National Aeronautics and Space Administration

BUDGET ESTIMATES

FISCAL YEAR 1967

Volume V

MANNED SPACE FLIGHT PROGRAMS

RESEARCH AND DEVELOPMENT
CONSTRUCTION OF FACILITIES
ADMINISTRATIVE OPERATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

MANNED SPACE FLIGHT PROGRAMS

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

RESEARCH AND DEVELOPMENT

GENERAL STATEMENT

The program of research and development and supporting activities of the National Aeronautics and Space Administration is directed toward maintaining the United States in a position of world leadership in aeronautics and space. The major program elements designed to achieve this objective are:

MANNED SPACE FLIGHT: The attainment of a capability for manned space operations and exploration through extended earth orbital flights, development of rendezvous and docking techniques, and manned lunar landing and return.

SPACE SCIENCE AND APPLICATIONS: An unmanned space flight program directed toward scientific investigations of the Earth, Moon, Sun, planets, stars and interplanetary space; and the development of technology and spacecraft systems that can be used in operational systems, such as meteorology and communications.

ADVANCED RESEARCH AND TECHNOLOGY: An effort required to provide the fundamental knowledge and the technological base for the future aeronautics and space programs.

TRACKING AND DATA ACQUISITION: The effort required for the operational support of the NASA manned and unmanned flight programs.

MANNED SPACE FLIGHT

The greatest portion of the FY 1967 request is for the support of the manned space flight program. The development of a capability for manned space operations with a supporting base of engineering, scientific and production capacity remains unchanged as the basic objective of this program. Within this basic objective there is a specific goal of landing men on the lunar surface for limited lunar exploration and returning them safely to earth in this decade. Projects Gemini and Apollo continue to be the hard core of the present flight and ground test and development effort. Supplementing these projects are studies and supporting development activity which are directed toward the exploitation of the hardware and techniques developed by Gemini and Apollo.

Gemini has already established man's capability for useful activities in space for periods of up to two weeks. In FY 1967 its flight operations will be completed. These flights will provide Apollo with important development information on space navigation, guidance, rendezvous and docking techniques.

In addition to continuation of the ground test activities, FY 1967 Apollo efforts will expand into manned spacecraft flight tests using the Saturn IB launch vehicle, and the initial development flights of the Saturn V launch vehicle.

In the area of advanced flight missions, studies and advanced component development will be continued. The aim of this effort will be to exploit and extend the capability of the Apollo spacecraft.

SPACE SCIENCE AND APPLICATIONS

In the FY 1967 budget request the next major program is that of space science and applications. Part of the scientific program is concerned with unmanned space flights, which are used to study the environment and surface of the Earth, Moon, and planets, as well as the intervening space environment. The flight projects concerned with the above objectives include sounding rockets, Geophysical satellites, Explorers, Pioneer probes, Mariners and Surveyor. The project involved with the study of the Sun is the Orbiting Solar Observatory; while the purpose of the Orbiting Astronomical Observatory is to study the stars. The biosatellite program will continue development so as to launch its first flight in 1966. In the area of applications, project Nimbus will continue to support the present and future requirements of the operational weather satellite systems for the Weather Bureau. Effort will also continue in the development of the Applications Technology Satellite which will give useful information for application to meteorology and communications as well as scientific spacecraft systems.

ADVANCED RESEARCH AND TECHNOLOGY

The advanced research and technology effort constitutes a continuing overall program aimed at meeting the technology goals of the nation with particular attention to providing the technical base for carrying out attractive future aero-space missions. This effort covers the spectrum of activity from basic research to improve our fundamental knowledge of physical and life science phenomena, through applied technology to improve our practical capability for developing advanced systems. The specific areas of effort in the advanced research and technology program are basic research, biotechnology and human research, electronics and control, nuclear systems and space power, chemical propulsion, space vehicle research and technology, and aeronautics.

TRACKING AND DATA ACQUISITION

The tracking and data acquisition effort is directed toward providing the necessary support required by the increasing activity of the NASA space flight programs. During FY 1967 increased numbers of launches are scheduled for both the manned and unmanned space flight programs, thereby requiring additional effort by the world-wide network of tracking stations. Additionally, the program provides for supplementing and maintaining the tracking and data acquisition capability of the network as required.

TECHNOLOGY UTILIZATION

The technology utilization program provides for the distribution and dissemination of the scientific, technological and engineering information and concepts resulting from NASA programs so as to permit their fullest use in accomplishing national objectives. In order to assure fulfillment of this basic objective, several subsidiary objectives must be realized. They are: 1. Establishing effective mechanisms and systems for assuring that all new knowledge is identified, collected, evaluated and made available in the most useful manner; and 2. Establishing effective mechanisms for announcing and disseminating this new knowledge in order to assure the widest possible application and utilization thereof.

FINANCING

The FY 1967 budget to support the research and development program, which is discussed in detail in this volume, is $4,246,600,000. This compares with a program totaling $4,511,644,000 for FY 1966.

Expenditures for the current fiscal year are estimated at $4,520,000,000 and $4,340,000,000 for FY 1967

NATIONAL AERONATUICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

GENERAL STATEMENT

This appropriation provides for contractual services for the design, construction and modification of facilities; the purchase of equipment related to construction and modification; and advance design of facilities planned for future authorization. The principal projects in the 1967 program are described below:

MANNED SPACE FLIGHT: The estimates include funding requirements for operational and testing facilities, utility installation, and additions and modifications to existing facilities, to support the Apollo spacecraft and Saturn launch vehicle programs and other research and support activities.

SCIENTIFIC INVESTIGATIONS IN SPACE: Projects in this category will support activities in space science. The estimates provide for modifications to launch facilities; new launch and servicing facilities for Delta vehicles, an Aerobee launch facility, and additional utility installations.

SPACE TECHNOLOGY: These projects comprise research laboratories, a support facility, and a chemical distribution facility.

AIRCRAFT TECHNOLOGY: Funds will provide for a V/STOL wind tunnel, expansion of the propulsion systems laboratory, and modifications for a hypersonic propulsion facility.

SUPPORTING ACTIVITIES: Funds are included for facility planning and design; a 40-foot antenna test bed, and a utility installation to support tracking and data acquisition requirements.

The appropriation for FY 1966 was $60,000,000 and the authorization was $62,376,350. The request for 1967 is $101,500,000; an increase of $41,500,000 from the 1966 appropriation. Total expenditures are estimated to be $300,000,000 in FY 1967, a decrease of $195,000,000 from the $495,000,000 estimated for FY 1966.

The budget request contains $20,000 to provide a fall-out shelter protection for a new facility at Kennedy Space Center. The amount has been determined in consultation with the Department of Defense based on DOD policy and criteria.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ADMINISTRATIVE OPERATIONS

GENERAL STATEMENT

The Administrative Operations appropriation provides for personnel, travel, and other supporting expenses of NASA installations including Headquarters. These installations are institutionally administered by the Associate Administrator who has prime responsibility for the Research and Development programs conducted at each installation. The Associate Administrator for Manned Space Flight is responsible for the Kennedy Space Center, Manned Spacecraft Center, and the Marshall Space Flight Center. Goddard Space Flight Center and Wallops Station are under the institutional cognizance of the Associate Administrator for Space Science and Applications. The Associate Administrator for Advanced Research and Technology is institutionally responsible for the Ames Research Center, and the Electronics Research Center, the Flight Research Center, the Langley Research Center, the Lewis Research Center, and the Space Nuclear Propulsion Office. Headquarters reports directly to the Deputy Associate Administrator, and the Western Operations Office reports to the Assistant Administrator for Industry Affairs. Installation descriptions and funding requirements are grouped in this volume in accordance with the prime missions of the installations.

Manpower

NASA originally planned for a total of 34,100 civilian personnel positions in FY 1966. However, due to the successful acceleration in the manned space flight program, additional manpower was required to support this program. As a result, an additional 424 positions were assigned to the Manned Spacecraft Center and the Kennedy Space Center bringing the total end of year positions to 34,524. In FY 1967 an additional 450 positions are planned for the Electronics Research Center in accordance with the phased build up for that installation. Post-flight studies of the early Gemini flights showed a strong relationship between spacecraft hours in flight and manhours in flight, and requirements for supporting personnel for launch, mission operations, and tracking. As a result of these workload indicators, in addition to the 424 positions assigned in FY 1966, a further allocation of 365 positions for the Kennedy Space Center and the Goddard Space Flight Center to support the heavy emphasis on launching and tracking of manned space flight missions is planned. These increases are partially offset by a target reduction of 400 positions throughout the agency which will not be filled upon becoming vacant. A total of 34,939 positions is requested for FY 1967.

The number of positions requested and the grade level of the employees is a product of the Human Resources Study conducted by NASA over a six month period. This study included a detailed position-by-position study at all NASA installations with the intent of eliminating organizational entities or

positions not considered necessary for the assigned missions. The study verified that manpower was and is being used effectively and that every effort is being made to provide for new requirements by adjustments within the authorized manpower level. An important part of the study was the development of a computer-assisted technique for assignment of grade and salary levels throughout the agency. The historical study had indicated that the factors which had the greatest impact on grade and salary levels were: (1) promotion practices, (2) rate of separation, (3) level of accessions, and (4) statutory within grade pay increases. The computer program utilized these four forcing factors to evaluate sensitivity of policies relating to promotions, separations, and accessions and provided a method to make long range forecasts of the effect on average grade and salary of differing concepts of personnel management. The estimates for personnel compensation contained in the budget have been established through this technique. In addition to developing a technique for estimating grade and salary requirements, the Human Resources Study includes a follow-up procedure which continuously evaluates the progress of the manpower activity against the projection.

The following tabulations indicate the distribution of NASA personnel by program and the numbers of personnel by center:

Personnel Distribution

	1965	1966	1967
Direct Personnel by Program			
Manned Space Flight			
Gemini	1,050	1,168	197
Apollo	9,369	9,528	10,356
Advanced missions	250	273	302
Sub-total, MSF	10,669	10,969	10,855
Space Science and Applications			
Physics and astronomy	1,357	1,330	1,295
Lunar and planetary exploration	342	376	387
Sustaining university program	72	71	71
Launch vehicle development	265	241	176
Launch vehicle procurement	317	351	352
Bioscience	260	267	269
Meteorological satellites	275	244	237
Communication and applications technology satellites	154	158	161
Sub-total, SSA	3,042	3,038	2,948

	1965	1966	1967
Advanced Research and Technology			
Basic research.....	1,258	1,284	1,286
Space vehicle systems.....	1,483	1,488	1,485
Electronics systems.....	1,068	1,264	1,629
Human factor systems.....	230	235	245
Space power and electric propulsion systems.....	931	807	800
Nuclear rockets.....	774	607	593
Chemical propulsion.....	505	660	680
Aeronautics.....	1,513	1,679	1,743
Sub-total, ART.....	7,762	8,024	8,461
Tracking and Data Acquisition....	780	831	953
Technology Utilization.....	47	45	45
Sub-total, direct positions..	22,300	22,907	23,262
Support Personnel			
Director and staff.....	1,092	1,096	1,092
Administration.....	4,872	4,940	4,941
Research and development support.	4,936	4,981	5,044
Sub-total, support positions...	10,900	11,017	11,077
Total, permanent positions.....	33,200	33,924	34,339
Total, other positions.....	1,100	600	600
Grand Total, all positions.....	34,300	34,524	34,939

Personnel Requirements

	1965	1966	1967
Manned Space Flight			
Kennedy Space Center.....	2,428	2,620	2,750
Manned Spacecraft Center.....	4,237	4,809	4,747
Marshall Space Flight Center...	7,510	7,317	7,221
Sub-total, MSF.....	14,175	14,746	14,718

	1965	1966	1967
Space Science and Applications			
Goddard Space Flight Center.....	3,704	3,577	3,759
Pacific Launch Operations Office	19	---	---
Wallops Station.....	518	518	518
Sub-total, SSA.....	4,241	4,095	4,277
Advanced Research and Technology			
Ames Research Center.....	2,210	2,220	2,191
Electronics Research Center.....	244	550	1,000
Flight Research Center.....	605	604	596
Langley Research Center.....	4,244	4,234	4,179
Lewis Research Center.....	4,815	4,810	4,747
Space Nuclear Propulsion Office.	117	117	115
Sub-total, ART.....	12,235	12,535	12,828
Supporting Activities			
Headquarters, NASA.....	2,163	2,162	2,135
Western Operations Office.....	386	386	381
Sub-total	2,549	2,548	2,516
Permanent positions.....	33,200	33,924	34,339
Other positions.....	1,100	600	600
Grand total, all positions.....	34,300	34,524	34,939

Funding

The FY 1966 NASA budget included a request for $609,400,000 for Administrative Operations. This was reduced by the Authorization Act to $591,048,850 and further reduced by the Appropriation Act to $584,000,000. A detailed analysis of requirements to be funded under Administrative Operations resulted in the conclusion that the estimate could be reduced by $5,892,000 to a total of $603,508,000. With the peak workload approaching, however, any amount below this level would make it impossible to conduct successfully the planned flight missions. In addition to this requirement, the recent Federal Employees Salary Act of 1965 created a new funding requirement of $8,312,000 for a total of $611,820,000 for the Administrative Operations appropriation. As a result, a total of $27,820,000 has been reprogrammed and transferred from the Research and Development appropriation to increase funding to $611,820,000.

The FY 1967 funding request for Administrative Operations is $663,900,000 an increase of $52,080,000. The major reason for the increase requested is related to the manned lunar landing program with the Cape Kennedy Merritt Island Launch Area approaching its full development and the Manned Spacecraft Center approaching its full operational capability, as well as the support of this program in other centers, particularly the Goddard Space Flight Center. The other major area of increase is related to the build up of the Electronics Research Center. The object classification description of resources requested is tabulated below:

ANALYSIS OF RESOURCES REQUIREMENTS BY OBJECT CLASSIFICATION

(Thousands of Dollars)

	1965	1966	1967
11. Personnel compensation.....	332,722	355,511	375,354
12. Personnel benefits.....	23,713	25,299	27,090
21. Travel and transportation of persons.....	20,427	20,841	21,279
22. Transportation of things.....	4,543	4,689	5,048
23. Rent, communications and utilities	46,424	49,795	56,417
24. Printing and reproduction.....	4,174	4,615	4,916
25. Other services.....	85,045	107,584	127,538
26. Supplies and materials.....	24,553	21,156	26,122
31. Equipment.....	86,370	16,998	14,696
32. Lands and structures.....	6,539	5,300	5,408
42. Insurance claims and indemnities...	27	32	32
Total.....	634,537 a/	611,820 b/	663,900

The analysis of changes by Object Classification FY 1966 to FY 1967 follows:

	1965	1966	1967	Change in FY 1967
Personnel Compensation and Benefits	$356,435	$380,810	$402,444	+$21,634

In FY 1967 the cost of personnel compensation and benefits will be $21.6 million greater than FY 1966. Of this amount $3.8 million is caused by the full year effect of the Federal Employees Salary Act of 1965, effective in October 1965. The most significant increase reflects the cost of providing for a net increase of 846 manyears for permanent personnel. Actual increases include 621 manyears for new FY 1967 positions at the Kennedy Space Center, the Electronics Research Center, and the Goddard Space Flight Center, and an increase of 425 manyears related to the new positions filled during FY 1966.

a/Includes $14,573,000 comparative transfer from Research and Development.
b/Includes $27,820,000 appropriation transfer from Research and Development.

These increases of 1,046 manyears are partially offset by the saving of 200 manyears resulting from not filling 400 vacancies due to the 1965 retirement legislation. The cost of the net additional manyears is estimated at $9.8 million.

Reimbursement to the Department of Defense for military personnel detailed to NASA will increase by $1.1 million in FY 1967 over FY 1966. In FY 1966, 128 trained military personnel, who became available because of the phase-out of the Atlas and Titan I missile systems, were detailed to NASA for the support of Gemini and Apollo flight operations. In FY 1966 the Department of Defense paid the entire cost of these personnel. NASA will assume the funding responsibility for these personnel in FY 1967.

In addition to the increased costs resulting from the salary increase, additional manyears, and reimbursement for military personnel, there is an increase of $9.9 million resulting from the structural changes in the personnel complement. The total increase of $24.6 million is offset by a decrease of $.4 million in temporary employment and $2.6 million in overtime and holiday pay, for a net increase of $21.6 million. The net increase for personnel compensation and benefits consists of $19.8 million for compensation and $1.8 million for benefits.

	1965	1966	1967	Change in FY 1967
Travel and Transportation of Persons	$20,427	$20,841	$21,279	+$438

The estimate for travel and transportation of persons in FY 1967 represents an increase of $525 thousand for Electronics Research Center, Kennedy Space Center, and Manned Spacecraft Center offset by a reduction of $87 thousand in other centers. The increase of $45 thousand for the Electronics Research Center is related to the growth of the Center. The increases of $93 thousand at the Kennedy Space Center and $387 thousand at the Manned Spacecraft Center are directly related to the increased flight activity which includes the last third of the Gemini flights, the first manned Apollo spacecraft launching on the Saturn IB and the first Saturn V launch during this time period.

