.....	<u>10,959</u>	<u>5,397</u>	<u>11,682</u>	<u>12,374</u>	<u>12,620</u>
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A. <u>Automatic Data Processing</u>	<u>3,378</u>	<u>3,290</u>	<u>3,868</u>	<u>4,290</u>	<u>4,423</u>
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This estimate provides for the lease, purchase, maintenance, and programming and operations services of ADP equipment. The amount shown in the Transition Quarter reflects the cost of purchasing the previously leased business data computer system. The increase between the 1977 budget and the current estimate is for the cost of additional ADP studies, time sharing services and the ADP communications network, offset by the

	<u>1976 Actual</u>	<u>Transition Quarter Actual</u>	<u>1977</u>		<u>1978</u>
			<u>Budget Estimate</u>	<u>Current Estimate</u>	<u>Budget Estimate</u>

(Thousands of Dollars)

termination of lease requirements due to the Transition Quarter equipment purchase. The increase in FY 1978 is due to previously negotiated support contractor wage increases.

B. <u>Engineering Services</u>	<u>116</u>	<u>7</u>	<u>179</u>	<u>175</u>	<u>175</u>
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These funds provide for the continuation of studies on reliability cost evaluations and NASA-wide Safety, Reliability and Quality Assurance Standards. It is planned that costs for these services in 1978 will be at the same level as 1977.

C. <u>Scientific and Technical Information and Educational Programs</u>	<u>7,465</u>	<u>2,100</u>	<u>7,635</u>	<u>7,909</u>	<u>8,022</u>
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1. Operation of Technical Libraries.....	97	16	116	112	106
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The technical libraries provide reference acquisition, cataloging, translating and dissemination services to all NASA employees. No significant changes are planned in 1977 and 1978 for the services provided in 1976 and the Transition Quarter.

2. Educational/Informational Programs.....	1,930	668	1,992	2,057	2,120
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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.

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

1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977		1978
		<u>Budget Estimate</u>	<u>Current Estimate</u>	<u>Budget Estimate</u>

(Thousands of Dollars)

physics, biology, chemistry, and math; assistance to over 1,000 teacher workshops and professional education meetings (with over 30,000 teachers participating); and participation in science fairs. The largest single program is the Spacemobile, a touring space-science education lecture demonstration unit. These funds also provide for EEO exhibits and EEO films to relate to high schools, colleges, and the public, the key roles that women and minorities play in the U.S. Space Program. The increase in 1977 current estimate over the budget estimate reflects an increase in Spacemobile operation and maintenance costs. The increase in 1978 provides for support contract wage increases.

3. Scientific and Technical Information.....	5,438	1,416	5,527	5,740	5,796
--	-------	-------	-------	-------	-------

The scientific and technical information activity includes the cost of the NASA Scientific and Technical Information Facility (STIF), documentation and publication services, systems development, and translation services. The largest requirement is the NASA Scientific and Technical Information Facility, which is estimated to cost \$3.6 million in 1978. The level of cost for all other information services is estimated at approximately \$2.2 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 increase in the 1977 current estimate from the budget estimate reflects an increase in STIF operations costs and in printing of special publications. The increase in 1978 provides for support contract wage increases.

ADMINISTRATIVE SUPPORT

	1976 <u>Actual</u>	Transition Quarter <u>Actual</u>	1977 <u>Budget</u> Estimate	1977 Current <u>Estimate</u>	1978 <u>Budget</u> Estimate
	(Thousands of Dollars)				
V. <u>ADMINISTRATIVE SUPPORT</u>	<u>5,777</u>	<u>1,782</u>	<u>7,451</u>	<u>6,102</u>	<u>6,004</u>
	<u>Basis of Fund Requirements</u>				
	<u>Summary of Administrative Support</u>				
A. <u>Communications</u>					
1. Leased lines and long distance.....	600	152	572	600	600
2. Local telephone service.....	475	120	585	485	485
3. Other communications.....	<u>674</u>	<u>168</u>	<u>2,126</u>	<u>722</u>	<u>772</u>
Subtotal, Communications.....	<u>1,749</u>	<u>440</u>	<u>3,283</u>	<u>1,807</u>	<u>1,857</u>
B. <u>Administrative Printing</u>	<u>521</u>	<u>108</u>	<u>446</u>	<u>527</u>	<u>527</u>
C. <u>Supplies, Materials and Equipment</u>	<u>985</u>	<u>352</u>	<u>982</u>	<u>1,054</u>	<u>1,054</u>
D. <u>Transportation</u>					
1. Center operations.....	94	2	161	140	140
2. Common carrier.....	<u>42</u>	<u>6</u>	<u>29</u>	<u>30</u>	<u>30</u>
Subtotal, Transportation.....	<u>136</u>	<u>8</u>	<u>190</u>	<u>170</u>	<u>170</u>
E. <u>Administrative Support Services</u>					
1. Installation support services.....	2,193	755	2,342	2,313	2,186
2. Occupational medicine and environmental health.....	<u>193</u>	<u>119</u>	<u>208</u>	<u>231</u>	<u>210</u>
Subtotal, Administrative Support Services	<u>2,386</u>	<u>874</u>	<u>2,550</u>	<u>2,544</u>	<u>2,396</u>
Total, Administrative Support.....	<u>5,777</u>	<u>1,782</u>	<u>7,451</u>	<u>6,102</u>	<u>6,004</u>

	1976 Actual	Transition Quarter Actual	1977		1978 Budget Estimate
			Budget Estimate	Current Estimate	
	(Thousands of Dollars)				
A. <u>Communications</u>	<u>1,749</u>	<u>440</u>	<u>3,283</u>	<u>1,807</u>	<u>1,857</u>

Included in this category are the costs of leased lines, long distance tolls, telephone exchange services, and other communications, such as TWX and postage. The decrease from the 1977 budget estimate to the current estimate reflects a realignment of costs to reflect each Centers' share of the agency's postage costs. The increase from 1977 to 1978 are due to higher postal costs.

B. <u>Administrative Printing</u>	<u>521</u>	<u>108</u>	<u>446</u>	<u>527</u>	<u>527</u>
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Administrative printing includes 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 increase in the FY 1977 current estimate over the budget estimate reflects 1976 actual experience and continues the same level of effort.

C. <u>Supplies, Materials and Equipment</u>	<u>985</u>	<u>352</u>	<u>982</u>	<u>1,054</u>	<u>1,054</u>
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Administrative supplies, materials, and equipment include those items of a general nature which service the entire Headquarters. The increase in 1977 over the budget estimate reflect 1976 experience and current unit prices.