	1965	1966	1967	Change in FY 1967
Transportation of Things	$4,543	$4,689	$5,048	+$359

The majority of the FY 1967 increase of $359 thousand in this object class results from the expansion of personnel and facilities at the Merritt Island Launch Area and Launch Complex 39 at Cape Kennedy as the Apollo program moves into the flight stage. Other increases are related to additional facilities coming into use at the Goddard Space Flight Center and the phased build up at the Electronics Research Center.

	1965	1966	1967	Change in FY 1967
Rent, Communications and Utilities	$46,424	$49,795	$56,417	+$6,622

The major increases in FY 1967 requirements over FY 1966 include: increased space rental at the Electronics Research Center, increased rental of ADP equipment, increased communications, and increased utilities. In FY 1967 the Electronics Research Center will add 450 positions as part of the approved center build up plan. It is estimated that an additional 100,000 square feet of space will be rented at a cost of $544 thousand to accommodate these personnel.

The estimate for ADP rental cost in FY 1967 is $2.7 million greater than in FY 1966. The majority of the increase will be at the Goddard Space Flight Center where an overlapping of equipment will be required during the phase-out of second generation equipment and the installation of the super-speed complex. The Electronics Research Center will begin installation of ADP equipment. In FY 1967 the initial ADP system will be installed, and the cost will increase from $27 thousand in FY 1966 for EAM equipment to $543 thousand for ADP and EAM equipment in FY 1967. The Langley and Ames Research Centers require an increase in equipment rentals to supplement NASA owned systems as a prerequisite to solving the more complex problems presented by planned research programs. Other Centers' requirements reflect minor reductions as the full effects of FY 1965 and FY 1966 equipment purchases are realized.

There is a net increase in the manned space flight centers in FY 1967 of $.3 million. At the Marshall Space Flight Center third generation equipment will be installed to replace the present second generation equipment. In addition, the new equipment will change the method of operation at this Center by replacing several small systems separately located in each of the laboratories with a large central processor with remote inquiry stations. Because of this change in method of operation, NASA will initially lease this equipment. This will cause overlapping of lease costs in FY 1967 in the amount of $.7 million. Offsetting the increase at the Marshall Space Flight Center, the lease cost at the Manned Spacecraft Center will be $.4 million lower in FY 1967 which represents the first full year effect of the lease savings resulting from the FY 1965 equipment purchase program.

The increase in manned flight activity, and the effect of increased Federal Telecommunications Systems rates and lines for the full year, will result in about about $.6 million more communication costs.

In FY 1967 the number of facilities becoming operational will result in an increase of $2.7 million in utility costs. About one-half of this will be for the activation of the Merritt Island Launch Area and Launch Complex 39 at the Kennedy Space Center, NASA. The increase in costs at other centers is a result of the completion of facilities authorized in prior years.

In summary, the increase of $6.6 million consists of $.5 million for rental of space, $2.7 million for ADP leases, $.6 million for communications, $2.7 million for utilities, and $.1 million for all other items in this category.

	1965	1966	1967	Change in FY 1967
Printing and Reproduction	$4,174	$4,615	$4,916	+$301

The majority of the increase in this object class is for Headquarters and for the Kennedy Space Center, NASA. The Headquarters increase of $150 thousand results from the growing volume of scientific and technical information being generated by the NASA research and development programs and the statutory requirement to make this information available to the scientific community. Another increase of $122 thousand is at the Kennedy Space Center, NASA, to provide the necessary support for the greater number of personnel manning the completed Merritt Island Launch Area and Launch Complex 39 facilities. There are minor increases also at the Electronics Research Center and the Goddard Space Flight Center related to increased activity at these centers.

	1965	1966	1967	Change in FY 1967
Other Services	$85,045	$107,584	$127,538	+$19,954

The increase in other services represents requirements resulting from program development and the completion of new construction begun in prior years. The largest increases are strictly related to the support of the planned flight schedules. Flight schedules are being met and the indications are that this will continue. As a result of the greater complexity of the missions, considerably more support is required. This is particularly true at the Kennedy Space Center, where the logistic support for all launch vehicle stage contractors will be provided through this account, and where the huge Merritt Island Launch Area and Launch Complex 39 will become fully operational. The completion of additional facilities at nearly all locations will require additional custodial and maintenance services, and the large scale procurement of ADP equipment in prior years will require increases in maintenance costs and programming effort.

The largest increase for other services is to support the expanded activity at the Kennedy Space Center. FY 1967 requirements reflect the full year effect of the FY 1966 base support services build up. During 1966 the majority of the Merritt Island Launch Area and Launch Complex 30 facilities will be completed and will become operational. Accordingly, as each facility is completed, it will be manned by NASA and contractor personnel. To provide base operational support, $5.7 million more will be required in FY 1967 than in FY 1966. In addition, administrative support for the expanded effort will require an increase of $2.8 million, for a total increase of

$8.5 million for contractual services outside the government.

As the NASA manned and unmanned flight activity increases at Cape Kennedy, NASA is assuming the funding responsibility for more facilities from the Air Force. Also, as the overall NASA activity increases, the amount of services provided by the Air Force on a reimbursable basis increases accordingly. This will result in an increase of $1.3 million in FY 1967.

The combination of the rise in Air Force reimbursements coupled with the increase in contractual services outside the government results in a total increase for other services at Kennedy Space Center, NASA of $9.8 million.

Another significant increase in FY 1967 over FY 1966 will be for the technical documentation and scientific and technical information programs. This expanded activity is occasioned by the advancement in the Apollo program from design and development effort to testing, qualification and flight. In addition, as other NASA flight and research programs achieve additional milestones, the necessity for documentation, classification and dissemination of the results obtained increases. It is estimated that the cost of this effort will require an additional $2.4 million in FY 1967.

The requirements for ADP programming, operations support, and maintenance are estimated to increase in FY 1967 by $2.7 million. The cost of maintaining NASA owned ADP equipment will be $.5 million greater than in FY 1966. This increase reflects the effects of the FY 1965 and FY 1966 purchase programs. The estimates for ADP programming and operations support are $2.2 million higher in FY 1967. The largest increases are in support of the Electronics Research Center and the increased complexity of the work conducted by the Goddard Space Flight Center Institute of Space Studies.

In FY 1967 the estimated cost of maintenance and custodial services will be $3.7 million higher than in FY 1966. The increased physical plant for which custodial services are required, coupled with the full year effect of the Service Contract Act of 1965 on NASA service contracts, will raise the cost in this area by $1.5 million. As the NASA capital investment grows larger and facilities become older, the cost of maintenance and repair increases accordingly. In FY 1967 it is estimated that the cost of maintaining the NASA plant, including equipment, will be $2.2 million greater than in FY 1966.

The balance of the increase over FY 1966 is reflected in minor changes in many categories of service. The largest items in this category are the increase in medical services at the Manned Spacecraft Center caused by greater astronaut activity, and an intensive study by Headquarters of the incentive contracting policy and procedure.

	1965	1966	1967	Change in FY 1967
Supplies and Materials	$24,553	$21,156	$26,122	+$4,966

In FY 1967 the requirement for supplies and materials to support the larger number of facilities which will become operational in FY 1966 and FY 1967, and the greater number of personnel, both civil service and contractor, will increase by $4.6 million as the Apollo program moves into the flight mission stage. The balance of the increase, $.4 million, is required to support the build up at the Electronics Research Center and for adjustments at other centers.

	1965	1966	1967	Change in FY 1967
Equipment	$86,370	$16,998	$14,696	-$2,302

The total cost of equipment required in FY 1967 is $2.3 million less than that needed in FY 1966. The reduction is directly attributable to the ADP equipment purchase program which has been reduced from $7.9 million in FY 1966 to $2.8 million in FY 1967. This reduction is partially offset by an increase of $2.1 million to provide equipment to support the build up required for manned flight support operations at the Kennedy Space Center, the Manned Spacecraft Center, and the Goddard Space Flight Center. The other $.7 million increase is required to offset the deferment of equipment purchases in recent years and to allow for modernization of laboratory equipment.

	1965	1966	1967	Change in FY 1967
Lands and Structures	$6,539	$5,300	$5,408	+$108

In FY 1967 the amount requested for lands and structures reflects a net increase in requirements of $108 thousand. The additional resources required to support the expansion of Apollo flight activity are estimated to be slightly in excess of $313 thousand, offset by a reduction at Ames Research Center of $205 thousand.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

SUMMARY OF RESEARCH AND DEVELOPMENT BUDGET PLAN BY BUDGET ACTIVITY AND RELATED FINANCING

	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
Budget Activity:			
1. Manned Space Flight:			
(a) Gemini.....	$308,400,000	$226,611,000	$40,600,000
(b) Apollo.....	2,614,619,000	2,967,385,000	2,974,200,000
(c) Advanced mission studies.....	26,000,000	10,000,000	8,000,000
2. Scientific Investigations in Space:			
(a) Physics and astronomy.....	176,029,000	189,132,000	167,300,000
(b) Lunar and planetary exploration....	267,442,000	326,523,000	260,800,000
(c) Bioscience.....	31,001,000	46,200,000	39,900,000
(d) Launch vehicle development....	138,191,000	90,300,000	61,700,000
3. Space Applications.....	70,467,000	83,682,000	88,100,000
4. Space Technology.....	299,320,000	248,500,000	247,900,000
5. Aircraft Technology....	35,240,000	41,496,000	33,000,000
6. Supporting Activities:			
(a) Tracking and data acquisition....	253,236,000	231,065,000	279,300,000
(b) Sustaining university program.....	46,000,000	46,000,000	41,000,000
(c) Technology utilization....	4,750,000	4,750,000	4,800,000
Total Budget Plan....	$4,270,695,000	$4,511,644,000	$4,246,600,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

SUMMARY OF RESEARCH AND DEVELOPMENT BUDGET PLAN BY BUDGET ACTIVITY AND RELATED FINANCING

	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
Financing:			
Appropriation.....	$4,363,594,000	$4,531,000,000	$4,246,600,000
Transferred to-			
"Construction of facilities" (78 Stat. 658).....	-3,545,000	---	---
"Administrative operations" (79 Stat. 534).....	---	-27,896,000	---
Appropriation (adjusted).....	4,360,049,000	4,503,104,000	4,246,600,000
Transferred to "Construction of facilities" in FY 1966	-354,000	---	---
Prior year funding applied - available from adjustments to FY 1962 and prior budget plans.....	2,263,000	---	---
Reprogramming to (-) or from prior year budget plans.....	-76,690,000	8,540,000	---
Comparative transfer to "Administrative Operations"	-14,573,000	---	---
Total financing of the budget plan.....	$4,270,695,000	$4,511,644,000	$4,246,600,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

SUMMARY OF RESEARCH AND DEVELOPMENT BUDGET PLAN BY PROGRAM BY COGNIZANT OFFICE

BUDGET ACTIVITY	OFFICE/PROGRAM	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
	MANNED SPACE FLIGHT.....	$2,949,019,000	$3,203,996,000	$3,022,800,000
1a	Gemini.....	308,400,000	226,611,000	40,600,000
1b	Apollo.....	2,614,619,000	2,967,385,000	2,974,200,000
1c	Advanced missions.....	26,000,000	10,000,000	8,000,000
	SPACE SCIENCE AND APPLICATIONS.....	$732,362,000	$783,237,000	$661,400,000
2a	Physics and astronomy...	139,082,000	143,500,000	131,400,000
2b	Lunar and planetary exploration.....	206,027,000	251,337,000	197,900,000
6b	Sustaining university program.....	46,000,000	46,000,000	41,000,000
2d	Launch vehicle development.....	96,500,000	55,300,000	33,700,000
*	Launch vehicle procurement.....	154,487,000	178,700,000	152,000,000
2c	Bioscience.....	28,501,000	36,700,000	35,400,000
3	Meteorological satellites.....	30,991,000	38,900,000	43,600,000
3	Communication and applications technology satellites.	30,774,000	32,800,000	26,400,000
	ADVANCED RESEARCH AND TECHNOLOGY.....	$331,328,000	$288,596,000	$278,300,000
4	Basic research.....	21,231,000	22,000,000	23,000,000
4	Space vehicle systems...	44,193,000	35,000,000	36,000,000
4	Electronics systems.....	25,622,000	32,300,000	36,800,000
4	Human factor systems....	13,320,000	14,900,000	17,000,000
4	Space power and electric propulsion systems....	58,220,000	45,200,000	42,500,000
4	Nuclear rockets.....	57,000,000	58,000,000	53,000,000
4	Chemical propulsion.....	76,502,000	39,700,000	37,000,000
5	Aeronautics.....	35,240,000	41,496,000	33,000,000
6a	TRACKING AND DATA ACQUISITION.....	$253,236,000	$231,065,000	$279,300,000

BUDGET ACTIVITY	OFFICE/PROGRAM	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
6c	TECHNOLOGY UTILIZATION...	$4,750,000	$4,750,000	$4,800,000
	TOTAL BUDGET PLAN.....	$4,270,695,000	$4,511,644,000	$4,246,600,000

*Funds for the procurement of launch vehicles are statistically distributed to unmanned flight programs (e.g. Physics and Astronomy, Space Vehicle Systems).

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

DISTRIBUTION OF RESEARCH AND DEVELOPMENT BUDGET PLAN BY INSTALLATION AND FISCAL YEAR

(In thousands of dollars)

PROGRAM OFFICE	TOTAL	J. F. KENNEDY SPACE CENTER, NASA	MANNED SPACECRAFT CENTER	MARSHALL SPACE FLIGHT CENTER	GODDARD SPACE FLIGHT CENTER	PACIFIC LAUNCH OPERATIONS OFFICE	WALLOPS STATION	AMES RESEARCH CENTER	ELECTRONICS RESEARCH CENTER	FLIGHT RESEARCH CENTER	LANGLEY RESEARCH CENTER	LEWIS RESEARCH CENTER	SPACE NUCLEAR PROPULSION OFFICE	HEADQUARTERS	WESTERN OPERATIONS OFFICE
Office of Manned Space Flight															
1965	2,949,019	56,110	1,418,648	1,435,989	389	-	-	39	-	-	2,400	1,160	-	33,367	917
1966	3,203,996	121,109	1,479,182	1,574,635	425	-	-	230	-	-	700	-	-	25,215	2,500
1967	3,022,800	164,505	1,363,400	1,466,295	500	-	-	250	-	-	-	-	-	25,350	2,500
Office of Space Science and Applications															
1965	732,362	2,674	2,608	1,462	186,868	99	1,150	34,683	275	10	67,388	199,083	-	107,230	128,832
1966	783,237	3,327	14,400	10,607	195,404	-	2,830	37,948	650	5	68,217	179,843	-	106,597	163,409
1967	661,400	4,019	15,200	495	189,193	-	3,640	31,463	750	15	35,960	147,371	-	93,146	140,148
Office of Advanced Research and Technology															
1965	331,328	-	1,512	28,911	8,517	-	-	19,391	2,333	7,638	34,953	122,084	45,760	31,648	28,581
1966	288,596	250	2,355	17,264	9,678	-	-	18,775	6,554	14,919	40,749	69,431	50,218	37,765	20,638
1967	278,300	250	3,370	17,496	9,701	-	-	21,455	12,400	7,925	41,127	61,603	48,500	31,833	22,640
Office of Tracking and Data Acquisition															
1965	253,236	-	-	2,000	179,252	-	5,100	-	-	1,900	2,200	-	-	7,015	55,769
1966	231,065	-	-	1,500	155,950	-	5,835	-	-	1,880	2,000	-	-	10,400	53,500
1967	279,300	-	-	1,500	199,600	-	6,400	-	-	2,100	2,100	-	-	12,000	55,600
Office of Technology Utilization and Policy Planning															
1965	4,750	-	-	-	-	-	-	-	-	-	-	-	-	4,750	-
1966	4,750	-	-	-	-	-	-	-	-	-	-	-	-	4,750	-
1967	4,800	-	-	-	-	-	-	-	-	-	-	-	-	4,800	-
Total Budget Plan															
1965	4,270,695	58,784	1,422,768	1,468,362	375,026	99	6,250	54,113	2,608	9,548	106,941	322,327	45,760	184,010	214,099
1966	4,511,644	124,686	1,495,937	1,604,006	361,457	-	8,665	56,953	7,204	16,804	111,666	249,274	50,218	184,727	240,047
1967	4,246,600	168,774	1,381,970	1,485,786	398,994	-	10,040	53,168	13,150	10,040	79,187	208,974	48,500	167,129	220,888

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

DISTRIBUTION OF RESEARCH AND DEVELOPMENT BUDGET PLAN BY INSTALLATION AND FISCAL YEAR

(In thousands of dollars)

PROGRAM		TOTAL	J. F. KENNEDY SPACE CENTER, NASA	MANNED SPACECRAFT CENTER	MARSHALL SPACE FLIGHT CENTER	GODDARD SPACE FLIGHT CENTER	PACIFIC LAUNCH OPERATIONS OFFICE	WALLOPS STATION	AMES RESEARCH CENTER	ELECTRONICS RESEARCH CENTER	FLIGHT RESEARCH CENTER	LANGLEY RESEARCH CENTER	LEWIS RESEARCH CENTER	SPACE NUCLEAR PROPULSION OFFICE	HEADQUARTERS	WESTERN OPERATIONS OFFICE 1/
OFFICE OF MANNED SPACE FLIGHT, TOTAL	1965	2,949,019	56,110	1,418,648	1,435,989	389	-	-	39	-	-	2,400	1,160	-	33,367	917
	1966	3,203,996	121,109	1,479,182	1,574,635	425	-	-	230	-	-	700	-	-	25,215	2,500
	1967	3,022,800	164,505	1,363,400	1,466,295	500	-	-	250	-	-	-	-	-	25,350	2,500
Gemini	1965	308,400	-	308,050	-	-	-	-	-	-	-	-	-	-	350	-
	1966	226,611	-	226,211	-	-	-	-	-	-	-	-	-	-	400	-
	1967	40,600	-	40,300	-	-	-	-	-	-	-	-	-	-	300	-
Apollo	1965	2,614,619	55,610	1,100,973	1,430,516	389	-	-	39	-	-	1,200	1,160	-	24,087	645
	1966	2,967,385	120,509	1,249,371	1,569,135	425	-	-	230	-	-	700	-	-	24,515	2,500
	1967	2,974,200	163,905	1,320,500	1,461,795	500	-	-	250	-	-	-	-	-	24,750	2,500
Advanced mission studies	1965	26,000	500	9,625	5,473	-	-	-	-	-	-	1,200	-	-	8,930	272
	1966	10,000	600	3,600	5,500	-	-	-	-	-	-	-	-	-	300	-
	1967	8,000	600	2,600	4,500	-	-	-	-	-	-	-	-	-	300	-
OFFICE OF SPACE SCIENCE AND APPLICATIONS, TOTAL	1965	732,362	2,674	2,608	1,462	186,868	99	1,150	34,683	275	10	67,388	199,083	-	107,230	128,832
	1966	783,237	3,327	14,400	10,607	195,404	-	2,830	37,948	650	5	68,217	179,843	-	106,597	163,409
	1967	661,400	4,019	15,200	495	189,193	-	3,640	31,463	750	15	35,960	147,371	-	93,146	140,148
Physics and astronomy	1965	139,082	-	-	755	110,244	-	1,090	1,557	-	10	2,226	-	-	22,866	334
	1966	143,500	-	-	62	108,498	-	2,550	2,586	-	5	2,272	-	-	27,075	452
	1967	131,400	-	-	25	100,961	-	3,400	2,563	-	15	1,100	-	-	22,836	500
Lunar and planetary exploration	1965	206,027	-	2,608	435	1,267	-	-	15,734	-	-	50,050	97	-	9,256	126,580
	1966	251,337	-	14,400	375	1,164	-	-	12,763	-	-	53,115	-	-	12,913	156,607
	1967	197,900	-	15,200	300	1,200	-	-	7,000	-	-	23,200	-	-	14,300	136,700
Sustaining university program	1965	46,000	-	-	-	-	-	-	-	-	-	-	11	-	45,986	3
	1966	46,000	-	-	-	-	-	-	-	-	-	-	-	-	46,000	-
	1967	41,000	-	-	-	-	-	-	-	-	-	-	-	-	41,000	-
Launch vehicle development	1965	96,500	1,321	-	152	1,557	-	-	-	100	-	735	91,302	-	1,333	-
	1966	55,300	820	-	10,000	250	-	-	-	200	-	570	42,820	-	640	-
	1967	33,700	700	-	-	-	-	-	-	250	-	600	31,550	-	600	-
Launch vehicle procurement	1965	154,487	1,353	-	-	19,496	99	-	-	-	-	13,737	107,673	-	12,129	-
	1966	178,700	2,507	-	-	18,580	-	-	-	-	-	11,600	137,023	-	5,625	3,365
	1967	152,000	3,319	-	-	22,205	-	-	-	-	-	10,400	115,821	-	-	255
Bioscience	1965	28,501	-	-	-	385	-	60	17,392	-	-	-	-	-	9,145	1,519
	1966	36,700	-	-	-	420	-	100	22,599	-	-	30	-	-	11,214	2,337
	1967	35,400	-	-	-	420	-	100	21,900	-	-	30	-	-	10,450	2,500
Meteorological satellites	1965	30,991	-	-	120	29,505	-	-	-	175	-	425	-	-	766	-
	1966	38,900	-	-	170	35,400	-	180	-	450	-	630	-	-	2,070	-
	1967	43,600	-	-	170	39,300	-	140	-	500	-	630	-	-	2,860	-
Communication and applications technology satellites	1965	30,774	-	-	-	24,414	-	-	-	-	-	215	-	-	5,749	396
	1966	32,800	-	-	-	31,092	-	-	-	-	-	-	-	-	1,060	648
	1967	26,400	-	-	-	25,107	-	-	-	-	-	-	-	-	1,100	193

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

DISTRIBUTION OF RESEARCH AND DEVELOPMENT BUDGET PLAN BY INSTALLATION AND FISCAL YEAR

(In thousands of dollars)

PROGRAM		TOTAL	J. K. KENNEDY SPACE CENTER, NASA	MANNED SPACECRAFT CENTER	MARSHALL SPACE FLIGHT CENTER	GODDARD SPACE FLIGHT CENTER	PACIFIC LAUNCH OPERATIONS OFFICE	WALLOPS STATION	AMES RESEARCH CENTER	ELECTRONICS RESEARCH CENTER	FLIGHT RESEARCH CENTER	LANGLEY RESEARCH CENTER	LEWIS RESEARCH CENTER	SPACE NUCLEAR PROPULSION OFFICE	HEADQUARTERS	WESTERN OPERATIONS OFFICE 1/
OFFICE OF ADVANCED RESEARCH AND TECHNOLOGY, TOTAL	1965	331,328	-	1,512	28,911	8,517	-	-	19,391	2,333	7,638	34,953	122,084	45,760	31,648	28,581
	1966	288,596	250	2,355	17,264	9,678	-	-	18,775	6,554	14,919	40,749	69,431	50,218	37,765	20,638
	1967	278,300	250	3,370	17,496	9,701	-	-	21,455	12,400	7,925	41,127	61,603	48,500	31,833	22,640
Basic research	1965	21,231	-	-	916	257	-	-	1,966	95	3	1,901	2,234	-	7,503	6,356
	1966	22,000	-	-	815	117	-	-	1,910	595	30	2,119	2,731	-	8,627	5,056
	1967	23,000	-	-	850	120	-	-	2,100	1,000	30	2,200	2,800	-	8,500	5,400
Space vehicle systems	1965	44,193	-	629	16,444	1,231	-	-	3,354	-	1,825	10,594	2,408	-	3,474	4,234
	1966	35,000	-	435	4,201	1,751	-	-	3,076	250	1,010	11,466	3,087	-	6,006	3,718
	1967	36,000	-	670	3,096	2,081	-	-	3,475	250	1,010	14,282	3,223	-	3,713	4,200
Electronics systems	1965	25,622	-	465	3,685	2,967	-	-	3,480	2,178	1,038	6,660	400	-	2,022	2,727
	1966	32,300	-	525	4,003	2,975	-	-	3,718	5,110	698	7,260	539	-	3,906	3,566
	1967	36,800	-	450	4,200	2,960	-	-	4,100	10,000	660	7,420	540	-	3,180	3,290
Human factor systems	1965	13,320	-	365	355	-	-	-	4,233	60	1,750	4,053	232	-	2,172	100
	1966	14,900	-	795	310	25	-	-	5,224	359	1,500	4,246	125	-	2,216	100
	1967	17,000	-	1,100	300	-	-	-	5,830	700	1,250	5,000	-	-	2,820	-
Space power and electric propulsion systems	1965	58,220	-	53	2,415	3,512	-	-	191	-	-	1,324	43,517	-	1,351	5,857
	1966	45,200	-	100	2,010	4,260	-	-	110	50	-	846	28,768	-	4,565	4,491
	1967	42,500	-	650	1,650	3,990	-	-	50	300	-	700	26,065	-	3,045	6,050
Nuclear rockets	1965	57,000	-	-	1,375	-	-	-	-	-	-	-	9,846	45,760	13	6
	1966	58,000	-	-	1,125	-	-	-	-	-	-	-	6,599	50,218	58	-
	1967	53,000	-	-	900	-	-	-	-	-	-	-	3,550	48,500	50	-
Chemical propulsion	1965	76,502	-	-	3,721	550	-	-	-	-	-	1,369	49,588	-	11,973	9,301
	1966	39,700	250	500	4,800	550	-	-	540	-	-	2,877	15,205	-	11,271	3,707
	1967	37,000	250	500	6,500	550	-	-	500	-	-	2,900	12,800	-	9,300	3,700
Aeronautics	1965	35,240	-	-	-	-	-	-	6,167	-	3,022	9,052	13,859	-	3,140	-
	1966	41,496	-	-	-	-	-	-	4,197	190	11,681	11,935	12,377	-	1,116	-
	1967	33,000	-	-	-	-	-	-	5,400	150	4,975	8,625	12,625	-	1,225	-
OFFICE OF TRACKING AND DATA ACQUISITION	1965	253,236	-	-	2,000	179,252	-	5,100	-	-	1,900	2,200	-	-	7,015	55,769
	1966	231,065	-	-	1,500	155,950	-	5,835	-	-	1,880	2,000	-	-	10,400	53,500
	1967	279,300	-	-	1,500	199,600	-	6,400	-	-	2,100	2,100	-	-	12,000	55,600
Tracking and data acquisition	1965	253,236	-	-	2,000	179,252	-	5,100	-	-	1,900	2,200	-	-	7,015	55,769
	1966	231,065	-	-	1,500	155,950	-	5,835	-	-	1,880	2,000	-	-	10,400	53,500
	1967	279,300	-	-	1,500	199,600	-	6,400	-	-	2,100	2,100	-	-	12,000	55,600
OFFICE OF TECHNOLOGY UTILIZATION AND POLICY PLANNING	1965	4,750	-	-	-	-	-	-	-		-	-	-	-	4,750	-
	1966	4,750	-	-	-	-	-	-	-	-	-	-	-	-	4,750	-
	1967	4,800	-	-	-	-	-	-	-	-	-	-	-	-	4,800	-
Technology utilization	1965	4,750	-	-	-	-	-	-	-	-	-	-	-	-	4,750	-
	1966	4,750	-	-	-	-	-	-	-	-	-	-	-	-	4,750	-
	1967	4,800	-	-	-	-	-	-	-	-	-	-	-	-	4,800	-
TOTAL BUDGET PLAN	1965	4,270,695	58,784	1,422,768	1,468,362	375,026	99	6,250	54,113	2,608	9,548	106,941	322,327	45,760	184,010	214,099
	1966	4,511,644	124,686	1,495,937	1,604,006	361,457	-	8,665	56,953	7,204	16,804	111,666	249,274	50,218	184,727	240,047
	1967	4,246,600	168,774	1,381,970	1,485,786	398,994	-	10,040	53,168	13,150	10,040	79,187	208,974	48,500	167,129	220,888

1/Amount for Western Operations Office includes funds for the Jet Propulsion Laboratory as shown in the Research and Development program justification (Vol. II)

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

SUMMARY OF CONSTRUCTION OF FACILITIES BUDGET PLAN AS RECONCILED TO FINANCING SCHEDULE

Budget Activity	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
1. Manned Space Flight.....	$199,770,096	$21,401,350	$54,378,000
2. Scientific Investigations in Space.....	8,342,600	7,084,000	6,322,000
3. Space Applications.....	---	---	---
4. Space Technology.....	21,291,000	13,435,000	11,089,000
5. Aircraft Technology.....	3,729,000	682,000	21,011,000
6. Supporting Activities.....	27,974,000	16,984,650	8,700,000
Total Budget Plan.....	$261,106,696	$59,587,000	$101,500,000
Financing:			
Appropriation.....	$262,880,500	$60,000,000	$101,500,000
Transferred from (78 Stat. 658) - "Research and development".....	3,545,193	---	---
Appropriation (adjusted).....	266,425,693	60,000,000	101,500,000
Transferred from (78 Stat. 658) - "Research and Development".....	353,800	---	---
Reprogramming to or from (-) prior year budget plans.....	-5,672,797	-413,000	---
Total financing of budget plan.....	$261,106,696	$59,587,000	$101,500,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

SUMMARY OF CONSTRUCTION OF FACILITIES BUDGET PLAN
BY BUDGET ACTIVITY SHOWING LOCATION TOTALS INCLUDED IN EACH ACTIVITY

	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
1. MANNED SPACE FLIGHT.....	$199,770,096	$21,401,350	$54,378,000
John F. Kennedy Space Center, NASA.....	85,044,000	6,895,000	36,497,000
Manned Spacecraft Center	23,907,500	4,180,000	13,800,000
Marshall Space Flight Center.....	12,454,096	2,309,450	581,000
Michoud Assembly Facility	6,449,500	284,750	700,000
Mississippi Test Facility.....	58,891,000	1,910,450	1,700,000
Various Locations.....	13,024,000	5,821,700	1,100,000
2. SCIENTIFIC INVESTIGATIONS IN SPACE.....	$8,342,600	$7,084,000	$6,322,000
Ames Research Center....	---	2,749,000	---
Goddard Space Flight Center.....	605,000	2,400,000	---
Jet Propulsion Laboratory	3,582,000	---	350,000
John F. Kennedy Space Center, NASA.....	2,180,800	887,000	1,379,000
Various Locations.....	275,800	---	4,388,000
Wallops Station.....	1,699,000	1,048,000	205,000
3. SPACE APPLICATIONS.....	$ ---	$ ---	$ ---
4. SPACE TECHNOLOGY.....	$21,291,000	$13,435,000	$11,089,000
Ames Research Center....	3,038,000	---	---
Electronics Research Center.....	10,000,000	5,000,000	10,000,000
Langley Research Center..	2,540,500	7,568,000	1,089,000
Lewis Research Center...	770,000	867,000	---
Various Locations.....	4,942,500	---	---

	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
5. AIRCRAFT TECHNOLOGY.....	$3,729,000	$682,000	$21,011,000
Ames Research Center.....	2,630,000	---	---
Langley Research Center....	1,099,000	682,000	5,011,000
Lewis Research Center.....	---	---	16,000,000
6. SUPPORTING ACTIVITIES.....	$27,974,000	$16,984,650	$8,700,000
Goddard Space Flight Center	1,709,000	---	710,000
John F. Kennedy Space Center, NASA.....	1,393,000	---	---
Various Locations.....	14,872,000	14,361,000	990,000
Facility Planning and Design.....	10,000,000	2,623,650	7,000,000
TOTAL PLAN.....	$261,106,696	$59,587,000	$101,500,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

SUMMARY OF CONSTRUCTION OF FACILITIES BUDGET PLAN BY LOCATION

Location	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
Ames Research Center.....	$5,668,000	$2,749,000	$ ---
Electronics Research Center.....	10,000,000	5,000,000	10,000,000
Goddard Space Flight Center.....	2,314,000	2,400,000	710,000
Jet Propulsion Laboratory.....	3,582,000	---	350,000
John F. Kennedy Space Center, NASA.....	88,617,800	7,782,000	37,876,000
Langley Research Center.....	3,639,500	8,250,000	6,100,000
Lewis Research Center.....	770,000	867,000	16,000,000
Manned Spacecraft Center.....	23,907,500	4,180,000	13,800,000
Marshall Space Flight Center....	12,454,096	2,309,450	581,000
Michoud Assembly Facility.....	6,449,500	284,750	700,000
Mississippi Test Facility.....	58,891,000	1,910,450	1,700,000
Various Locations.....	33,114,300	20,182,700	6,478,000
Wallops Station.....	1,699,000	1,048,000	205,000
Facility Planning and Design....	10,000,000	2,623,650	7,000,000
Total Plan.....	$261,106,696	$59,587,000	$101,500,000

The geographic location of NASA installations is shown on the following page. Installations for which construction projects are requested in the fiscal year 1967 budget are identified.