D. <u>Transportation</u>	<u>136</u>	<u>8</u>	<u>190</u>	<u>170</u>	<u>170</u>
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Transportation services include rental of trucks, as well as the movement of supplies, materials, equipment and related items. Also included is the cost of operating and maintaining the administrative aircraft which is assigned to the Jet Propulsion Laboratory but funded through NASA Headquarters.

E. <u>Administrative Support Services</u>	<u>2,386</u>	<u>874</u>	<u>2,550</u>	<u>2,544</u>	<u>2,396</u>
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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, minor Government services, contract histories, special economic studies,

trucking and laboring services, medical services, patent services, international support services, contractor incentive awards, EEO community relations and fellowships, administrator representation allowance, NASA management training facility study, overseas administration support, and documentation and related services. The decrease from 1977 to 1978 reflects reduced requirements in several of these areas.

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 1978 ESTIMATES

JET PROPULSION LABORATORY

DESCRIPTION

The Jet Propulsion Laboratory (JPL) 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 September 30, 1976, was \$386,647,000.

The Jet Propulsion Laboratory is a Government-owned facility, managed, staffed, and operated by the California Institute of Technology under a contract with NASA. The entire cost of operating the Laboratory is borne by the Research and Development appropriation, except for the lease or purchase of administrative aircraft and the purchase of passenger motor vehicles, which costs are funded from the Research and Program Management appropriation and are included in the NASA Headquarters budget presentation. Accordingly, the Research and Program Management type costs presented in this Special Analysis for JPL are for purposes of comparison only, and are not a part of the NASA Research and Program Management budget.

MISSION

The Jet Propulsion Laboratory has been assigned primary responsibility for the conduct of NASA programs concerned with scientific exploration of the moon, planets, and interplanetary space using automated spacecraft. The Laboratory is also assigned the conduct of selected automated earth orbital missions. These assignments encompass a broad range of engineering, scientific, and management functions devoted to:

1. The conduct of complete spaceflight projects, including overall project management and all phases of project activity beginning with mission design and scientific justification and following with spacecraft design, development, testing, and flight operations.
2. The development and operation of the Deep Space Network which provides tracking and data acquisition services for all NASA projects involving flights of automated spacecraft beyond near-earth orbits.
3. Continuing programs of scientific investigation and supporting research and technology.

Planetary Exploration - The Mariner series of spacecraft was designed and developed by the Jet Propulsion Laboratory, and the Laboratory has had project management responsibility for all Mariner missions, including the functions of integration, assembly, and testing of the spacecraft. The two most recently launched missions in the Mariner series are those of Mariner 9, which returned scientific data for nearly a year from an orbit around Mars, and Mariner 10, which gathered data in a close flyby of Venus followed by three separate encounters with Mercury.

In the continuing series of Mariner missions, the Jet Propulsion Laboratory 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 1/2 - 4 years following launch. Scientific data will be gathered on the interplanetary medium, the planets themselves, several of their large satellites, and the rings of Saturn. The mission design includes an option to adjust the trajectory of one spacecraft as it nears Saturn and enable it to continue on to Uranus. The spacecraft for these missions makes maximum use of previous Mariner and Viking Orbiter designs and technology, consistent with the requirements of long-range communications, solar independent power, and the required flight times.

The Laboratory is involved as a major participant in the Viking project which involved two flights to Mars that were launched during August and September 1975. Each flight employed a spacecraft consisting of an orbiter and a lander. Langley Research Center has overall management responsibility for the Viking project and for development of the lander. JPL had responsibility for the development of the orbiter, for the tracking and data acquisition system, and for the mission control and computing center. The plan involved placing the entire spacecraft in orbit about Mars, and, after suitable preparations, released the lander to enter the Martian atmosphere and soft land on the surface of the planet. Scientific data was collected during atmospheric entry, and is still being collected in orbit, and on the surface. In addition to delivery of the lander, the primary functions of the orbiter are to provide observational data and to serve as a relay station to receive, store, and to retransmit to earth data obtained

from the lander. The orbiter conducts its own science experiments, including television pictures of the Martian surface, infrared radiometry to determine surface temperature, infrared spectrometry to detect water vapor, and radio propagation experiments to improve planetary navigation capabilities and provide measurements of properties of the Mars atmosphere.

Both Viking missions have proceeded nearly flawlessly. Successful on-target landings were accomplished on July 20 and September 3, 1976, and both orbiters and landers have achieved all of their scientific objectives. The prime mission ended with the onset of solar conjunction (Mars hidden behind the sun from earth) in mid-November 1976. Activities in an extended mission phase lasting a year or so will resume mid-December 1976.

The Jet Propulsion Laboratory will have project management responsibility for the Jupiter Orbiter/Probe, a FY 1978 new start. The Jupiter Orbiter with Probe (JOP) mission combines the next two logical steps in the exploration of Jupiter following the Mariner Jupiter/Saturn flyby mission launches in 1977: penetration of the atmosphere by an entry probe for direct measurement of Jovian physical and chemical characteristics; and the long-term, synoptic study of Jupiter, its satellites, and its environment from an orbiter.

Scientific Satellites - Consistent with its role as an alternate center for earth orbital spacecraft development, the Laboratory has been selected to manage the Infrared Astronomy Satellite (IRAS) project. This project will involve international cooperation with the spacecraft bus being designed and built in the Netherlands. The NASA Ames Research Center will be responsible for the infrared telescope.

Space Applications - The Jet Propulsion Laboratory is assigned a principal role in the earth and ocean dynamics program and is responsible for management of the SEASAT-A project which is scheduled for launch in 1978. SEASAT-A is an experimental earth-orbiting satellite system designed to demonstrate techniques for global monitoring on a daily basis of sea-state conditions such as surface winds and temperature, currents, wave heights, ice conditions, and storm activity. Objectives include demonstration of social and economic benefits involving a variety of user communities, as well as improvement of scientific data for use by geodesists and tectonic physicists.

Supporting Research and Technology - The Jet Propulsion Laboratory maintains a strong program of supporting research and advanced technical development designed to provide sound technologies for present and prospective project assignments, and to further the general capabilities of NASA. Areas of involvement include spacecraft advanced development, materials and structures, space power and electric propulsion, chemical propulsion, electronics, and basic research in such fields as fluid physics, polymer materials, and applied mathematics.

Science Program - The Laboratory participates in scientific experiments on both JPL-managed and non-JPL managed flight projects. This participation includes not only the performance of scientific investigations, but also a significant commitment to the development of scientific instruments for use in space missions. Ground-based research programs are carried out in the planetary sciences, physics and astronomy, and earth and ocean physics. These activities involve broad collaboration with the scientific and academic communities and with staff members from other NASA field installations.