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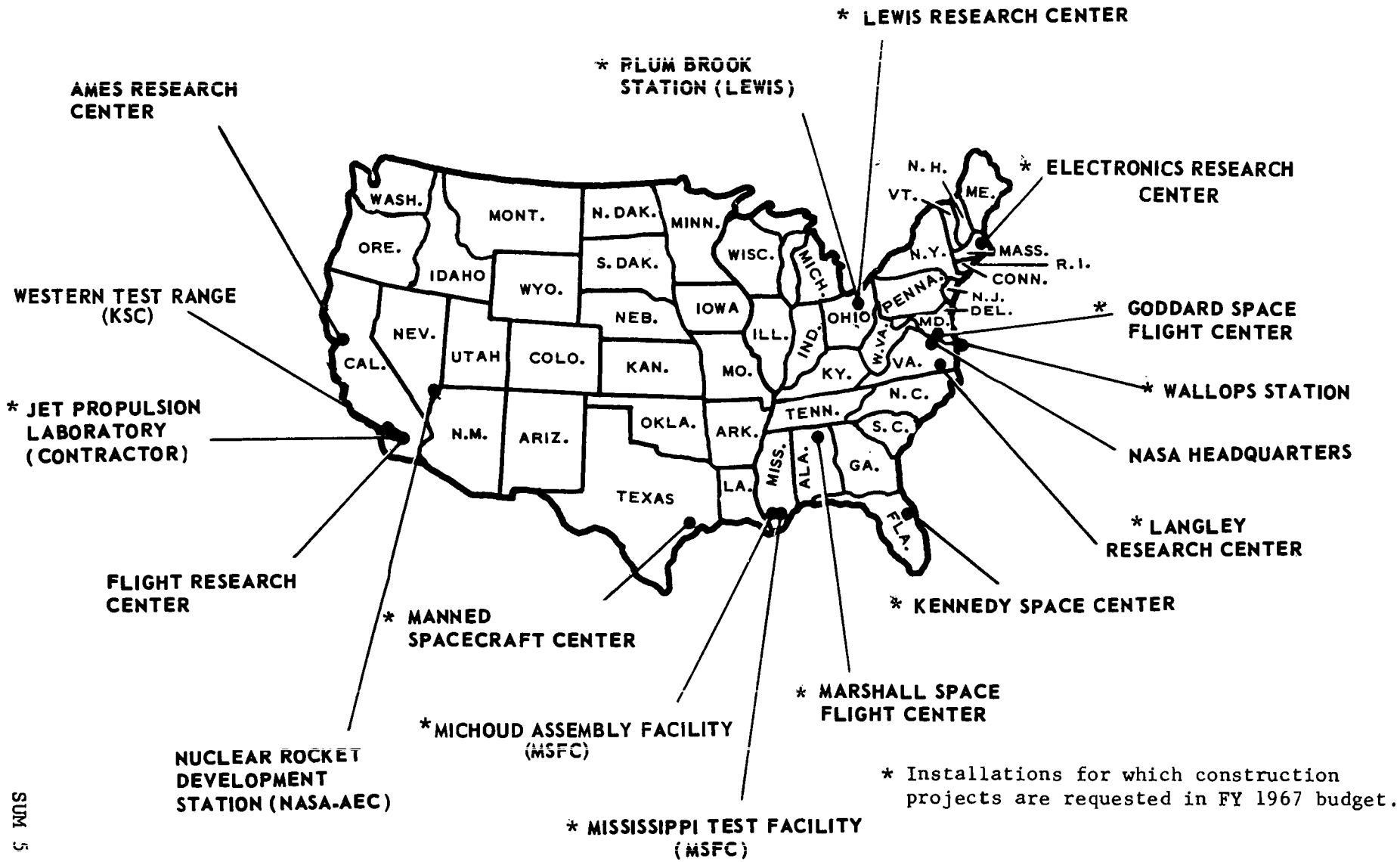
NASA INSTALLATIONS



* Installations for which construction projects are requested in FY 1967 budget.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

ADMINISTRATIVE OPERATIONS

SUMMARY OF OBLIGATIONS BY INSTALLATION

	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
MANNED SPACE FLIGHT			
John F. Kennedy Space Center, NASA	$52,416,000	$79,723,000	$98,108,000
Manned Spacecraft Center	91,036,000	87,550,000	98,212,000
Marshall Space Flight Center	137,787,000	128,260,000	131,934,000
SPACE SCIENCE AND APPLICATIONS			
Goddard Space Flight Center	92,570,000	64,040,000	71,687,000
Pacific Launch Operations Office	844,000	---	---
Wallops Station	10,931,000	9,446,000	10,166,000
ADVANCED RESEARCH AND TECHNOLOGY			
Ames Research Center	31,807,000	32,923,000	33,475,000
Electronics Research Center	3,201,000	6,233,000	15,143,000
Flight Research Center	10,523,000	9,335,000	9,641,000
Langley Research Center	58,998,000	63,006,000	62,587,000
Lewis Research Center	68,546,000	67,207,000	66,284,000
Space Nuclear Propulsion Office	1,669,000	1,824,000	1,847,000
SUPPORTING ACTIVITIES			
NASA Headquarters	51,516,000	56,286,000	58,667,000
Western Operations Office	22,693,000	5,987,000	6,149,000
TOTAL	$634,537,000	$611,820,000	$663,900,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

ADMINISTRATIVE OPERATIONS

NUMBER OF POSITIONS BY INSTALLATION

	Fiscal Year 1965	Fiscal Year 1966	Fiscal Year 1967
MANNED SPACE FLIGHT			
John F. Kennedy Space Center, NASA.....	2,491	2,666	2,796
Manned Spacecraft Center.....	4,431	4,928	4,866
Marshall Space Flight Center..	7,754	7,486	7,390
SPACE SCIENCE AND APPLICATIONS			
Goddard Space Flight Center...	3,782	3,625	3,807
Pacific Launch Operations Office.....	22	-0-	-0-
Wallops Station.....	555	530	530
ADVANCED RESEARCH AND TECHNOLOGY			
Ames Research Center.....	2,270	2,240	2,211
Electronics Research Center...	250	550	1,000
Flight Research Center.....	669	618	610
Langley Research Center.....	4,374	4,304	4,249
Lewis Research Center.....	4,917	4,842	4,779
Space Nuclear Propulsion Office.....	117	117	115
SUPPORTING OPERATIONS			
NASA Headquarters.....	2,263	2,227	2,200
Western Operations Office.....	405	391	386
TOTAL.....	34,300	34,524	34,939

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

ADMINISTRATIVE OPERATIONS

DISTRIBUTION OF BUDGET PLAN BY OBJECT CLASSIFICATION BY INSTALLATION

(In dollars)

Object Classification	Total	J.F. Kennedy Space Center, NASA	Manned Spacecraft Center	Marshall Space Flight Center	Goddard Space Flight Center	Pacific Launch Operations Office	Wallops Station	Ames Research Center	Electronics Research Center	Flight Research Center	Langley Research Center	Lewis Research Center	Space Nuclear Propulsion Office	Western Operations Office	Headquarters
FISCAL YEAR 1965															
Personnel compensation	332,722,000	20,107,000	46,076,000	79,345,000	37,512,000	213,000	4,437,000	21,027,000	1,362,000	6,105,000	39,355,000	46,439,000	1,318,000	4,115,000	25,311,000
Personnel benefits	23,713,000	1,355,000	3,154,000	5,528,000	2,671,000	15,000	305,000	1,549,000	100,000	441,000	2,880,000	3,373,000	94,000	289,000	1,959,000
Travel & transp of pers	20,427,000	2,441,000	4,830,000	3,722,000	2,553,000	36,000	166,000	643,000	110,000	221,000	1,430,000	1,469,000	199,000	947,000	2,550,000
Transportation of things	4,543,000	919,000	864,000	379,000	1,162,000	6,000	113,000	23,000	28,000	20,000	373,000	303,000	4,000	8,000	341,000
Rents, communications, and utilities	46,424,000	3,964,000	7,316,000	10,854,000	7,245,000	41,000	625,000	4,575,000	340,000	393,000	4,984,000	3,839,000	---	349,000	1,899,000
Printing and reproduction	4,174,000	216,000	614,000	1,025,000	398,000	6,000	32,000	27,000	13,000	23,000	175,000	50,000	---	15,000	1,580,000
Other services	74,310,000	14,970,000	11,427,000	18,610,000	5,092,000	42,000	1,001,000	1,611,000	316,000	1,467,000	2,699,000	3,862,000	37,000	522,000	12,654,000
Services of other agencies	10,735,000	3,163,000	743,000	2,542,000	399,000	164,000	77,000	137,000	464,000	37,000	63,000	139,000	17,000	12,000	2,778,000
Supplies and materials	24,553,000	3,534,000	4,282,000	5,820,000	1,927,000	91,000	1,450,000	1,296,000	64,000	422,000	2,681,000	2,435,000	---	51,000	500,000
Equipment	86,370,000	799,000	10,694,000	8,744,000	32,840,000	44,000	2,207,000	608,000	396,000	1,293,000	3,401,000	6,323,000	---	17,085,000	1,936,000
Lands and structures	6,539,000	938,000	1,235,000	1,212,000	771,000	184,000	518,000	311,000	---	101,000	957,000	312,000	---	---	---
Insurance claims and indemnities	27,000	10,000	1,000	6,000	---	---	---	---	---	---	---	2,000	---	---	8,000
Totals	634,537,000	52,416,000	91,036,000	137,787,000	92,570,000	844,000	10,931,000	31,807,000	3,201,000	10,523,000	58,998,000	68,546,000	1,669,000	22,693,000	51,516,000
FISCAL YEAR 1966															
Personnel compensation	355,511,000	28,546,000	49,917,000	80,206,000	38,455,000	---	4,692,000	21,935,000	3,389,000	6,312,000	41,036,000	47,993,000	1,460,000	4,289,000	27,281,000
Personnel benefits	25,299,000	1,930,000	3,368,000	5,558,000	2,737,000	---	333,000	1,584,000	262,000	453,000	2,993,000	3,499,000	106,000	309,000	2,167,000
Travel & transp of pers	20,841,000	2,080,000	4,874,000	3,769,000	2,636,000	---	185,000	676,000	302,000	222,000	1,503,000	1,470,000	200,000	282,000	2,642,000
Transportation of things	4,689,000	862,000	893,000	366,000	1,264,000	---	153,000	25,000	70,000	40,000	370,000	303,000	3,000	45,000	295,000
Rents, communications, and utilities	49,795,000	5,565,000	9,068,000	9,255,000	8,000,000	---	430,000	4,733,000	688,000	317,000	5,607,000	3,389,000	---	402,000	2,341,000
Printing and reproduction	4,615,000	339,000	700,000	1,038,000	240,000	---	35,000	27,000	25,000	20,000	201,000	50,000	---	15,000	1,925,000
Other services	94,231,000	28,315,000	13,199,000	19,106,000	7,102,000	---	1,390,000	1,537,000	610,000	911,000	2,807,000	3,654,000	38,000	514,000	15,048,000
Services of other agencies	13,353,000	6,761,000	612,000	2,632,000	188,000	---	53,000	140,000	258,000	4,000	63,000	139,000	17,000	14,000	2,472,000
Supplies and materials	21,156,000	3,550,000	2,918,000	4,322,000	1,928,000	---	1,250,000	1,148,000	229,000	475,000	2,700,000	2,028,000	---	53,000	555,000
Equipment	16,998,000	818,000	800,000	1,000,000	1,040,000	---	480,000	730,000	400,000	480,000	5,256,000	4,380,000	---	64,000	1,550,000
Lands and structures	5,300,000	947,000	1,200,000	1,000,000	450,000	---	445,000	388,000	---	100,000	470,000	300,000	---	----	---
Insurance claims and indemnities	32,000	10,000	1,000	8,000	---	---	---	---	---	1,000	---	2,000	---	---	10,000
Totals	611,820,000	79,723,000	87,550,000	128,260,000	64,040,000	---	9,446,000	32,923,000	6,233,000	9,335,000	63,006,000	67,207,000	1,824,000	5,987,000	56,286,000
FISCAL YEAR 1967															
Personnel compensation	375,354,000	30,777,000	54,866,000	80,271,000	41,563,000	---	4,865,000	22,572,000	9,012,000	6,510,000	41,999,000	49,064,000	1,483,000	4,426,000	27,946,000
Personnel benefits	27,090,000	2,068,000	3,824,000	5,660,000	2,974,000	---	345,000	1,629,000	687,000	481,000	3,043,000	3,581,000	108,000	317,000	2,373,000
Travel & transp of pers	21,279,000	2,173,000	5,261,000	3,724,000	2,633,000	---	185,000	670,000	347,000	220,000	1,489,000	1,455,000	198,000	282,000	2,642,000
Transportation of things	5,048,000	1,127,000	884,000	366,000	1,329,000	---	124,000	25,000	136,000	40,000	370,000	303,000	3,000	50,000	295,000
Rents, communications, and utilities	56,417,000	7,066,000	9,460,000	10,213,000	9,721,000	---	442,000	5,133,000	1,836,000	270,000	6,035,000	3,449,000	---	402,000	2,390,000
Printing and reproduction	4,916,000	461,000	700,000	1,038,000	250,000	---	35,000	27,000	44,000	20,000	201,000	50,000	---	15,000	2,075,000
Other services	112,317,000	36,756,000	16,804,000	20,429,000	8,360,000	---	1,729,000	1,706,000	1,990,000	989,000	3,319,000	3,656,000	38,000	517,000	16,024,000
Services of other agencies	15,221,000	8,146,000	615,000	2,628,000	170,000	---	65,000	150,000	359,000	4,000	63,000	139,000	17,000	58,000	2,807,000
Supplies and materials	26,122,000	6,594,000	3,350,000	5,397,000	1,929,000	---	1,451,000	1,100,000	412,000	506,000	2,720,000	2,055,000	---	53,000	555,000
Equipment	14,696,000	1,970,000	1,147,000	1,000,000	2,312,000	---	480,000	280,000	320,000	500,000	2,878,000	2,230,000	---	29,000	1,550,000
Land and structures	5,408,000	960,000	1,300,000	1,200,000	450,000	---	445,000	183,000	---	100,000	470,000	300,000	---	---	---
Insurance claims and indemnities	32,000	10,000	1,000	8,000	---	---	---	---	---	1,000	---	2,000	---	---	10,000
Totals	663,900,000	98,108,000	98,212,000	131,934,000	71,687,000	---	10,166,000	33,475,000	15,143,000	9,641,000	62,587,000	66,284,000	1,847,000	6,149,000	58,667,000

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

COMPUTATION OF PERSONNEL COSTS BY INSTALLATION AND FISCAL YEAR

(In thousands of dollars)

FISCAL YEAR 1965 ACTUAL	Total	J. F. Kennedy Space Center, NASA	Manned Spacecraft Center	Marshall Space Flight Center	Goddard Space Flight Center	Pacific Launch Operations Office	Wallops Station	Ames Research Center	Electronics Research Center	Flight Research Center	Langley Research Center	Lewis Research Center	Space Nuclear Propulsion Office	Headquarters	Western Operations Office
Personnel Compensation:															
Permanent positions	$325,818	$24,069	$41,391	$73,635	$37,965	$204	$3,862	$21,093	$2,593	$5,689	$38,587	$45,017	$1,419	$26,308	$3,985
Pay above the stated annual rate	1,271	92	159	280	146	1	38	80	10	22	148	173	5	101	15
Lapses (deduct)	-16,039	-5,849	-187	-1,283	-2,100	-14	-112	-638	-1,301	-71	-876	-859	-115	-2,464	-170
Net cost of permanent positions	311,050	18,312	41,363	72,632	36,011	191	3,788	20,535	1,302	5,640	37,859	44,331	1,309	23,945	3,830
Other personnel compensation	22,218	1,795	4,713	6,714	2,046	22	649	492	60	465	1,496	2,108	9	1,366	285
Total personnel compensation	$333,268	$20,107	$46,076	$79,346	$38,057	$213	$4,437	$21,027	$1,362	$6,105	$39,355	$46,439	$1,318	$25,311	$4,115
Reimbursable	546	---	---	1	545	---	---	---	---	---	---	---	---	---	---
NASA funded	332,722	20,107	46,076	79,345	37,512	213	4,437	21,027	1,362	6,105	39,355	46,439	1,318	25,311	4,115
Total personnel benefits	$23,758	$1,355	$3,154	$5,528	$2,716	$15	$305	$1,549	$100	$441	$2,880	$3,373	$94	$1,959	$289
Reimbursable	45	---	---	---	45	---	---	---	---	---	---	---	---	---	---
NASA funded	23,713	1,355	3,154	5,528	2,671	15	305	1,549	100	441	2,880	3,373	94	1,959	289
Total personnel costs	$357,026	$21,462	$49,230	$84,874	$40,773	$228	$4,742	$22,576	$1,462	$6,546	$42,235	$49,812	$1,412	$27,270	$4,404
Reimbursable	591	---	---	1	590	---	---	---	---	---	---	---	---	---	---
NASA funded	356,435	21,462	49,230	84,873	40,183	228	4,742	22,576	1,462	6,546	42,235	49,812	1,412	27,270	4,404
FISCAL YEAR 1966 ESTIMATED															
Personnel Compensation:															
Permanent positions	$353,072	$27,808	$50,226	$76,173	$38,559	---	$4,211	$22,299	$5,919	$5,979	$40,491	$47,854	$1,510	$27,849	$4,193
Pay above the stated annual rate	1,355	107	193	293	148	---	16	84	23	23	156	184	5	107	16
Lapses (deduct)	-20,755	-1,909	-5,793	-2,129	-1,408	---	-106	-997	-2,678	-229	-1,148	-1,900	-64	-2,165	-228
Net cost of permanent positions	333,672	26,006	44,626	74,337	37,299	---	4,121	21,386	3,264	5,773	39,499	46,138	1,451	25,791	3,981
Other personnel compensation	22,471	2,540	5,291	5,869	1,788	---	571	549	125	539	1,537	1,855	9	1,490	308
Total personnel compensation	$356,143	$28,546	$49,917	$80,206	$39,087	---	$4,692	$21,935	$3,389	$6,312	$41,036	$47,993	$1,460	$27,281	$4,289
Reimbursable	632	---	---	---	632	---	---	---	---	---	---	---	---	---	---
NASA funded	355,511	28,546	49,917	80,206	38,455	---	4,692	21,935	3,389	6,312	41,036	47,993	1,460	27,281	4,289
Total personnel benefits	$25,346	$1,930	$3,368	$5,558	$2,784	---	$333	$1,584	$262	$453	$2,993	$3,499	$106	$2,167	$309
Reimbursable	47	---	---	---	47	---	---	---	---	---	---	---	---	---	---
NASA funded	25,299	1,930	3,368	5,558	2,737	---	333	1,584	262	453	2,993	3,499	106	2,167	309
Total personnel costs	$381,489	$30,476	$53,285	$85,764	$41,871	---	$5,025	$23,519	$3,651	$6,765	$44,029	$51,492	$1,566	$29,448	$4,598
Reimbursable	679	---	---	---	679	---	---	---	---	---	---	---	---	---	---
NASA funded	380,810	30,476	53,285	85,764	41,192	---	5,025	23,519	3,651	6,765	44,029	51,492	1,566	29,448	4,598
FISCAL YEAR 1967 ESTIMATED															
Personnel Compensation:															
Permanent positions	$364,599	$29,897	$50,790	$76,720	$41,163	---	$4,315	$22,435	$10,604	$6,009	$40,627	$48,371	$1,501	$27,945	$4,221
Pay above the stated annual rate	1,396	108	196	296	158	---	17	86	40	23	156	186	5	107	16
Lapses (deduct)	-10,644	-1,703	-453	-1,747	-1,100	---	-47	-519	-1,835	-24	-133	-1,399	-32	-1,538	-111
Net cost of permanent positions	355,351	28,302	50,533	75,269	40,221	---	4,285	22,002	8,809	6,008	40,650	47,158	1,474	26,514	4,126
Other personnel compensation	20,568	2,475	4,333	5,002	1,907	---	580	570	203	502	1,349	1,906	9	1,432	300
Total personnel compensation	$375,919	$30,777	$54,866	$80,271	$42,128	---	$4,865	$22,572	$9,012	$6,510	$41,999	$49,064	$1,483	$27,946	$4,426
Reimbursable	565	---	---	---	565	---	---	---	---	---	---	---	---	---	---
NASA funded	375,354	30,777	54,866	80,271	41,563	---	4,865	22,572	9,012	6,510	41,999	49,064	1,483	27,946	4,426
Total personnel benefits	$27,132	$2,068	$3,824	$5,660	$3,016	---	$345	$1,629	$687	$481	$3,043	$3,581	$108	$2,373	$317
Reimbursable	42	---	---	---	42	---	---	---	---	---	---	---	---	---	---
NASA funded	27,090	2,068	3,824	5,660	2,974	---	345	1,629	687	481	3,043	3,581	108	2,373	317
Total personnel costs	$403,051	$32,845	$58,690	$85,931	$45,144	---	$5,210	$24,201	$9,699	$6,991	$45,042	$52,645	$1,591	$30,319	$4,743
Reimbursable	607	---	---	---	607	---	---	---	---	---	---	---	---	---	---
NASA funded	402,444	32,845	58,690	85,931	44,537	---	5,210	24,201	9,699	6,991	45,042	52,645	1,591	30,319	4,743

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

DISTRIBUTION OF PERSONNEL POSITIONS BY INSTALLATION AND FISCAL YEAR

FISCAL YEAR 1965 ACTUAL	Total NASA	J. F. Kennedy Space Center, NASA	Manned Spacecraft Center	Marshall Space Flight Center	Goddard Space Flight Center	Pacific Launch Operations Office	Wallops Station	Ames Research Center	Electronics Research Center	Flight Research Center	Langley Research Center	Lewis Research Center	Space Nuclear Propulsion Office	Headquarters	Western Operations Office
TOTAL EXCEPTED POSITIONS[a]	439	16	36	49	36	-	2	26	10	6	31	30	2	191	4
General Schedule Positions:															
GS-16	259	14	20	57	29	-	1	20	-	4	25	23	5	60	1
GS-15	1,756	87	211	409	209	1	4	105	27	15	135	146	18	376	13
GS-14	2,824	204	385	692	389	4	10	154	43	27	236	310	24	300	46
GS-13	4,020	340	639	990	566	1	23	205	34	51	327	582	26	178	58
GS-12	4,080	534	635	1,069	512	5	32	169	21	56	363	504	3	91	86
GS-11	3,653	324	600	861	501	3	40	165	10	70	486	461	3	86	45
GS-10	58	1	-	2	-	-	24	6	-	-	-	16	-	8	1
GS-9	2,449	206	381	359	391		49	165	14	41	445	308	-	81	9
GS-8	96	3	2	4	11	-	12	-	-	-	2	21	-	40	1
GS-7	1,552	135	304	300	165	-	36	94	13	21	181	138	1	160	4
GS-6	693	56	57	70	80	1	7	35	2	13	73	57	7	221	14
GS-5	1,776	160	263	361	219	1	41	124	14	19	178	139	13	183	61
GS-4	1,677	136	240	458	182	3	30	115	45	19	145	179	7	80	38
GS-3	1,141	95	166	316	124	-	22	55	11	9	112	143	6	75	7
GS-2	195	5	32	83	22	-	9	4	-	2	6	20	2	10	-
GS-1	28	-	25	1	-	-	-	-	-	-	-	-	-	2	-
TOTAL GENERAL SCHEDULE POSITIONS	26,257	2,300	3,960	6,032	3,400	19	340	1,416	234	347	2,714	3,047	115	1,951	382
TOTAL WAGE BOARD POSITIONS	6,504	112	241	1,429	268	-	176	768	-	252	1,499	1,738	-	21	-
TOTAL PERMANENT POSITIONS	33,200	2,428	4,237	7,510	3,704	19	518	2,210	244	605	4,244	4,815	117	2,163	386
OTHER TEMPORARY POSITIONS	1,100	63	194	244	103	3	12	60	6	64	130	102	-	100	19
GRAND TOTAL POSITIONS - FY 1965	34,300	2,491	4,431	7,754	3,807	22	530	2,270	250	669	4,374	4,917	117	2,263	405
FISCAL YEAR 1966 ESTIMATED															
TOTAL EXCEPTED POSITIONS[a]	439	17	36	49	35	-	2	26	10	6	31	30	2	191	4
General Schedule Positions:															
GS-16	293	16	29	61	30	-	1	20	10	3	25	26	6	65	1
GS-15	1,776	85	211	360	205	-	4	120	46	20	156	155	25	377	12
GS-14	2,879	213	404	761	376	-	10	139	73	23	215	301	17	300	47
GS-13	4,567	447	785	1,012	553	-	38	235	79	64	397	672	27	202	56
GS-12	4,370	602	788	1,020	507	-	36	212	44	58	379	513	3	114	94
GS-11	3,925	350	759	806	491	-	44	186	70	65	508	508	1	95	42
GS-10	51	1	-	2	-	-	13	6	-	-	-	21	-	8	-
GS-9	2,391	200	514	340	384	-	51	110	64	39	400	203	-	81	5
GS-8	92	3	2	3	11	-	5	-	-	-	2	23	-	42	1
GS-7	1,382	102	233	275	145	-	36	90	34	25	151	125	2	159	5
GS-6	707	61	60	59	74	-	17	35	4	14	73	64	6	224	16
GS-5	1,824	170	305	355	184	-	55	125	34	16	179	142	13	185	61
GS-4	1,569	132	248	393	169	-	47	108	59	20	139	149	7	59	39
GS-3	1,039	101	168	313	106	-	15	54	23	2	80	133	6	35	3
GS-2	237	15	49	107	39	-	-	1	-	4	-	15	2	5	-
GS-1	44	-	-	42	-	-	-	-	-	-	-	-	-	2	-
TOTAL GENERAL SCHEDULE POSITIONS	27,146	2,498	4,555	5,909	3,274	-	372	1,441	540	353	2,704	3,050	115	1,953	382
TOTAL WAGE BOARD POSITIONS	6,339	105	218	1,359	268	-	144	753	-	245	1,499	1,730	-	18	-
TOTAL PERMANENT POSITIONS	33,924	2,620	4,809	7,317	3,577	-	518	2,220	550	604	4,234	4,810	117	2,162	386
OTHER TEMPORARY POSITIONS	600	46	119	169	48	-	12	20	-	14	70	32	-	65	5
GRAND TOTAL POSITIONS - FY 1966	34,524	2,666	4,928	7,486	3,625	-	530	2,240	550	618	4,304	4,842	117	2,227	391
FISCAL YEAR 1967 ESTIMATED															
TOTAL EXCEPTED POSITIONS[a]	439	17	36	49	35	-	2	26	10	6	31	30	2	191	4
General Schedule Positions:															
GS-16	293	16	29	61	30	-	1	20	10	3	25	26	6	65	1
GS-15	1,932	88	219	373	227	-	6	130	77	21	180	175	25	399	12
GS-14	3,158	225	425	801	417	-	13	190	126	22	234	320	17	321	47
GS-13	4,607	472	785	1,000	577	-	38	230	137	63	397	646	26	182	54
GS-12	4,501	662	800	1,012	543	-	37	183	116	58	381	528	3	84	94
GS-11	3,939	367	754	771	537	-	44	180	97	71	506	497	-	75	40
GS-10	50	1	-	2	-	-	13	5	-	-	-	21	-	8	-
GS-9	2,300	226	474	315	389	-	45	95	88	36	393	153	-	81	5
GS-8	92	3	2	3	11	-	5	-	-	-	2	23	-	42	1
GS-7	1,378	109	179	265	154	-	36	90	97	16	144	122	2	159	5
GS-6	722	67	62	54	70	-	17	33	22	14	73	64	6	224	16
GS-5	1,780	123	310	365	191	-	55	118	61	16	139	144	13	185	60
GS-4	1,548	139	257	328	174	-	47	116	123	20	109	130	7	59	39
GS-3	1,087	105	159	351	108	-	15	53	36	2	77	135	8	35	3
GS-2	233	26	40	99	39	-	-	5	-	4	-	15	-	5	-
GS-1	28	-	-	26	-	-	-	-	-	-	-	-	-	2	-
TOTAL GENERAL SCHEDULE POSITIONS	27,648	2,629	4,495	5,826	3,467	-	372	1,448	990	346	2,660	2,999	113	1,926	377
TOTAL WAGE BOARD POSITIONS	6,252	104	216	1,346	257	-	144	717	-	244	1,488	1,718	-	18	-
TOTAL PERMANENT POSITIONS	34,339	2,750	4,747	7,221	3,759	-	518	2,191	1,000	596	4,179	4,747	115	2,135	381
OTHER TEMPORARY POSITIONS	600	46	119	169	48	-	12	20	-	14	70	32	-	65	5
GRAND TOTAL POSITIONS - FY 1967	34,939	2,796	4,866	7,390	3,807	-	530	2,211	1,000	610	4,249	4,779	115	2,200	386

a/Total Excepted Positions include two (2) Special Ungraded and twelve (12) P. L. 313 positions.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FISCAL YEAR 1967 ESTIMATES

ADMINISTRATIVE OPERATIONS

ANALYSIS OF REQUIREMENTS FOR PASSENGER-CARRYING MOTOR VEHICLES

The appropriation language provides for the acquisition of 31 passenger motor vehicles, of which 15 are for augmentation to the fiscal year 1966 ending inventory and 16 are for replacement. All vehicles scheduled for replacement meet, or will meet, the criteria established by the General Services Administration for replacement of vehicles due either to age, mileage, annual maintenance costs, or a combination of these factors.

A summary analysis of the planned acquisitions by class of vehicle in fiscal year 1967 is as follows:

	Total	Medium Sedans	Other Sedans	Station Wagons	Ambulances	Buses
On hand July 1, 1966..	179	1	42	114	11	11
Acquisitions:						
a. By purchase.....	20	-	3	17	-	-
b. By transfer 1/....	11	-	2	4	2	3
Subtotal.....	31	-	5	21	2	3
(For replacement)...	(16)	(-)	(2)	(14)	(-)	(-)
(Disposed - not replaced).....	(-)	(-)	(-)	(-)	(-)	(-)
On hand June 30, 1967.	194	1	45	121	13	14

1/ During fiscal year 1966 the Research Range at Fort Churchill, Canada, was transferred from the Department of Defense to the National Aeronautics and Space Administration because NASA was the principle user of the facility. Involved in this transfer are 11 vehicles which will augment the NASA passenger-carrying motor vehicle fleet.

RESEARCH AND DEVELOPMENT

FISCAL YEAR 1967 ESTIMATES

OFFICE OF MANNED SPACE FLIGHT GEMINI PROGRAM

PROGRAM OBJECTIVES AND JUSTIFICATION:

The Gemini program objectives are to develop an operational capability in manned space flight and through this capability to conduct specific experiments and tests which support Apollo, Department of Defense programs, and scientific investigations. In the Gemini program, the U.S. is developing and demonstrating the capability for long-duration flights of at least 14 days, rendezvous and docking, post-docking maneuvers, extravehicular activity, and controlled reentry.

The Gemini spacecraft systems are substantially more sophisticated and versatile than those used in Mercury. The spacecraft includes a number of subsystems used for the first time in manned space flight: ejection seats; fuel cells; on-board propulsion; rendezvous radar; inertial guidance; and controlled reentry. The inertial guidance system used for rendezvous also provides an alternate capability in the event of failure in the launch vehicle primary guidance system. In-flight experiments are conducted as part of a planned program to utilize the full payload and operational capabilities of Gemini.

By the end of calendar year 1965, 7 of the 12 planned flights had been successfully conducted. Gemini I, II, and III were flight qualification missions; Gemini IV, V, and VII were long-duration flights that proved man's ability to perform useful tasks in space for extended periods of time. Man's operational capability outside the confines of a spacecraft was demonstrated by the extravehicular activity conducted during the Gemini IV mission. The rendezvous of spacecraft 6 with spacecraft 7 represented a major step in developing the operational skills and techniques that are vital to the Apollo missions. The experiments program conducted on the 5 manned missions during calendar year 1965 have significantly increased our medical and scientific knowledge of the Earth and near-space environment.

Extensive extravehicular activity is planned for the remaining Gemini flights (VIII through XII) both to evaluate life support systems and maneuvering units for the astronauts, and to demonstrate the ability to perform specific operational tasks in space. The DOD maneuvering unit will also be evaluated as a cooperative NASA/DOD effort.

Delivery of the major flight hardware has continued at a rapid pace in support of the intensive operational activity underway. By the end of calendar year 1965, 7 flight spacecraft, 7 Gemini Launch Vehicles, 2 Gemini Agena Target Vehicles and 3 Atlas SLV-III had been delivered. By mid-calendar year 1966, deliveries will total 10 spacecraft, 10 GLV, 4 Atlas SLV-III, and

5 Gemini Agena Target Vehicles. The remainder of the Gemini hardware, including 2 spacecraft, 2 Gemini Launch Vehicles, 1 Gemini Agena Target Vehicle and 2 Atlas SLV-III will be delivered to the Kennedy Space Center during FY 1967.

Upon completion of the remaining Gemini missions, the United States will have developed a sound operational capability in manned space flight; will have demonstrated a capability for manned flights of at least 14 days' duration; rendezvous; docking and post-docking maneuvers; extravehicular activity; and controlled reentry, all of which are essential to Apollo.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Spacecraft.....	$165,300,000	$107,211,000	$19,100,000
Launch vehicles.....	115,400,000	88,600,000	8,500,000
Support.....	27,700,000	30,800,000	13,000,000
Total.....	$308,400,000	$226,611,000	$40,600,000

Distribution of Program Amount by Installation:

	1965	1966	1967
Manned Spacecraft Center.....	$308,050,000	$226,211,000	$40,300,000
NASA Headquarters.....	350,000	400,000	300,000

BASIS OF FUND REQUIREMENTS:

Spacecraft

	1965	1966	1967
Spacecraft.....	$165,300,000	$107,211,000	$19,100,000

Under the McDonnell contract, major items being provided for the Gemini program include: 12 flight spacecraft; 6 non-flying "boilerplate" spacecraft for use in development and qualification testing of subsystems; 5 static articles, non-flying reentry articles used primarily for various structural, thermal and flotation tests; a complete flight-quality spacecraft for simulated space missions in an environmental chamber (Project Orbit); an electrical systems test unit for integrated testing of engineering models of electrical and electronic equipment; a compatibility test unit (a non-flying spacecraft configured for checking flight-qualified models of all subsystems for operation and compatibility with the ground equipment before the all-systems test flight); 2 mission simulators; 1 translation and docking trainer; systems trainers; target vehicle docking adapters; and specialized ground equipment, test hardware, and spares. With the exception of the flight spacecraft and target docking adapters, delivery of the above items was completed during FY 1965. Seven Gemini spacecraft had completed flight missions by the end

of calendar year 1965. Three spacecraft have been delivered in FY 1966 and two are scheduled for delivery prior to the end of the fiscal year. The last two spacecraft are well into the production phase at the McDonnell plant in St. Louis, Missouri, in preparation for delivery in FY 1967.

Launch Vehicles

	1965	1966	1967
Launch vehicles.....	$115,400,000	$88,600,000	$8,500,000

Three separate vehicles are required for the Gemini program: the Gemini Launch Vehicle (GLV), the Atlas SLV-III, and the Gemini Agena Target Vehicle. The GLV, which places the spacecraft in orbit, is an Air Force Titan II intercontinental ballistic missile which has been modified for manned flight. The modifications include incorporation of redundant electrical power supply and flight control systems, a malfunction detection system to warn the astronauts of a failure requiring abort, and replacement of the Titan II inertial guidance system with the radio guidance system used successfully in Mercury. The Atlas SLV-III which places the Gemini Agena Target Vehicle in orbit, is an Air Force Standard Atlas Launch Vehicle. The Gemini Agena Target Vehicle is an Agena-D modified to provide (1) additional maneuverability in orbit; (2) command communications compatible with the spacecraft and ground station network; and (3) a docking mechanism. The modifications include changes to the electrical power supply, telemetry, spacecraft command subsystems, and the propulsion system. To facilitate rendezvous maneuvers, the main engine was modified to provide a five-time restart capability while in orbit. A secondary propulsion system was added to provide for smaller velocity changes and propellant orientation for main engine start. All three vehicles are procured for the Gemini program under the direction of the Manned Spacecraft Center through the Space Systems Division (SSD) of the Air Force Systems Command. SSD is procuring the GLV under five major contracts; Martin-Marietta is the contractor for the vehicle; Aerojet supplies the engines; General Electric produces the guidance system; Burroughs fabricates the computer; and Aerospace Corporation is responsible for systems engineering. For the Atlas SLV-III and the GATV the Space Systems Division of the Air Force has principle contracts with General Dynamics/Convair Division and Lockheed Missiles and Space Company, respectively.