Tracking and Data Acquisition - The Jet Propulsion Laboratory is responsible for the design, development, maintenance, and operation of NASA's worldwide Deep Space Network and a Mission Control and Computing Center. Tracking stations are located in California, Spain, and Australia. These facilities provide support not only to JPL-managed flight missions, but also to projects such as Pioneer and Helios managed by other NASA installations and involving flights beyond near-earth orbits.

SUMMARY OF RESOURCES REQUIREMENTS

	<u>FUNDS</u>		<u>1977</u>		<u>1978</u>
	<u>1976</u>	Transition	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
	<u>Actual</u>	<u>Quarter</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
		<u>Actual</u>	(Thousands of Dollars)		
I. Personnel and Related Costs.....	91,069	25,024	98,066	95,701	94,663
II. Travel.....	4,031	806	3,417	3,828	3,867
III. Facilities Services.....	8,014	2,243	8,877	8,394	8,882
IV. Technical Services.....	2,670	584	2,435	2,457	2,414
V. Administrative Support.....	<u>10,571</u>	<u>2,931</u>	<u>9,798</u>	<u>10,790</u>	<u>10,797</u>
Total, fund requirement.....	<u>116,355</u>	<u>31,588</u>	<u>122,593</u>	<u>121,170</u>	<u>120,623</u>

Distribution of Permanent Positions by Program

	<u>1976</u>	Transition	<u>1977</u>		1978
	<u>Actual</u>	<u>Quarter</u>	<u>Budget</u>	<u>Current</u>	<u>Budget</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>
<u>Direct Positions</u>					
<u>Space Flight</u>	<u>12</u>	<u>12</u>	<u>19</u>	<u>10</u>	<u>12</u>
Space Shuttle.....	---	---	14	---	---
Space flight operations.....	11	11	---	9	10
Expendable launch vehicles.....	1	1	5	1	2
<u>Space Science</u>	<u>1,066</u>	<u>1,066</u>	<u>973</u>	<u>991</u>	<u>758</u>
Physics and astronomy.....	33	33	37	61	73
Lunar and planetary exploration.....	1,013	1,013	932	904	660
Life sciences.....	20	20	4	26	25
<u>Space Applications</u>	<u>167</u>	<u>167</u>	<u>181</u>	<u>186</u>	<u>150</u>
<u>Aeronautics and Space Technology</u>	<u>214</u>	<u>214</u>	<u>268</u>	<u>249</u>	<u>272</u>
Aeronautical research and technology.....	15	15	17	19	19
Space research and technology.....	199	199	251	230	253
<u>Energy Technology Applications</u>	<u>41</u>	<u>41</u>	<u>---</u>	<u>32</u>	<u>44</u>
<u>Tracking and Data Acquisition</u>	<u>345</u>	<u>345</u>	<u>345</u>	<u>355</u>	<u>373</u>
<u>Technology Utilization</u>	<u>9</u>	<u>9</u>	<u>12</u>	<u>7</u>	<u>6</u>
Subtotal, direct positions.....	1,854	1,854	1,798	1,830	1,615
<u>Direct Support</u>	<u>617</u>	<u>617</u>	<u>607</u>	<u>593</u>	<u>581</u>
<u>Indirect Positions</u>	<u>1,185</u>	<u>1,185</u>	<u>1,146</u>	<u>1,128</u>	<u>1,073</u>
<u>Total, Positions</u>	<u>3,656</u>	<u>3,656</u>	<u>3,551</u>	<u>3,551</u>	<u>3,269</u>

SIMULATED RESEARCH AND PROGRAM MANAGEMENT BUDGET

EXPLANATION OF CHANGES

Personnel and Related Costs - The decrease in the 1977 current estimate from the budget estimate is due to lower than estimated average salary for regular personnel, and a reduction of 36 manyears of temporary personnel. These decreases were partially offset by the higher than anticipated amount of pay to separated employees for unused leave. The decrease from 1977 to 1978 is due to planned reduction in regular personnel of 286 manyears, partially offset by cost of living and merit increases in salary and the higher cost of personnel benefits.

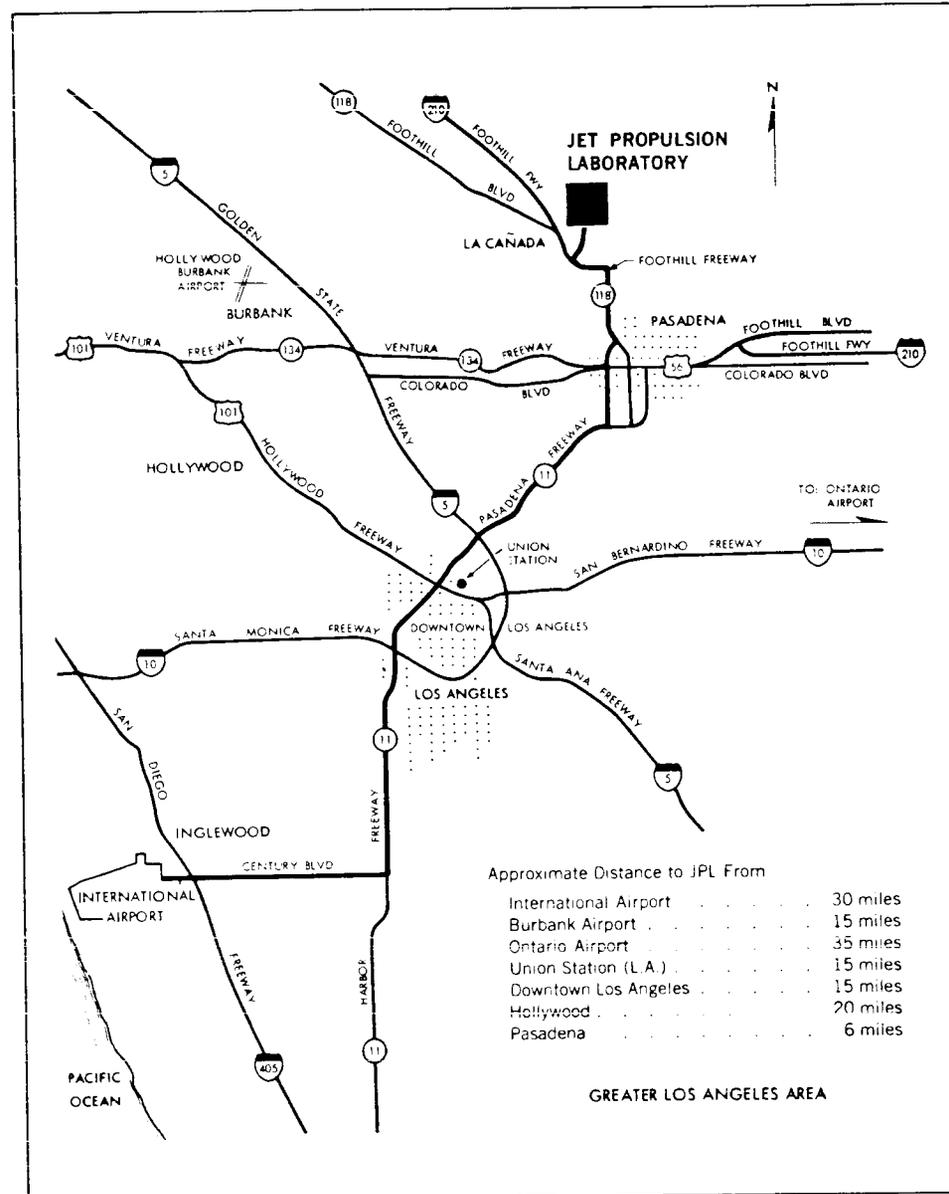
Travel - The increases from the 1977 current estimate over the budget estimate and the increase from 1977 to 1978 are a result of higher airline fares, per diem, and lodging costs.

Facilities Services - The decrease in the 1977 current estimate from the budget estimate is due to decreased consumption of supplies and equipment, and lower than anticipated costs for maintenance of buildings and grounds. The increase from 1977 to 1978 is due to contractual wage escalation and utilities cost increases.

Technical Services - The small increase from the 1977 budget estimate to the current estimate is due to engineering studies related to seismic safety standards and energy reduction. The decrease from 1977 to 1978 results from a reduction in fabrication and support contract manyears.

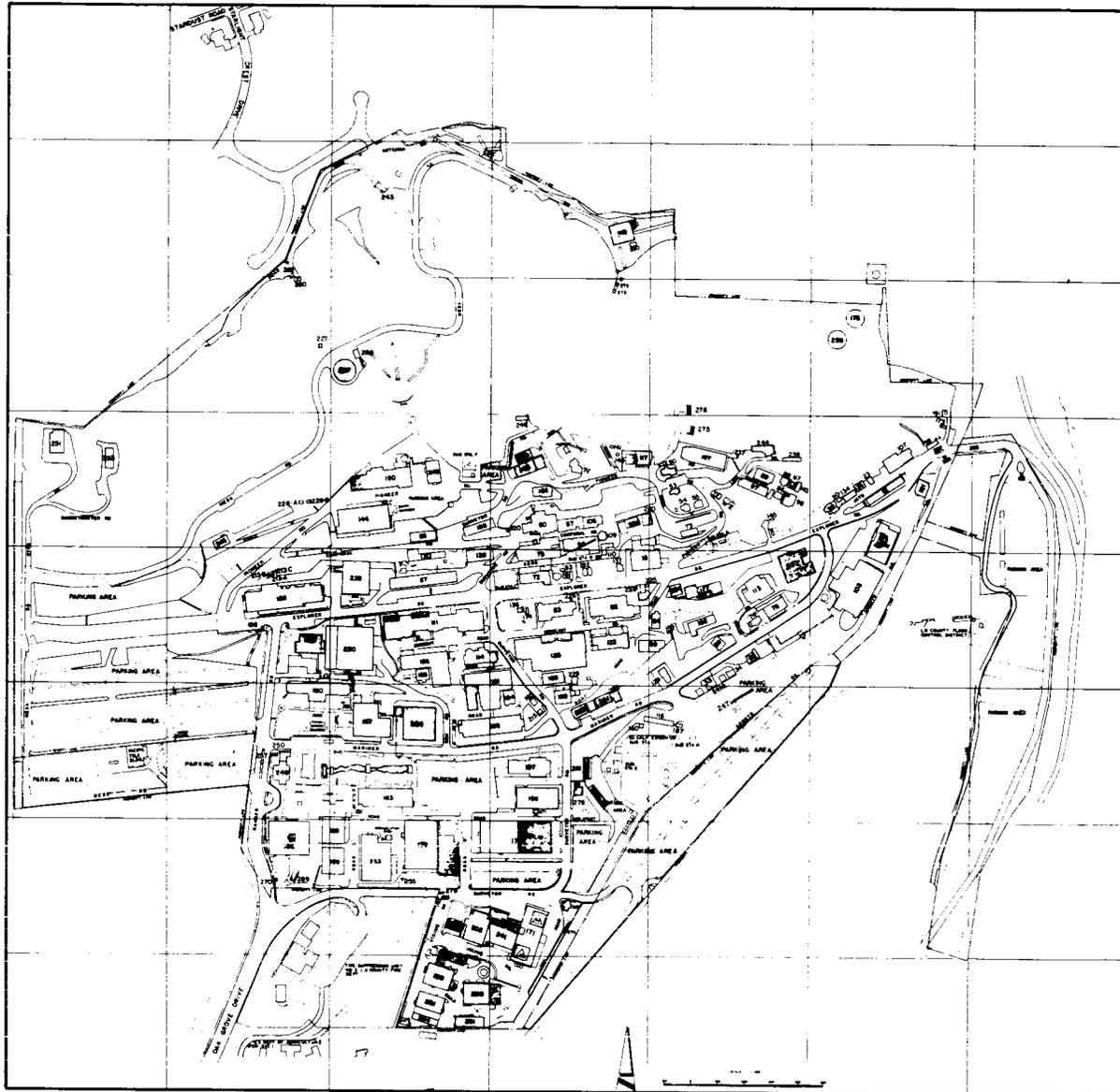
Administrative Support - The increase from the 1977 budget estimate to the current estimate is due to higher communications costs than anticipated, and the addition of a placement consultant to assist employees planned for separation. The 1978 estimate is essentially level since communications cost increases are offset by lower Caltech overhead and fee.