To support the planned missions of the Gemini program, 12 Gemini Launch Vehicles and 6 Atlas/Agena vehicles are required. FY 1965 and prior year funds provided for the development and qualification tests prescribed for components and subsystems of the GLV peculiar to Gemini, as well as delivery and checkout of 6 flight vehicles. FY 1966 funds provide for delivery of 4 additional GLV while the FY 1967 funding covers delivery of the final 2 GLV.

One Atlas was delivered in December 1964 to validate and check out Launch Complex 14. This vehicle was utilized on the Gemini VI mission. FY 1966 funds provide for delivery and checkout of 3 Atlas vehicles during FY 1966 and delivery and checkout of the last 2 during FY 1967.

One Gemini Agena Target Vehicle was lost in an unsuccessful orbit insertion attempt in October 1965. Four additional GATV will be delivered in FY 1966 and one is scheduled for delivery in FY 1967.

Support

	1965	1966	1967
Support.....	$27,700,000	$30,800,000	$13,000,000

The manned missions planned in FY 1966 and FY 1967 place heavy emphasis on crew operations, flight operations, and spacecraft and launch vehicle support.

Crew operations funds provide for three types of effort: (1) astronaut training, (2) mission simulators, and (3) specialized in-flight devices:

Astronaut Training - Gemini astronaut training includes academic instruction; water, jungle, and desert survival; zero-gravity indoctrination; and flight in high-performance jet aircraft.

Mission Simulators - Each primary and backup flight crew member receives at least 125 hours of simulator training before a mission. The simulators are modified prior to each mission to update the configuration and procedures for that specific mission.

Specialized in-flight devices, such as camera mounts, sextants, timers, tools, and exercising equipment, are also being developed and procured. These items are required for performing experiments and carrying out flight plans.

Spacecraft and Launch Vehicle Support funds provide for procurement and qualification testing of components and subsystems, including life support systems and extravehicular equipment.

In the area of space medicine and life support, development and qualification of the light-weight pressure suit has been completed. This suit was worn by both astronauts during the 14-day Gemini VII mission. Development of the Extravehicular Life Support System chest pack for future mission extravehicular activity was also completed in FY 1966.

Astronauts will perform in-flight experiments during all FY 1966 and FY 1967 Gemini missions. Medical experiments will provide data on psychological and physiological reactions to the space environment and the astronauts' ability to perform operational tasks during space flight. Engineering experiments performed during FY 1966 will measure the space radiation environment just outside the orbiting spacecraft and measure the direction and amplitude of the Earth's magnetic field relative to the spacecraft. Scientific experiments will provide data in a number of fields, including the effects of weightlessness on cell tissue and the nature of interplanetary dust. In addition to these experiments, NASA is conducting for DOD technological experiments which will evaluate the astronauts' ability to observe objects on Earth and in outer space and to navigate their spacecraft during periods in which there is little ground control.

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Flight operations activities cover three main areas: (1) mission planning, (2) flight control, and (3) recovery.

Mission planning entails organizing and coordinating the group activities necessary to conduct manned missions successfully. Included are network tracking and data handling, trajectory design and analysis, and real-time computer program design and implementation.

Flight control to support the FY 1966 and FY 1967 missions is essentially the management of heterogeneous groups responsible for vehicle and life systems, vehicle dynamics, crew safety, network operations required to support manned space flight, and mission control.

Recovery activities for the manned missions are concerned with reentry and recovery of astronauts and spacecraft. Primary and secondary recovery areas are assigned for each mission; however, unforeseen circumstances may require a recovery anywhere along the flight path. Therefore, ships, aircraft, and para-rescue teams are required for contingency recovery areas.

Recovery support is provided most effectively and economically by agencies of the Department of Defense (DOD). To conduct these operations, DOD provides ships, aircraft, and men to support each recovery. Typical support forces are the same for both rendezvous and long-duration flights; however, costs are higher for long-duration flights, since the recovery forces are on station for longer periods.

Requirements for the DOD recovery support, which is the largest element in the flight operations budget, depend directly on the number of flights scheduled for a given year. Ship and aircraft costs are calculated on the average deployment times and other factors associated with each type of mission. The FY 1966 and FY 1967 funding requirements also take into account the effect of minimal delays in launch operations and re-cycle times.

OFFICE OF MANNED SPACE FLIGHT APOLLO PROGRAM

PROGRAM OBJECTIVES AND JUSTIFICATION:

The goal of the manned space flight program is to provide a broad national capability for manned space exploration, which will achieve and maintain a position of leadership for the United States. A specific objective in acquiring this capability is to land men on the moon and return them safely to earth within this decade. The Apollo Program will not only meet the specific objective, but will also create a broad base of operational capability in manned space flight and the associated skills and technology; a valuable complex of development, manufacturing, test, and operational facilities; and an experienced Government and industrial team.

To accomplish the objective, the Apollo Program requires the development of a highly reliable spacecraft, capable of supporting three men in space for periods up to two weeks, docking in space, landing on and returning from the lunar surface, and safely re-entering the earth's atmosphere. The program includes three large launch vehicles - the Saturn I, which completed its flight series in July 1965; the Saturn IB; and the Saturn V. The Saturn IB and V are being developed and qualified for manned space flight.

The Apollo Program is divided into unmanned flights, manned earth orbital flights, and manned lunar flights. Unmanned Apollo Saturn IB flights will verify the structural integrity and compatibility of the spacecraft and adapter in relation to the launch vehicle; the satisfactory firing and restarting of the spacecraft engines and the safe recovery of the spacecraft command module; and the capability of the guidance and navigation system to perform re-entry at earth orbital speeds.

Manned earth orbital flights on the Saturn IB will include operations with the command and service modules and the lunar excursion module. The command module will be manned in the long-duration missions lasting up to 14 days. Both crew and equipment will be exposed to the rigors of the space environment. An unmanned lunar excursion module will be remotely controlled and evaluated for the purpose of checking the reliability of its systems and the performance of the descent and ascent engines in the space environment. Rendezvous and docking of the command and service modules with an unmanned lunar excursion module will also be accomplished. Rendezvous, docking, and post-docking maneuvers will be refined and the navigation and guidance system, rendezvous trajectories and ground support network will be validated in subsequent earth orbital flights.

The Saturn V will be used initially in unmanned earth orbital qualification flights. Unmanned re-entry of the command module at 36,000 feet per second will be demonstrated to qualify the command module heat shield.

Manned earth orbital flights, using the Saturn V launch vehicle, will be conducted with a fully loaded space vehicle to simulate the lunar mission. All phases of crew operations and equipment performance will be validated during these Apollo Saturn V flights. Manned lunar flight is planned before the end of this decade.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Spacecraft.....	$1,009,898,000	$1,170,600,000	$1,200,600,000
Saturn I.....	40,265,000	800,000	---
Saturn IB.....	262,690,000	274,185,000	216,400,000
Saturn V.....	964,924,000	1,177,320,000	1,191,000,000
Engine development.....	166,300,000	134,095,000	111,000,000
Mission support.....	170,542,000	210,385,000	255,200,000
Total.....	$2,614,619,000	$2,967,385,000	$2,974,200,000

Distribution of Program Amount by Installation:

John F. Kennedy Space Center, NASA.....	$55,610,000	$120,509,000	$163,905,000
Manned Spacecraft Center.....	1,100,973,000	1,249,371,000	1,320,500,000
Marshall Space Flight Center.....	1,430,516,000	1,569,135,000	1,461,795,000
Goddard Space Flight Center.....	389,000	425,000	500,000
Ames Research Center..	39,000	230,000	250,000
Langley Research Center.....	1,200,000	700,000	---
Lewis Research Center.	1,160,000	---	---
NASA Headquarters.....	24,087,000	24,515,000	24,750,000
Western Operations Office.....	645,000	2,500,000	2,500,000

BASIS OF FUND REQUIREMENTS:

Spacecraft

	1965	1966	1967
Command and service modules.....	$577,834,000	$615,000,000	$586,900,000
Lunar excursion module....	242,600,000	310,800,000	388,300,000
Guidance and navigation...	81,038,000	115,000,000	90,000,000
Integration, reliability, and checkout.....	24,763,000	34,400,000	38,900,000
Support.....	83,663,000	95,400,000	96,500,000
Total.....	$1,009,898,000	$1,170,600,000	$1,200,600,000

The Apollo spacecraft is composed of three basic units: the command module, which houses the three astronauts and the necessary control systems for in-flight maneuvers, life support, and guidance and navigation; the service module, which contains additional utilities and life support supplies, as well as the primary propulsion system for altering the spacecraft course; and the two-stage lunar excursion module, which is designed to carry two of the three Apollo astronauts down to the moon's surface and back to the command and service modules in lunar orbit.

The spacecraft modules are currently undergoing extensive development and qualification testing on the ground in preparation for Saturn IB and Saturn V flights. Unmanned flights on the Saturn IB will begin in calendar year 1966 and will be followed by manned missions in earth orbit during calendar year 1967. Unmanned flights on the Saturn V launch vehicle will also begin during calendar year 1967 and manned flights are planned for calendar year 1968, leading to a lunar landing mission before the end of the decade.

Command and Service Modules (CSM)

In December 1961, the Space and Information Systems Division of the North American Aviation Corporation was selected as prime contractor to design, develop, and fabricate the command and service modules of the Apollo spacecraft. North American was also assigned responsibility for design and fabrication of the spacecraft launch-vehicle adapter; integration of test, scientific, and other government-furnished equipment into the spacecraft; assembly and test of the spacecraft; and support of spacecraft preparation for flight. In addition to the work of North American as the CSM prime contractor, funding for this activity includes the effort related to the development, procurement, integration and installation of flight experiments and experimental hardware into the CSM.

In FY 1965, definition of the detailed design requirements for the Block I and Block II CSM was completed. The Block I configuration is used in the ground test program and initial unmanned and manned flights in earth orbit. The Block II configuration is similar in most respects, but has upgraded subsystems to provide a capability for lunar missions.

Delivery of ground test boilerplate CSM was completed in FY 1965. These boilerplates are used in a comprehensive ground test program, including structural, dynamic, water and land impact, flotation, acoustic, launch escape, and integrated system and subsystem testing. Three boilerplate CSM were used on micrometeoroid experiments flown on Saturn I launch vehicles.

In FY 1966, a heavy ground test program is being conducted, using CSM components and subsystems, boilerplate CSM, and five production-type CSM which are being delivered during the year. Testing is conducted at the contractors' plants, the Manned Spacecraft Center (MSC), the White Sands Test Facility (WSTF), and at other Government installations.

The first Block I flight CSM has been delivered to the John F. Kennedy Space Center (KSC) for an unmanned flight test on a Saturn IB in calendar year 1966. Five additional Block I flight CSM are in various phases of assembly, systems installations, and checkout in preparation for shipment to KSC. These CSM will be used for unmanned and manned flights on Saturn IB and V launch vehicles during 1966 and 1967.

Manufacture of Block II CSM began in 1965 and Block II development tests are underway. Block II CSM will be available in FY 1966 for an intensive ground test program, including structural, environmental, and integrated systems tests. A Block II CSM will undergo manned thermal-vacuum tests at MSC. During the second half of FY 1967, the first Block II flight-CSM will be delivered to KSC for checkout in preparation for flight. Ten additional Block II flight-CSMs will be in the process of assembly, systems installation, and checkout. These Block II flight-CSMs will be used in earth-orbit rendezvous missions on Saturn IB and for lunar mission simulation and lunar missions on Saturn V.

Lunar Excursion Module (LEM)

The Lunar Excursion Module study and design effort was initiated by Grumman Aircraft Engineering Corporation (GAEC) in mid-FY 1963. As with the CSM, funding is included for the effort related to the experiments and related hardware that will be carried in the lunar excursion module. During FY 1964, preliminary designs were established; mock-up reviews were held; and subsystem development was started. Descent engine firings began. By the end of the fiscal year, four heavy-weight propulsion rigs had been delivered for use in the LEM test program.

LEM design was established and frozen following detailed design, review, and examination of a mock-up version at the Grumman plant. Major subsystem development, fabrication, and testing are now underway. Ascent and descent propulsion system tests are in progress at White Sands Test Facility (WSTF) and Arnold Engineering Development Center (AEDC). A LEM test article (LTA) has been delivered to Marshall Space Flight Center (MSFC) for vibration testing with both the Saturn IB and the Saturn V. A second LTA was sent to North American Aviation for structural tests with the LEM/S-IVB stage adapter. Additional LTA, propulsion rigs, and test modules are in manufacture and checkout to meet ground test requirements. Assembly of the first LEM flight article has begun.

In FY 1967, the major portion of the ground development and qualification test program will be completed. LTA will be subjected to structural, thermal-vacuum, and propulsion testing. Ground qualification testing of key systems, including electric power, reaction control, communications, propulsion, landing gear, and environmental control, will be concluded. During FY 1967, the first flight LEM will be completed, delivered to KSC, and tested on a Saturn IB launch vehicle. Ten additional flight LEM will be in manufacturing and checkout. By the end of the fiscal year, two of these LEM will be delivered to KSC in preparation for flight.

Guidance and Navigation (G&N)

The Guidance and Navigation (G&N) System for the Apollo command and service modules and the lunar excursion module was designed by the Massachusetts Institute of Technology and is being built by the A.E. Electronics Division of General Motors and its subcontractors, Raytheon and Kollsman Instrument. Block I G&N systems will be used for ground testing and earth-orbital flights. Ground qualification testing and delivery of flight units will be completed during FY 1966. Flight qualification of the system and its use in manned Apollo Saturn IB flights will occur during FY 1967.

Design and development of a lighter Block II G&N system, which will be used on both the command module and the lunar excursion module for lunar flights, will be completed during FY 1966. In addition, engineering models will undergo extensive ground testing. Three Block II G&N units will be delivered for CSM environmental and qualification testing. G&N systems for initial Apollo Saturn IB flights will also be delivered during FY 1966.

Eight Block II command module and six LEM G&N systems are scheduled for delivery in FY 1967. The intensive ground test program, leading to complete system qualification and demonstration of reliability, will be underway throughout the fiscal year.

Integration, Reliability, and Checkout

The Automatic Checkout Equipment (ACE) for the Apollo spacecraft is being designed, developed, fabricated, installed, and operated by the General Electric Company. In support of the GE effort, equipment contracts have been negotiated with the Control Data Corporation and Radiation, Inc.

The basic design of ACE ground stations was completed in FY 1964. Five stations became operational during FY 1965; three at North American Aviation; one at the Manned Spacecraft Center (MSC); and one at the Kennedy Space Center (KSC). During FY 1966, three additional stations became operational: two at Grumman and one at KSC. Two more stations will be installed and checked out by the end of this fiscal year. FY 1967 funding provides for completion of two more ACE stations, making a total of twelve; operation of all the stations; and related engineering changes and spare parts to maintain the operational equipment.

In addition to ACE hardware and related support, funding is provided for engineering support to MSC. This support includes spacecraft specification maintenance and review; systems performance analysis; test planning and analysis; reliability and quality assurance; trend analysis of failure reports; critical parameter studies and technical problem analysis; mission planning and analysis; post-flight data processing and analysis documentation; simulation and training; and interface control. As the program progresses, emphasis will shift to support of hardware verification, mission accomplishment, and analysis of flight results. FY 1967 funding continues this effort at a level consistent with the increased rate of hardware deliveries and frequency of Apollo missions.

Support

Apollo spacecraft support funds cover the requirements for test operations and support, including Little Joe II launch vehicles, logistic support, instrumentation, and scientific equipment.

Funds are required to conduct spacecraft development tests at the Manned Spacecraft Center (MSC), the White Sands Test Facility (WSTF), and other government test laboratories, such as the Arnold Engineering Development Center (AEDC). Testing at MSC facilities includes manned and unmanned thermal-vacuum testing in the large environmental chamber, component qualification and reliability testing, and electronic systems compatibility tests. The FY 1967 effort will focus on Block II CSM and LEM qualification testing.

Spacecraft launch escape system tests, using Little Joe II vehicles, were conducted at WSTF during FY 1965 and 1966, and propulsion systems testing is in progress. LEM ascent and descent testing will be emphasized at WSTF during FY 1966 and 1967. The LEM propulsion system and reaction control system will also be tested under simulated space-environment conditions in test cells at AEDC.

Spacecraft support funding also provides for development and procurement of spacesuits and related life support equipment, such as survival equipment, personal hygiene systems, and bioinstrumentation. Major effort in FY 1966 and 1967 relates to development, manufacture, and test of a spacesuit and portable life support system for use on the lunar surface.