JET PROPULSION LABORATORY





JET PROPULSION LABORATORY FISCAL YEAR ESTIMATES LOCATION PLAN



**JET PROPULSION LABORATORY
LEGEND**

Bldg. No.	Title	Location	Bldg. No.	Title	Location	Bldg. No.	Title	Location	Bldg. No.	Title	Location
ii	Space Sciences Lab	E-2	103	Fabrication Shop	E-3	177	Transportation Garage	D-2	249	Visitor Reception Bldg	B-2
13	Offices, Lab & Shop	D-3	106	Test Cell (Air Fuel)	C-2	179	Spacecraft Assy Facility	B-3	250	Guard Shelter	B-2
18	Structural Test Lab	D-2	107	Test Cell	E-2	180	Central Engineering Bldg	B-3	251	Gyra Lab	A-2
20	Shop Test Cell No. 2 (Liq)	D-2	109	Cooling Tower (Wind Tunnel)	C-2	182	Bus Stop Shelter	E-2	253	Low-Mag Interference Lab	A-2
23	Shop Test Cell No. 12 (Liq)	E-2	110	Fuel Stor Tank	C-2	183	Physical Science Lab	B-3	255	Sewage Lift Station	B-7
31	Test Cell (Liq)	E-2	111	General Offices Bldg	B-2	184	Electronic Stores	C-3	256	Model Range Control Bldg	B-1
32	Test Cell (Liq)	D-2	114	Cafeteria & Offices	C-3	185	Programming Office	B-3	257	Guard Island	B-3
33	Test Cell (Liq)	D-3	115	Heating Plant (Solid)	D-2	186	Space Sciences Div Bldg	A-3	258	Water Reservoir	E-2
34	Shop Test Cell No. 33 (Liq)	D-3	116	Propellant Storage Dock	D-3	187	Chemical Storage	D-3	259	Liquid Nitrogen Bottling Stor	D-2
35	Mag Flux Tank Shelter	B-1	117	Test Cell (Solid)	D-2	188	Engineering Facilities Bldg	C-2	260	Illuminator Equipment Bldg	B-1
41	Hi-Temp Lab	D-3	118	Cooling Tower	C-3	189	Electronics Lab - Annex	C-3	261	Material Storage	C-3
42	Test Cell (Liq)	D-3	120	Cooling Tower	D-2	190	190A - Procurement Offices	B-4	262	Radiometer Bldg	B-1
46	Shop Test Cell No. 42 (Liq)	D-3	121	Employment Development Ctr	E-2	191	Hazardous Test Bay	E-2	263	Protective Services Bldg	C-3
47	Plant Protection	D-2	122	Engineering Offices	C-3	192	Propulsion Engineering	D-3	264	SFOF Sys Dev Lab	B-3
53	Conditioning Lab (Solid)	D-3	125	Combined Electronics	C-3	195	Guard Shelter	B-3	267	Water Reservoir	B-2
54	Blending Lab (Solid)	D-2	126	Systems Div Office Bldg	B-2	196	Guard Shelter	B-2	268	Pump House	B-1
55	Mixing Lab (Solid)	D-2	129	Test Cell (Chemistry)	D-3	197	Solid-Propellant Process Lab	D-2	269	Grounds Maintenance Bldg	C-4
57	Test Cell (Air Fuel)	C-2	130	Engineering Offices	C-2	198	Guidance Lab	C-3	270	Sewage Metering Station	A-3
58	Compressor Bldg	C-2	133	Service Dock	C-2	199	Celestial Simulator Bldg	C-3	271	Oil Barrel Stor	C-3
59	Chemistry Lab	D-3	134	Shop Test Cell	E-2	200	Plant Engineering Services	B-4	272	East Illuminator Bldg	C-1
65	Materials Lab	D-3	135	Guard Shelter	A-2	201	Carpenter Shop	B-4	273	East Illuminator Tower	C-1
67	Microbiology Facility	B-2	136	Cooling Tower	C-2	202	Procurement Offices	B-4	274	Cooling Tower	C-3
71	Mechanics Stores	D-2	137	Cooling Tower	C-2	209	Illuminator Tower	D-1	275	Chemical Star Prop Bldg	D-2
72	Engineering Offices	C-2	138	Engineering Offices	C-2	210	Blaine Track	D-1	276	Chemical Star Prop Bldg	D-2
73	Utilities Area Storage	D-2	140	Magazine X Temp	C-2	212	Antenna Lab	D-1	277	Isotope Thermolectric Lab	D-2
74	Test Cell (Chemistry)	D-3	141	Magazine X Temp	C-2	213	Cooling Tower 'A', 'B' & 'C'	B-2	278	Helicopter Maint Hangar	C-3
77	Soil Science Lab	C-2	145	Magazine Propellant	D-2	218	Credit Union	B-3	279	Guard Island	B-3
78	Hydraulics Lab	D-3	147	Cooling Tower	D-2	220	C.R.S. Terminal Bldg	C-2	280	Static Test Tower	D-2
79	Wind Tunnel (20 inch)	C-2	148	Energy Conversion Lab	C-2	224	Sewer Lift Station	B-4	281	Fireman / Guard Station	C-3
80	Wind Tunnel (21 inch)	C-2	150	25-ft Space Simulator	B-2	225	Guard Shelter - Mesa	C-1	283	Metal Storage Building	C-3
81	Battery Laboratory	E-2	152	Hazardous Chemical Stor	C-3	226	Solvent Storage Bldg	C-2	284	Transportation Office Bldg	D-2
82	Environmental Test Lab	C-2	156	Computer Program Office	B-3	227	Guard Shelter	B-1	285	Arroyo Bridge	E-2
83	Electronic Parts & Engineering	C-2	157	Engineering & Mechanics Bldg	C-3	228	Cooling Tower (A & B)	B-2	286	Guard Bldg, Arroyo	E-2
84	Test Cell & Solid Chemistry	D-2	158	Material Research Proc Lab	C-3	229	Shielded Room Bldg	C-3	287	Island Guard Bldg	E-2
85	Business Systems Office	C-2	159	Pump House (Water)	E-2	230	Space Flight Operations Facility	B-2	288	Project Equipment Storage	C-2
86	Oxidizer Grinding (Solid)	D-2	160	Sewage Lift Station	C-3	231	Paint Shop	B-4	'A' Gate	A-3	
87	Ovens (Solid)	D-2	161	Telecommunications Lab	C-3	233	Spacecraft Development Bldg	B-3	'B' Gate	A-3	
88	Mixing Lab (Solid)	D-2	165	Cooling Tower	C-3	234	Lumber Stor Bldg	B-4	'C' Gate	B-2	
89	Processing Lab (Solid)	D-2	166	Cooling Tower	C-2	237	Cooling Tower	D-2	'D' Gate	F-2	
90	Shop Test Cell No. 51	D-2	167	Cafeteria	B-3	238	Telecommunications Lab	B-2	'E' Gate	B-3	
91	Air Dryer (Wind Tunnel)	C-2	168	Space Sciences Instrmt Sys Lab	B-3	239	Low-Temp Solid Prop Mag	D-2	'F' Gate	B-2	
92	Cooling Tower (Wind Tunnel)	C-2	169	Engineering Office Bldg	B-3	241	Shipping & Receiving	B-4	'G' Gate	A-2	
93	Vaporizer (Wind Tunnel)	C-2	170	Fabrication Shop	C-3	243	Remote Antenna Range Contr	B-1			
97	Development Lab & Offices	D-2	171	Materials Service Bldg	C-4	244	Hi-Temp Stor Mag	D-2			
98	Preparation Shop (Solid)	D-2	173	Test Shelter	E-2	245	Spectroscopy Lab	B-2			
99	Chemistry Lab (Solid)	D-3	174	Cooling Tower	C-2	246	Soils Test Lab	C-2			
			175	Water Reservoir	E-2	248	10-ft Space Simulator	C-2			

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1978 ESTIMATES

SUMMARY OF AERONAUTICAL RESEARCH AND TECHNOLOGY
OFFICE OF AERONAUTICS AND SPACE TECHNOLOGY

	1976	Transition	1977		1978
	<u>Actual</u>	<u>Quarter</u> <u>Actual</u>	<u>Budget</u> <u>Estimate</u>	<u>Current</u> <u>Estimate</u>	<u>Budget</u> <u>Estimate</u>
	(Millions of dollars)				
Research and development.....	175.4	43.8	189.1	190.1	231.0
Construction of facilities.....	4.6	---	29.0	35.0	38.4
Research and program management.....	<u>144.9</u>	<u>38.7</u>	<u>146.2</u>	<u>153.7</u>	<u>154.0</u>
Total.....	<u>324.9</u>	<u>82.5</u>	<u>364.3</u>	<u>378.8</u>	<u>423.4</u>
Number of direct positions (end of year) associated with aeronautical research and technology.....	3,734	3,734	3,799	3,753	3,795

The Aeronautics program for FY 1978 will advance aeronautical technology to ensure safer, more economical air transportation systems which are responsive to current and future needs; provide the United States with a strong competitive position in the international market place; and provide technical support to the military in maintaining the superiority of the nation's military aircraft.

Fundamental research in the disciplines of materials, structures, avionics, aerodynamics, propulsion, and human-vehicle interactions will continue to provide the solid technology base necessary to stimulate and meet the future requirements of civil aviation. The FY 1978 program will continue to focus on developing the technology to improve aircraft performance, reduce energy requirements, enhance operating efficiency, reduce undesirable environmental effects, improve safety and reliability, and improve terminal area operations for a variety of aircraft types. Special emphasis will be given to increasing aircraft energy efficiency through focused efforts on engine component improvement, propulsion systems, active controls, composite materials, laminar flow control, and advanced turboprop systems technology.

The aeronautics program supports the military by providing an advanced technology base which is applicable to military aircraft as well as civil aircraft, and by providing technical problem solving support for current military aircraft development.

The construction of facilities request for FY 1978 includes funding for the rehabilitation of the Unitary Plan Wind Tunnel at the Langley Research Center. It also provides for the second annual funding increment for the construction of the national transonic facility at the Langley Research Center and for the modification of the 40 x 80 foot subsonic wind tunnel at the Ames 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 1978 OBLIGATIONS FOR
EQUIPMENT TO BE PLACED AT NASA INSTALLATIONS

<u>Program Budget Line Item</u>	(Thousands of Dollars) 1978
<u>Space Flight</u>	<u>84,076</u>
Space Shuttle	(65,949)
Space Flight Operations	(17,909)
Expendable Launch Vehicles	(218)
<u>Space Science</u>	<u>2,421</u>
Physics and Astronomy	(566)
Lunar and Planetary	(467)
Life Sciences	(1,388)
<u>Space Applications</u>	<u>5,734</u>
<u>Aeronautics and Space Technology</u>	<u>28,458</u>
Aeronautical Research and Technology	(23,755)
Space Research and Technology	(4,703)
<u>Tracking and Data Acquisition</u>	<u>14,460</u>
GRAND TOTAL	<u>135,149</u>

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1978 BUDGET

PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION, BUILDING LOCATION, AND EAD CONTROL NUMBER	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1978 OBLIGATIONS (\$ IN THOUS.)	RELATED FACILITY PROJECT
Space Shuttle	Johnson Space Center Bldg. 30 72-78-01	Wide Band Recorder	Records incoming data at Mission Control Center	356	
Space Shuttle	Johnson Space Center Bldg. 30 72-78-02	Display Control System	Provides data and control interface between the dis- play control system and the Shuttle data processing complex	306	
Space Shuttle	Johnson Space Center Bldg. 30 72-78-03	Orbiter Data Reduction Complex	Computers to support post flight orbiter data reduction	3,626	FY 1978 Modifications to administrative Bldg. 30
Space Shuttle	Johnson Space Center Bldg. 44 72-78-04	Electronics Systems Tester (TDRS Electronics)	Unit to assure continued compatibility between space and ground radio frequency systems, for use with tracking and data relay satellite (TDRS) system	400	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Space Shuttle	Johnson Space Center Bldg. 30 72-78-05	Digital Voice Unit	Unit for converting digital voice from on- board shuttle to its normal analog output and also converting analog to digital uplinks	201	
Space Shuttle	Johnson Space Center Bldg. 30 72-77-01	Computers for Shuttle Data Processing Complex	Replacement of computers in real time computer complex	4,263	FY 1977 Modifications to the Mission Con- trol Center Bldg. 30
Space Shuttle	Johnson Space Center Bldg. 30 72-77-02	Multi Bus Interface	Provides data interface between Shuttle Data Processing Complex and Network Interface Processor	116	
Space Shuttle	Johnson Space Center Bldg. 30 72-77-03	Analog Event System	Accepts digital output data from other systems and con- verts to visual media for interpretation	908	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Space Shuttle	Johnson Space Center Bldg. 30 72-77-04	Network Interface Processor (NIP)	Provides interface between mission control center and space tracking data network	750	
Space Shuttle	Johnson Space Center Bldg. 30 72-77-05	Master Interface Timing System	Provides central timing system for mission control center	647	
Space Shuttle	Johnson Space Center Bldg. 35 72-76-01	Shuttle Procedures Simulator	Provides shuttle crew station procedures simulator	200	
Space Shuttle	Johnson Space Center Bldg. 5 72-76-03	Shuttle Mission Simulator	Provides both a motion base and fixed simulator with out-the-window display	8,900	FY 1975 Modifications to Crew Training Facilities Bldg. 5
Space Shuttle	Kennedy Space Center Vehicle Assembly Bldg. 76-78-01	A/O-0558 Access Set	A platform set to provide for internal access for repair in the vertical crew cabin of the orbiter	267	