Logistic support funding for FY 1967 covers transportation of spacecraft between installations, reimbursement to the Department of Defense for inspection services, and procurement of spacecraft fuels and propellants used at MSC, WSTF, KSC, AEDC, and contractor sites.

Instrumentation and scientific equipment funding for FY 1967 provides for development and procurement of specialized flight research and test instrumentation for spacecraft development flight testing. Typical instrumentation equipment includes signal conditioners, sensors, transducers, telemeters, transmitters, transmitting antennas, and ground support equipment. Scientific equipment includes special cameras, magnetometers, seismographs, and radiation-measuring devices.

Saturn IB

	1965	1966	1967
1st stage (S-IB).....	$74,432,000	$63,450,000	$56,200,000
2nd stage (S-IVB).....	58,936,000	61,340,000	52,600,000
Vehicle instrument unit.....	35,841,000	40,780,000	36,050,000
Ground support equipment.....	40,999,000	24,170,000	7,430,000
H-1 engine procurement.....	11,900,000	9,200,000	4,000,000
J-2 engine procurement.....	11,980,000	14,000,000	7,700,000
Vehicle support.....	28,602,000	61,245,000	52,420,000
Total.....	$262,690,000	$274,185,000	$216,400,000

The two-stage Saturn IB is essentially an uprated version of the highly successful Saturn I, which completed its flight series in July 1965. The Saturn IB provides the capability for earth orbital flights of Apollo spacecraft, and also, in the unmanned flights, serves as a test bed for Saturn V components, including the S-IVB stage which will be the 3rd stage of Saturn V. The 1st stage (S-IB), a modified version of the 1st stage of the Saturn I, is being developed by the Chrysler Corporation. It is powered by an uprated set of eight H-1 engines, produced by the Rocketdyne Division of North American Aviation, and is capable of developing approximately 1.6 million pounds of thrust. The Douglas Aircraft Company is developing the 2nd stage (S-IVB). This stage is similar in basic design to the 2nd stage of the Saturn I, but has increased propellant capacity. In addition, a single J-2 engine, capable of approximately 200,000 pounds of thrust,

replaces the six RL-10 engines capable of about 90,000 pounds of thrust. The J-2 is produced by Rocketdyne. The Saturn IB payload capability through the first five flight vehicles will be about 35,000 pounds in low-earth orbit. The sixth flight vehicle will have a payload capability of approximately 36,000 pounds and the remaining flight vehicles will have a payload capability of about 38,000 pounds.

The first Saturn IB launch is planned for calendar year 1966. In calendar year 1967, four additional flights are planned which include long-duration manned missions.

1st Stage (S-IB)

Development of this stage was initiated in FY 1963. Fabrication, assembly and checkout of the flight stages is performed by the Chrysler Corporation at the Michoud Assembly Facility, Louisiana. Ground testing is conducted at the Marshall Space Flight Center. During FY 1964 and 1965, assembly of the first six flight stages was in process and static firing of the first flight stage was successfully conducted. Parts qualification testing is scheduled for completion during FY 1966.

Flights of the stage, planned for calendar year 1966, will verify the systems design. The first flight stage was delivered to the Kennedy Space Center (KSC) early in FY 1966. A second flight stage has completed static test. Two more flight stages are scheduled to arrive at KSC by the end of FY 1966, following completion of checkout and static test. Stages five through eleven are in various phases of manufacture, checkout, and static test. In addition, long-lead hardware for the twelfth stage is being procured during FY 1966.

FY 1967 funding provides for completion and delivery to KSC of the fifth through eighth flight stages and completion of manufacturing, checkout and static test on the ninth and tenth. By the end of the fiscal year, the eleventh stage will be undergoing static test and the twelfth stage will be in checkout.

2nd Stage (S-IVB)

Basic development efforts for this stage are funded in the Saturn V project. Procurement and the engineering design effort and modifications required to adapt the stage for use in the Saturn IB project are funded in this portion of the budget. Design of the stage began in FY 1963. During FY 1964 and 1965, fabrication of battleship, dynamic, structural, and facility checkout ground test articles was completed. Ground testing will be essentially completed during FY 1966.

Two flight stages completed static test at the Sacramento Operations Test Facility and were shipped to the Kennedy Space Center. By the end of the fiscal year, the third and fourth flight stages will be at KSC in preparation for launch. The fifth and sixth stages will be through the assembly process. The fifth flight stage will enter static test and the sixth will have completed in-factory checkout prior to static test. Five additional stages will be in various phases of fabrication, assembly, and in-factory checkout.

FY 1967 funding for the S-IVB will support continued production, test, and delivery of flight stages, as well as pre-launch checkout at KSC. The third and fourth stages, delivered to KSC in FY 1966, will be readied for flight. The fifth and sixth flight stages will complete static test and will be shipped to KSC for checkout and launch. The seventh and eighth flight stages will be through manufacturing, checkout, and static test in preparation for delivery to KSC by the end of FY 1967. The remaining flight stages will be in various phases of fabrication, assembly, in-factory checkout, and static test during FY 1967.

Vehicle Instrument Unit

Primary guidance, control, measuring, and telemetry systems are contained in the instrument unit (IU), which is being assembled and tested by International Business Machines Corporation (IBM) in Huntsville, Alabama. The components and configuration of the IU for the Saturn IB are essentially the same as those for the Saturn V. The IU design, established during FY 1965, will be verified during FY 1966 by extensive structural, dynamic and vibration testing. Component qualification is also scheduled for completion during FY 1966. In addition, IU Guidance and Control Laboratories will be established for field support at the Kennedy Space Center. Four Saturn IB flight units will complete manufacture and checkout.

The fifth flight unit will be nearing completion of final assembly and the sixth will be in structural assembly by the end of FY 1966.

FY 1967 funding provides for completion of final assembly, checkout, and shipment of the fifth unit; assembly, checkout and shipment of the sixth, seventh and eighth units; component fabrication and assembly of the ninth unit; initiation of assembly of the tenth unit; and hardware procurement for the last two units.

Ground Support Equipment

The automatic checkout equipment and procedures for the Saturn IB will serve as a test system for the Saturn V. Development of a checkout and

flight hardware simulator (breadboard) was started in FY 1963 and was followed in FY 1964 by initial procurement of hardware. During FY 1965, engineering development was continued and components testing for automatic checkout and associated ground support equipment was underway. Mechanical support equipment (MSE) and electrical support equipment (ESE) for Launch Complex 34 and Launch Complex 37B are being delivered in FY 1966 in preparation for Saturn IB launches.

FY 1967 funding covers engineering improvements and updating of MSE and ESE. Engineering effort will be provided by the General Electric Company on ESE and the Chrysler Corporation Space Division on MSE.

H-1 Engine Procurement

By the end of FY 1966 a total of 92 engines will have been delivered.

FY 1967 funds cover delivery of 22 engines in FY 1967. Estimates for all fiscal years include the flight hardware as well as spares, support hardware and services, and propellants for acceptance testing.

J-2 Engine Procurement

Fourteen engines will have been delivered by the end of FY 1966 and work will be started on engines to be delivered in FY 1967.

Delivery of six engines is required during FY 1967. Estimates for all fiscal years include spares, support hardware and services, and propellants for acceptance testing.

Vehicle Support

Vehicle support includes funds for studies, services, and equipment common to more than one stage. FY 1967 funding provides for engineering services; reliability tests; fabrication services; transportation; propellants; expendable supplies and equipment; and launch pad refurbishment. This funding also covers contract administration, audit, quality assurance, and inspection services performed by other Government agencies.

Saturn V

	1965	1966	1967
1st stage (S-IC).....	$243,137,000	$227,500,000	$215,600,000
2nd stage (S-II).....	190,192,000	255,800,000	257,700,000
3rd stage (S-IVB).....	130,300,000	162,800,000	160,400,000

	1965	1966	1967
Vehicle instrument unit....	$74,900,000	$72,500,000	$73,600,000
Ground support equipment...	63,254,000	104,500,000	73,800,000
F-1 engine procurement.....	68,100,000	67,400,000	85,800,000
J-2 engine procurement.....	57,965,000	74,700,000	75,200,000
Vehicle support.....	137,076,000	212,120,000	248,900,000
Total.....	$964,924,000	$1,177,320,000	$1,191,000,000

The Saturn V is composed of three stages and an instrument unit. This launch vehicle is capable of placing a payload of approximately 280,000 pounds into low earth orbit and approximately 95,000 pounds into a translunar trajectory. The Boeing Company/Aerospace Group Division is fabricating the 1st stage (S-IC); North American Aviation, Inc./Space and Information Systems Division, the 2nd stage (S-II); and the Douglas Aircraft Company/Missile and Space Division, the 3rd stage (S-IVB). International Business Machines/ Federal Systems Division is producing the Saturn V instrument unit and North American Aviation, Inc./Rocketdyne Division is manufacturing the F-1 engine, used in the 1st stage, and the J-2 engine, used in both the 2nd and 3rd stages.

FY 1966 represents a period of intensive development ground testing of Saturn V hardware. As an example, the S-IC all-systems stage has successfully passed a number of static test firings at the Marshall Space Flight Center (MSFC). In August 1965, the all-systems ground test stage was fired for full-duration (2½ minutes) at the thrust level of 7.5 million pounds. Heavy emphasis is also being placed on the activation of Saturn V facilities, including the S-IC and S-II acceptance test stands at the Mississippi Test Facility and Launch Complex 39 at the Kennedy Space Center (KSC).

The FY 1967 funding requirements for the Saturn V support a critical period of continued ground testing, both development and qualification, and the first Saturn V launches from Launch Complex 39, KSC. The initial unmanned missions are designed to qualify the vehicle systems under actual flight conditions.

Dynamic testing of the entire Apollo/Saturn V space vehicle, including the three stages, the instrument unit, and the spacecraft, will be carried out at MSFC. Static testing of 1st and 2nd stages will be conducted at the Mississippi Test Facility and 3rd stage testing will be conducted at the Sacramento Test Operations site in preparation for shipment to KSC.

1st Stage (S-IC)

The Marshall Space Flight Center, with Boeing's assistance, will complete manufacture of the structural test components, the first ground test stage

and the first two flight stages at Huntsville, Alabama. Boeing will manufacture two ground test stages and 13 flight stages at the Michoud Assembly Facility, Louisiana.

During FY 1966, ground testing will continue. The two ground test stages to be used for dynamic tests and facilities checkout have been completed by Boeing. Assembly, checkout and acceptance testing of the first two flight stages at Marshall Space Flight Center will be completed. By the end of the fiscal year, a third flight stage will be in checkout at Michoud and the fourth through seventh stages will be in assembly.

In FY 1967, funding will provide for the following activities: preparation for launch of flight stages at the Kennedy Space Center; completion of the structural, dynamic and Launch Complex 39 checkout ground test programs; completion of assembly, checkout, and acceptance tests at MSFC and shipment to Kennedy of the third flight stage; completion of assembly, checkout and acceptance testing at the Mississippi Test Facility of the fourth flight stages; various phases of manufacturing, checkout and test on the fifth through tenth flight stages and hardware procurement for the eleventh through fourteenth flight stages.

2nd Stage (S-II)

In FY 1965, the battleship stage was completed and tests were started. Common bulkhead tests were initiated and fabrication and assembly of the all-systems and facilities checkout ground test stage, as well as the first three flight stages, were in progress. Qualification and reliability tests for stage components were also begun during this period.

FY 1966 activity is marked by an intensive ground test effort. Structural and common bulkhead tests were conducted during the first half of FY 1966. In addition, the all-systems stage was shipped to the Mississippi Test Facility in preparation for facility and propulsion tests. As a result of the structural failure of the S-II dynamics test stage, the all-systems stage will subsequently be shipped to the Marshall Space Flight Center for dynamic testing. The facility checkout stage is scheduled for delivery to KSC for activation of Launch Complex 39. Fabrication and assembly of the first S-II flight stage will be accomplished. The second through seventh flight stages will be in manufacture and checkout, and hardware procurement for the eighth and ninth stages will be initiated.

FY 1967 funding provides for rigorous qualification testing of the S-II; delivery of the first three flight stages to KSC; preparation for launch of two of the stages at KSC; completion of acceptance testing on the fourth flight stage; continuation of fabrication, assembly, and checkout of the

fifth through seventh stages; initiation of fabrication on the eighth through twelfth stages; and initial hardware procurement for the remaining three stages.

3rd Stage (S-IVB)

The 3rd stage of the Saturn V is the S-IVB stage, which is also used on the Saturn IB. The stage used for the Saturn V vehicle has the capability of engine restart to achieve lunar escape velocity. Although used on the Saturn IB, basic development of this stage is funded in the Saturn V project. By the beginning of FY 1965, qualification testing was in progress; assembly of the battleship and structural test stages had been completed; and the structural test program had been initiated. Structural assembly of the all-systems, dynamics, and facilities checkout stages was also under way.

In early FY 1965, the decision was made to modify the ground test program by deleting the all-systems stage requirement and using the hardware as a facility checkout stage. Facility checkout stage hardware was used to meet other requirements, such as the MSFC stage simulator. Ground test stages were completed in time to support the Saturn IB requirements. The battleship hot-firing test program at the Sacramento Test Facility was also initiated, and fabrication of the first two Saturn V flight stages at Huntington Beach, California, was started.

During FY 1966, the battleship testing was completed. Saturn V dynamic testing at the Marshall Space Flight Center with the facility checkout stage is in progress. Post-manufacturing checkout of the first two Saturn V flight stages at Huntington Beach, California, and acceptance testing of the first flight stage at Sacramento will be completed during FY 1966. Fabrication and assembly of the four additional flight stages will also be underway during this period.

FY 1967 funding provides for completion of the ground test program; delivery of the first three flight stages to KSC; completion of fabrication and assembly of the third, fourth, fifth and sixth flight stages; completion of post-manufacturing checkout of the third, fourth and fifth flight stages and acceptance testing of the third and fourth flight stages; initiation of fabrication and assembly on the seventh through eleventh stages; and hardware procurement for the remaining four stages.

Vehicle Instrument Unit

The Saturn V instrument unit is essentially the same as the Saturn IB. The units are assembled and given final checkout at the Huntsville, Alabama facility of International Business Machines Corporation. Extensive testing; structural, dynamic, environmental and vibration, is being conducted during FY 1966.

During FY 1967, Saturn V instrument unit manufacturing (fabrication, assembly, and checkout) operations will be in full swing. Four units will be delivered to KSC. In addition three more units will be in process of manufacture.

Ground Support Equipment

The General Electric Company is under contract for design, fabrication, checkout, and logistic support of the Saturn V electrical support equipment (ESE). The Boeing Company is contractor for a Saturn V equipment management system which provides a master record for all vehicle ground support equipment. Boeing is also responsible for the integration and logistic support of all mechanical support equipment. The Radio Corporation of America is providing the computer systems and Sanders Associates the display systems for use at Launch Complex 39.

Fiscal years 1964 and 1965 funds were used for design and initiation of long lead-time procurement of mechanical and electrical checkout equipment for use at Launch Complex 39. In addition, installation and testing of an electrical checkout equipment and flight hardware simulator (breadboard) at Marshall Space Flight Center was in progress. Funds were also used to develop and procure special test equipment and components, such as hardware for the umbilical/swing arm test facility.

During FY 1966, the Saturn V breadboard at MSFC is being completed (installation and checkout of the equipment) and is being used to test and develop operating procedures for the electrical ground support equipment. By the end of the fiscal year delivery, installation and checkout of the Saturn V GSE for use on the first launch umbilical tower, the first high-bay and the low-bay of the vehicle assembly building, the first firing room of the launch control center, the first launch pad and the necessary support areas will be nearly complete in preparation for the first Saturn V launch. Delivery and installation of Apollo Saturn V - peculiar equipment for the second launch umbilical tower, high-bay areas, firing room and launch pad will be well along. FY 1966 funds will also be used for logistic support of certain ground equipment.

FY 1967 funding provides for completion of installation and checkout of equipment in these areas and for delivery and start of installation of equipment in a third launch umbilical tower, high-bay and firing room. In addition, FY 1967 funding will cover engineering improvements, updating and necessary changes and improvements to the mechanical and electrical support equipment, and continuation of logistic support.

F-1 Engine Procurement

By the end of FY 1966 a total of 38 engines will have been delivered. FY 1966 funding also covers hardware procurement for deliveries in FY 1967.

FY 1967 estimates provide for delivery of 24 engines and procurement of additional long-lead hardware. These funds also cover procurement of spares, support hardware, services, and propellants for acceptance testing of the engines scheduled for delivery.

J-2 Engine Procurement

By the end of FY 1966 a total of 56 engines will have been delivered. FY 1966 funding also covers hardware procurement for deliveries in FY 1967. Funding in FY 1967 will provide delivery of 37 J-2 engines and the procurement of long-lead hardware. Funds in all fiscal years cover spares, support hardware, support services, and propellants for engine acceptance testing.

Vehicle Support

Vehicle support funds are required to provide services and equipment that are common to more than one stage of the vehicle. Fiscal years 1965 and 1966 funding included instrumentation, recording and data reduction equipment for the Saturn V dynamic test stand at Marshall Space Flight Center; transportation costs which include use of marine vessels and aircraft for movement of stages, engines and components; activation and operation of the Mississippi Test Facility; operation of the Slidell Facility; range safety and tracking devices; propellants; systems integration; and computation services, engineering services, quality control and inspection, contract administration, audit and property administration services by other government agencies. In FY 1966 and 1967 initiation of S-II testing at the Mississippi Test Facility (MTF) will require increased plant and technical support activities at that location. Funding also includes propellants used in testing the stages.