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Space Shuttle	Kennedy Space Center Hypergolic Maintenance Bldg. 76-78-02	H70-0693 Sling Set	This sling set is for installation and removal of the OMS Payload Bay Kit from the orbiter	329	
Space Shuttle	Kennedy Space Center Vehicle Assembly Bldg. 76-78-03	A70-0710 Vertical Crew Module Internal Protection Set	Protects all interior surfaces of the crew module from damage by personnel during assembly, installation, inspection, test, and repair operations when the orbiter is in the vertical position	581	
Space Shuttle	Kennedy Space Center Orbiter Processing Facility 76-78-04	A70-0798 Primary Engine Purge Adapters (2)	Used for the disposal of engine purge gasses and toxic propellant vapors	524	
Space Shuttle	Kennedy Space Center Launch Pads and Shuttle Vertical Assembly and Check Out Bldg. 76-78-05	A70-0699 Vertical Internal Access Set, Mid-Fuselage	Provides internal access to the Mid-Fuselage of a vertical orbiter	271	

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PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION, BUILDING LOCATION, AND EAD CONTROL NUMBER	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1978 OBLIGATIONS (\$ IN THOUS.)	RELATED FACILITY PROJECT
Space Shuttle	Kennedy Space Center Hypergolic Maintenance Bldg. 76-78-06	C70-0860 Electric Mechanical Test Set	Set is used for maintenance and checkout of the Orbiter Maneuver Subsystem Engines	409	
Space Shuttle	Kennedy Space Center 76-76-01	The Launch Processing System and associated equipment	Test, checkout and launch of spacecraft and launch vehicles stages requires the transmission of command, and information regarding the status and the performance of flight systems, sub- systems and their associated ground support systems	6,300	
Space Shuttle	Kennedy Space Center OPF, 76-77-03	RF Communications and Tracking Checkout System	Provide an end-to-end checkout of the Orbiter S-Band, UHF, Rendezvous Radar, RF Nav aids and associated LRU's such as TV via antenna hats over the Orbiter antennas and hardline interface to the IPS equipment	1,990	
Space Shuttle	Kennedy Space Center Mobile Launcher 76-77-17	A72-0566 SRB/NLP Support Set	Support set holds Shuttle during thrust buildup and withstands the effects of ground winds and vehicle dynamics	236	

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PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION, BUILDING LOCATION, AND EAD CONTROL NUMBER	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1978 OBLIGATIONS (\$ IN THOUS.)	RELATED FACILITY PROJECT
Space Shuttle	Kennedy Space Center Pad A and B 76-77-18	U78-0102 External Tank intertank H2 Vent System	Provides venting for hazardous GH ₂ after cryogenic loading to launch	60	
Space Shuttle	Kennedy Space Center Mobile Launcher 76-77-19	A70-0670 Orbiter Tail Service Mast System	Provides the interfaces for ground servicing of the Orbiter with the necessary propellants, pneumatics, purges, reactants, thermal conditioning and electrical power via ambilical carriers mounted on a retractical mechanism which is housed within protective shields	32	
Space Shuttle	National Space Technology Laboratories 64-77-01	Space Shuttle Main Engine (SSME) Ground Support Equipment	This equipment is required at NSTL to support handling and checkout of SSME Engines during Space Shuttle MPTA Test Program	1,200	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1978 BUDGET

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Development, Test and Mission Operations (DTMO)	Marshall Space Flight Center, Bldg. 4663 62-78-03	Univac 1108 3x2 and 1x0 Computer Systems Recon- figuration with Disc Subsystem	Increases capability for demand processing in support of shuttle subsystems and spacelab	462	
Development, Test and Mission Operations (DTMO)	Marshall Space Flight Center, Bldg. 4663 62-78-04	Univac 1108 Computer System Tape Subsystem Upgrade, Phase I	Provides expanded capability including a full dual channel controller and eight Uniservo Model 20 magnetic units	380	
Spacelab	Johnson Space Center Bldg. 5 72-78-07	Spacelab Support Module Simulator (SSMS)	Simulator to train flight and ground crews for the operation and monitoring of spacelab subsystems	2,000	FY 1977 Modifications to Mission Simulation and Training Facility Bldg. 5
Mission Control Center Level II	Johnson Space Center Bldg. 30 72-78-08	Dump Data Facility	Handles and processes all data recorded on-board shuttle vehicles	775	

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Development, Test and Mission Operations (DTMO)	Johnson Space Center Bldg. 16 72-78-06	Computer System for Engineering Simulations	Used to support design and development of specific guidance and control systems and the interaction of the overall guidance and control systems	2,063	
Development, Test and Mission Operations (DTMO)	Marshall Space Flight Center, Bldg. 4663 62-78-01	Univac 1108 Computer System Tape Subsystem Upgrade, Phase II	This equipment will include a subsystem consisting of a full dual channel controller, four Uniservo Model 16 and four Uniservo Model 20 Tape units, Subsystem will be converted from lease to purchase in FY 1979	56	
Development, Test and Mission Operations (DTMO)	Marshall Space Flight Center, Bldg 4663 62-78-02	High Capacity Storage Unit	Unit is for high capacity mass storage (Trillion-Bit Memory capability) enabling greater system efficiency	132	

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PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION, BUILDING LOCATION, AND EAD CONTROL NUMBER	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1978 OBLIGATIONS (\$ IN THOUS.)	RELATED FACILITY PROJECT
Aeronautical Research and Technology	Ames Research Center Bldg. 239 21-78-01	Aviation Safety Reporting System Data Base Computer	The mainframe and associated peripheral equipment will be used for the input, storage, processing, and retrieval of safety reports submitted to the Aviation Safety Reporting System	980	
Aeronautical Research and Technology	Ames Research Center Crows Landing 21-78-02	Mobile Digital Data System II (MDDS II)	MDDS II is a flight test data acquisition and processing system which will provide on- line processing, displaying and merge of telemetered aircraft data and ground base data for various short-haul flight programs	700	
Aeronautical Research and Technology	Ames Research Center Bldg. 239 21-78-03	Calligraphic Image Display System (CIDS)	Special purpose display system to provide dedicated hardware and interface linkage necessary to generate the visual scene environment required for simulating aircraft maneuvers. The system further provides for high-speed matrix multiplication, rotation and translation of vectors, point light sources and alphanumerics critical for real-time visual simulation	300	

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SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1978 BUDGET

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Aeronautical Research and Technology	Ames Research Center Bldg. 243 21-78-04	Flight Simulator for Advanced Aircraft (FSAA) Motion Control System	Replacement of existing motion generator servo control amplifiers and ancillary control and performance monitoring equipment	325	
Aeronautical Research and Technology	Ames Research Center Bldg's. 210, 243, 239 21-78-05	Simulation Control System (OLYMPUS)	System of interconnected computers for the control and computation required for Ames Simulators	1,500	
Aeronautical Research and Technology	Ames Research Center Bldg's. N-206 and N-227 21-78-06	Dynamic Stability/Forced Oscillation Apparatus	Apparatus consists of forced oscillation dynamic balances and related equipment to measure aerodynamic damping forces and moments on airplane configurations at high angles of attack and high Reynolds numbers from low subsonic to supersonic speeds	350	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Aeronautical Research and Technology	Ames Research Center Crows Landing 21-78-07	Laser Tracking System	A precision ranging and angle detection system to interface with an existing Nike Hercules Radar Tracking System	260	
Aeronautical Research and Technology	Ames Research Center Bldg. 243 21-78-08	Pilot Control Compensation System	An analog/Digital (Hybrid) Controller for driving hydraulic powered pilot control columns located in motion simulators	300	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Tracking and Data Acquisition	GSFC, Network Operations Control Center, Bldg. 3/14 51-78-01	Reconfiguration and modification of the STDN Network Operations Control Center including imple- mentation of mini- computers, displays, and consoles.	This reconfiguration is required to provide auto- matic on-line spacecraft support scheduling for the STDN ground stations and to provide scheduling requirements to the TDRSS contractor. It is also required to provide real- time support status infor- mation to flight project control centers and to generate conflict-free support schedules for the TDRSS and STDN stations.	\$ 2,660	
Tracking and Data Acquisition	GSFC Space Operations Facility, Bldg. 14 51-78-02	Replacement computer systems for obsolescent XDS 930 computers.	Required to process real-time telemetry, drive displays, and format command messages for the many and varied spacecraft support by MSOCC #1.	500	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Tracking and Data Acquisition	GSFC Space Operations Facility, Bldg. 14 51-78-03	MDHS Augmentation. New communication interfaces equipment to accommodate digital data transmission from network stations and data handling equipment for higher data rates.	Modification to existing command and control consoles of the MDHS required to conduct the real-time operations of the Nimbus-G mission.	\$ 600	
Tracking and Data Acquisition	GSFC, Bldg. 14 51-78-04	The Telemetry and Command (TAC) will capture the data, line decode/encode, establish frame synch and format data compatible with existing POCC's.	Required to match the existing POCC's with command transmission and non frame- synchronized telemetry data. This approach of inserting a TAC front-end to existing POCC's minimizes the impact to on-going mission support.	700	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Tracking and Data Acquisition	GSFC, Bldg. 14 51-78-05	This acquisition is the start of the design and procurement of several mini/medi computers and peripherals to be used as a nucleus for the new POCNET pilot model POC. The pilot model will demonstrate the concept of distributed processing virtual peripherals, common software shared resources and computer networking.	Required to support the mission control workload in the 1980's and beyond in order to meet quick turn-around, increased support efficiency requirements and to minimize development and recurring costs with each new mission. The POCNET concept is envisioned as very cost effective in the TDRSS/STS/Spacelab/MMS era.	\$ 1,600	
Tracking and Data Acquisition	GSFC, Bldg. 23 51-78-06	This present planned capability for the IPF is about 10 ¹¹ bits per day. This capability is compatible with the 5-band MSS sensor data on Landsat-C. Future NASA flights will include sensors producing data rates of 10 times the planned capability of the IPF. To minimize a major impact to the planned IPF, a front-end pre-processor is required to capture, buffer, format, and slow down the data rate to be compatible with the MDP.	Greater capability in the IPF is required to demonstrate the feasibility of pre-processing the high data rate imaging R&D sensor data.	300	

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Tracking and Data Acquisition	GSFC, Data Interpretation Lab, Bldg. 23 51-78-07	A high speed high capacity random access disc storage will be added to the existing 1108 computers. Also included is equipment to interface the 1108 with the Telemetry On-Line Processing System (TELOPS) and to augment the 1108's with additional peripherals for increased production processing.	Required to handle transfer of large files of data between the TELOPS and existing 1108 computers.	\$ 300	
Tracking and Data Acquisition	GSFC, Data Interpretation Lab, Bldg. 23 51-78-08	Completion of medium size computer subsystems to process data digitally. Includes wideband recorders to generate the high precision output products required by experimenters.	Required for approved imaging satellites, including Nimbus-G/HCMN for high accuracy high resolution image processing.	500	
Tracking and Data Acquisition	GSFC, Data Interpretation Lab, Bldg. 23 51-78-09	Computing system to perform preprocessing function on incoming data.	Required to match incoming data characteristics with the present capability of the information processing installation.	800	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SUMMARY OF MAJOR EQUIPMENT ACQUISITION OBLIGATIONS INCLUDED IN FY 1978 BUDGET

PROGRAM BUDGET LINE ITEM	RECEIVING INSTALLATION, BUILDING LOCATION, AND EAD CONTROL NUMBER	EQUIPMENT DESCRIPTION	PROGRAMMATIC PURPOSE	FY 1978 OBLIGATIONS (\$ IN THOUS.)	RELATED FACILITY PROJECT
Tracking and Data Acquisition	GSFC, Location TBD 51-78-10	New Landsat-D OCC Systems	A new control center is required for a new class of quasi-operational Landsats. The present Landsat OCC cannot be augmented while at the same time supporting the Landsat 1, 2, and -C missions.	\$ 1,500	
Tracking and Data Acquisition	Jet Propulsion Laboratory Network Operations Control Center, Bldg. 202 55-78-01	Network Telemetry Monitor and Control System. Addition of third channel of telemetry real-time data processing and digital monitoring equipment to enable handling required number of spacecraft high rate telemetry during conduct of station handover operation. Computers, control peripherals, digital television monitors and digital tape recorders.	Required additional telemetry channel and digital monitoring capacity to enable simultaneous support of dual spacecraft Mariner Jupiter-Saturn with Pioneer Venus Orbiter and other on-going planetary missions.	643	

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Tracking and Data Acquisition	Wallops Flight Center 53-78-01	Small computerized Mobile "C" Band Radar System to be incorporated into the WFC Mobile Facility supporting sounding rocket and balloon programs from remote locations.	The existing MPS-19 radars in the Mobile Facility are surplus World War II equipment that will not meet current programmatic requirements as to range, accuracy, reliability, etc. Spare parts are difficult to obtain and are usually acquired by cannibalizing other surplus radars. This is the first of a four- unit replacement program to be accomplished in the 1978-1982 time frame.	\$ 750	