During FY 1967, acceptance testing of S-II stages will continue at MTF and S-IC testing will begin. This activity will increase plant and support and propellant requirements.

In addition, dynamic testing at MSFC will be in progress during FY 1967. Systems integration will continue at essentially the FY 1966 level to insure proper interface control of all stages, systems, and structures. Reliability and flight evaluation programs will also be funded during FY 1967.

Engine Development

	1965	1966	1967
H-1 engine.....	$6,550,000	$6,450,000	$5,500,000
RL-10 engine.....	14,470,000	1,900,000	---
F-1 engine.....	62,396,000	41,290,000	41,000,000
J-2 engine.....	49,102,000	41,750,000	37,900,000
Propellants and related engine support.....	33,782,000	42,705,000	26,600,000
Total.....	$166,300,000	$134,095,000	$111,000,000

Funds in this project provide for the development of engines to be used for Saturn launch vehicles. Procurement of the flight engines is funded under the appropriate launch vehicle project.

H-1 Engine

The H-1 engine, which is being developed by the Rocketdyne Division of North American Aviation, Inc., is used in clusters of eight per stage to propel the first stage of the Saturn IB vehicle. This engine uses liquid oxygen and RP-1 (kerosene) as propellants.

Development of the H-1 engine was initiated by the Department of Defense in September 1958 as a 165,000 pound thrust improved version of the Thor-Jupiter engine. The responsibility for development of the engine was transferred to NASA in 1960. The 165,000 pound thrust engine was used successfully in the first four Saturn I launches and a 188,000 pound thrust version of the engine was used on the remaining six launches of the Saturn I. A 200,000 pound thrust version has been developed and will be used on the first five Saturn IBs. A 205,000 pound thrust version will be used on subsequent Saturn IBs.

In FY 1966, the development program consists of testing, flight evaluation, and production and launch support. This effort includes engineering capability for design and development; ground test capability and retrieval, evaluation, and reporting of Saturn IB flight data. Efforts are also being devoted to calibrating and determining the reliability of the H-1 engine at the 205,000 pound thrust level for the sixth and subsequent Saturn IB flights.

The FY 1967 funding will provide for field support, including the static tests required for quick-response to problems. This effort includes component and engine system testing to supplement problem analysis for the engine and ground support equipment. The flight-worthiness of the engine for manned missions will also be verified periodically. In addition, the FY 1967 funding provides for maintaining the test engines in a configuration appropriate for solution of problems that are encountered. Updating and improvement of procedures and evaluation of static test and flight data will also be accomplished.

F-1 Engine

The F-1 engine is being developed by the Rocketdyne Division of North American Aviation at Canoga Park, California. The F-1 will be used in a cluster of five engines in the 1st stage of the Saturn V. Each engine is capable of producing 1,500,000 pounds of thrust, using liquid oxygen (LOX) and kerosene (RP-1) as propellants.

Development of the F-1 engine began in January 1959 when a contract was awarded to Rocketdyne for development, through preliminary flight rating tests (PFRT) of a LOX/RP-1 rocket engine. Test firing of the F-1 engine was accomplished in June 1961. Since that time, F-1 engines have achieved rated thrust and duration (150 seconds) runs well over 400 times. The final release of the design of the flight rating test engine was made in the first quarter of FY 1964, and testing was completed in the second quarter of FY 1965. A comprehensive qualification test series was begun to qualify the engine for manned flight and is scheduled to be completed in the second quarter of FY 1967.

During FY 1966 and FY 1967, about 700 separate engine system ground tests will be performed. These tests are part of the approximately 1,600 planned engine system tests that will be performed as part of the development effort to reach required maturity before qualification of the engine for manned flight. Major efforts for FY 1967 include: component qualification; demonstration of recovery from induced combustion instability; high specific-impulse performance and qualification tests operation and engineering support for static and flight testing; and design and operational simplification to improve engine-system flexibility. To maintain this extensive testing effort in FY 1967, five new engines will be built; eight rebuilt; and the equivalent of 2-1/2 engines in test components produced.

J-2 Engine

The J-2 engine is being developed by the Rocketdyne Division of North American Aviation at Canoga Park, California, for use in upper stages of the Saturn IB and Saturn V vehicles. This engine, using liquid hydrogen and liquid oxygen as propellants, is designed to develop 200,000 to 205,000 pounds of thrust. In the Saturn IB vehicle, one J-2 engine will be used in the 2nd stage (S-IVB). In the Saturn V, a cluster of five J-2 engines will be used in the 2nd stage (S-II) and one J-2 engine will be used in the 3rd stage (S-IVB).

Development of the J-2 engine began in September 1960 with the award of the development contract to Rocketdyne. In October 1962, the engine achieved its first full thrust (250 second duration) run. The first 500-second duration run, necessary to meet the requirements of the Saturn IB and V, was successfully conducted in November 1963. Other accomplishments during FY 1964 included demonstration of gimbal capability, nominal performance, propellant utilization system, and the first PFRT-type engine test.

During FY 1965, 465 ground tests were performed for a cumulative duration of 44,152 seconds. During the same period, nine new engines were built and 31 engines were rebuilt or overhauled. Accomplishments included completion of PFRT, demonstration of engine-vehicle interface, demonstration

of reliability, and demonstration of maximum mixture ratio capability. In FY 1966, 790 ground tests for an approximate duration of 80,000 seconds are planned. Ten new engines will be built and 33 rebuilt or overhauled. The flight rating tests were completed early in the fiscal year. Testing for qualification of the 200,000 pound thrust engine will be completed in the second quarter of the fiscal year. The engine will make its initial flight on a Saturn IB in FY 1966.

In FY 1967, 700 ground tests for an approximate run-time of 70,000 seconds will be performed. Eight new engines will be built and 25 rebuilt or over hauled. Qualification of a 205,000 pound thrust engine will be completed in mid-fiscal year.

Propellants and Related Engine Support

Propellants and ancillary chemicals required for the contractor test efforts are procured and provided as government-furnished material. The primary products used are liquid oxygen, liquid hydrogen, kerosene, liquid nitrogen, and gaseous helium. NASA procures propellants from both private producers and from the Air Force under a NASA/DOD support agreement.

The FY 1967 engine development tests will require approximately 180,000 tons of liquid oxygen, 7,000 tons of liquid hydrogen, 14 million gallons of kerosene, 37,000 tons of liquid nitrogen, and 44 million cubic feet of helium. Funds in FY 1967 will also provide for services and equipment associated with contractor effort; and contract administration, audit, property administration, and quality and inspection services provided by government agencies.

Mission Support

	1965	1966	1967
Operations.....	$96,717,000	$104,180,000	$154,405,000
Systems engineering.....	19,925,000	26,000,000	26,000,000
Supporting development.....	53,900,000	32,205,000	32,895,000
Apollo applications.....	---	48,000,000	41,900,000
Total.....	$170,542,000	$210,385,000	$255,200,000

Mission support provides for the over-all launch, flight, crew, and recovery operations; program-wide systems engineering; supporting development necessary for the successful accomplishment of manned space flights; and project definition experiment development, and maintenance of hardware production capability for Apollo applications.

Operations

Operations include the activation and operation of pre-flight and launching facilities, mission control, flight crew training and actual flight operations, including recovery. As the frequency of Apollo flights increases, more effort, materials, and supplies are required to support the operational phase of the program.

FY 1966 funds are providing for the following activities: activation of the launch operations and instrumentation facilities, and pre-flight activities required at the John F. Kennedy Space Center (KSC) in support of the initial Apollo Saturn IB missions; support of KSC contractor services, including major items of equipment for these contractors, and reimbursement to the Air Force; the mission control efforts for Apollo Saturn IB missions; continued support of astronaut training and flight crew requirements; operation and updating of mission simulators and trainers; mission planning and analysis; contractor support in the development of real-time computer programs for flight missions and flight monitoring; test evaluation and procurement of retrieval and location equipment; remote-site operations; and reimbursement to the Department of Defense for recovery support forces.

The FY 1967 funding provides for the increased operational services required to support Apollo Saturn IB manned flights and the initial Saturn V missions. The requirements also cover the improvements necessary for, as well as the increased cost of operating the Mission Control Center at Houston, which will be supporting Apollo Saturn IB and Saturn V flights. The funding also provides for the procurement and operation of three lunar landing training vehicles for use by the astronauts.

Systems Engineering

Systems engineering provides for integrated technical support, review, and analysis of manned space flight missions. These services include the development of functional and performance standards for the program, consistent with mission objectives; mission planning; test objectives and integration; program and systems specifications; trajectory analysis; checkout effectiveness; and technical documentation. Bellcomm and General Electric are the principal systems engineering contractors.

During FY 1967, greater emphasis will be placed on a quick-response capability for validation and analysis of flight data on a time scale compatible with the increased frequency of Apollo missions. The FY 1967 funding also covers contract administration and related services of the Department of Defense, as well as non-recurring maintenance and rehabilitation of government-owned industrial plants.

Supporting Development

Supporting development involves individually selected engineering efforts which support the Apollo Program and have potential use in advanced manned missions. Individual tasks are initiated in support of the on-going projects and provide for the development of backup or improved hardware or manufacturing, test, and evaluation techniques when a potential problem is identified. The objective is improved performance, improved confidence, and reduced cost. In addition to providing backups which could be substituted for their mainstream counterparts, supporting development also provides for the development of long-lead systems for potential use in the future. The character of the work varies with each task, depending on the state of development of the hardware or technique, and is strongly influenced by the nature of the mainstream difficulty. In some cases, the potential problem may be best overcome by developing new hardware or techniques; and in other cases by modification of the mainstream approaches through better definition of specifications.

Each task is planned so that the backup can be available for incorporation into the mainstream projects on a schedule compatible with development and operational milestones. Work initiated during previous years is resulting in delivery of developed hardware during FY 1966. For example, a mechanical damping device has been fabricated to control combustion instability; a TV camera has been qualified for use on the lunar surface; and design information is available for any potential desired increase in spacecraft shielding. During the last few months, development was started on a basic small-thrust engine that can be used, with minor variations, on the Apollo spacecraft and the upper stage of both the Saturn IB and Saturn V. This versatility will permit an optimum production rate for the basic engine, which will lower unit costs and increase reliability. During FY 1967, work in support of Apollo will be largely concerned with backup hardware, including the small-thrust engine, with the performance potential for desired Apollo mission objectives. The major portion of the funds will be used to complete the development of Apollo-type hardware which can replace mainstream counterparts with minimum disruption. For example, coating material for both heat protection and temperature control will be qualified; antenna performance will be demonstrated in preparation for production hardware; and astronaut equipment, such as a portable tape recorder, will be qualified for use on the lunar surface.

Apollo Applications

In FY 1967, no new manned programs are planned for initiation. However, planning is directed toward maximum utilization of the inherent capabilities of the current Apollo Saturn space vehicles, facilities, and government-industrial teams.

The FY 1966 applications effort is devoted to continued project definition. This effort provides the detailed planning options necessary for conducting

applications missions beginning as early as mid-1968, if early success in the Apollo program makes this possible. FY 1966 funding is providing for definition of payloads, space vehicle modifications, detailed mission and support plans, and payload integration.

Apollo applications missions are being planned to permit extended lunar exploration and long-duration earth orbital operations--both low-altitude and synchronous. Early applications missions would utilize the basic Apollo Saturn space vehicle configuration, while later missions would incorporate the subsystem modifications essential to refined mission requirements. The planning for exploitation of this capability is based on the principle of holding open as many options as feasible until the Nation is in a position to select the next major space effort.

To hold these planning options open, FY 1967 funding maintains the continuity of the production capability of the basic Apollo spacecraft and Saturn launch vehicles and continues project definition and payload development.

RESEARCH AND DEVELOPMENT

FISCAL YEAR 1967 ESTIMATES

OFFICE OF MANNED SPACE FLIGHT — ADVANCED MISSIONS PROGRAM

PROGRAM OBJECTIVES AND JUSTIFICATION:

The objective of the Advanced Missions program is to examine advanced manned space flight mission concepts. Included are: logical extensions of the national space capability through analysis of present hardware systems for growth potential; development of requirements for future systems; provision of guidance for research and technology activities; provision of technical information and cost data upon which future program decisions can be based; and initiation of the definition, preliminary design and specification of probable future missions.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Advanced missions studies.....	$26,000,000	$10,000,000	$8,000,000
Total.....	$26,000,000	$10,000,000	$8,000,000

Distribution of Program Amount by Installation:

John F. Kennedy Space Center, NASA.....	$500,000	$600,000	$600,000
Manned Spacecraft Center.....	9,625,000	3,600,000	2,500,000
Marshall Space Flight Center..	5,473,000	5,500,000	4,500,000
Langley Research Center.....	1,200,000	---	---
NASA Headquarters.....	8,930,000	300,000	300,000
Western Operations Office.....	272,000	---	---

BASIS OF FUND REQUIREMENTS:

Advanced Missions Studies

	1965	1966	1967
Advanced studies.....	$26,000,000	$10,000,000	$8,000,000

Advanced studies provide the basis for the planning and selection of future manned space flight missions. Specific areas of investigation include manned earth orbital, lunar, and planetary missions. FY 1965 studies concentrated

on the uses of Apollo-developed hardware in extending manned exploration of the moon and near-earth environment and led to the pre-development effort now underway for Apollo applications. During FY 1965, no funds were allocated for planetary studies and only a modest number of studies beyond Apollo applications were implemented in the earth orbital, lunar, and supporting vehicle systems areas.

During FY 1966, advanced studies are continuing to stress potential activities in the earth orbital and lunar exploration areas and include planning studies in the planetary/interplanetary category. Completed manned earth orbital mission studies have confirmed the feasibility of earth orbiting space stations. Alternate configurations, which make maximum use of current, as well as basically new, spacecraft configurations, have been examined. Additional studies of candidate scientific and technological experiments for the space stations are also being conducted.

The FY 1967 effort will be directed toward preliminary systems definition of the more promising space station concepts. Configurations under review include a long-term station not requiring resupply, using the present family of subsystems and launched with a Saturn V, and an optimized space station capable of supporting planetary flight. Preliminary systems definition will also be conducted on a ferry/logistic system for use with these concepts. Particular attention will be given to the description and definition of experiment modules which can be used in conjunction with the various space station concepts and which can be operated by the crew of the space station. In addition, efforts will continue on the selection and description of candidate experiments for advanced missions, and the constraints of these experiments on the space station and the logistic system will be assessed. The ultimate growth capability of such a space station into a planetary mission module will be considered and a new and larger spacecraft with inherently greater experimental man-hour capabilities will be studied.

Manned lunar mission studies are directed toward identifying and defining the most effective exploration systems. Included are studies of both improved Apollo-type and direct flight systems, alternate shelter and mobility concepts, and definition of orbital and surface experiments.

The FY 1967 effort will emphasize the definition of an extended lunar exploration plan and the accompanying conceptual designs. The results of comparative evaluations of shelter and mobility concepts, as well as various modes of payload delivery to the lunar surface, will be combined with the recommendations of the scientific community to formulate a comprehensive lunar exploration effort. This work will provide the basis for decisions concerning the initiation of program definition for an advanced lunar exploration system.

Manned planetary mission studies have established the feasibility of a number of mission modes and system concepts for Mars and Venus flybys and

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Mars landing missions. Although the flyby missions may be considered within the reach of Apollo-based technology, it appears that effective accomplishment of the Mars landing mission will require improved levels of technology. The complexity of the missions and the extensive resources required for such undertakings require detailed analysis of the various options before a program is initiated.

FY 1967 planetary mission studies will provide more detailed analysis of system feasibility, system concepts, and technological requirements. Major emphasis will be placed on manned planetary spacecraft concepts that can be applied to the broadest range of missions and launch dates. The studies recognize the requirement for unmanned programs to provide the scientific and engineering data essential for the design of future manned systems. Studies of objectives, schedules, and costs will be necessary so that the most promising system concepts can be identified for detailed engineering design.

Launch vehicle studies to support earth orbital, lunar, and planetary manned missions will also be conducted during FY 1967. These studies will stress preparation for systems definition of improved Saturn vehicles, as well as reusable transport concepts. The related requirements for operational and support facilities will also be studied.

OFFICE OF TECHNOLOGY UTILIZATION — TECHNOLOGY UTILIZATION PROGRAM

PROGRAM OBJECTIVES AND JUSTIFICATION:

The primary objective of the Technology Utilization program is to provide for the widest practicable and appropriate dissemination to industry of information concerning NASA activities and results which appear to have industrial applications potential. The NASA program offers U.S. industry unique opportunities to improve existing industrial techniques and to develop new products and methods. It is the purpose of Technology Utilization to assist in identifying quickly these many opportunities and to insure their expeditious dissemination for the benefit of American industry, and ultimately the individual U.S. citizen. Technology Utilization also includes projects to study and evaluate those factors which will improve our understanding of the implications of the space program.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Identification	$1,235,000	$1,220,000	$1,165,000
Evaluation	645,000	680,000	650,000
Dissemination	1,970,000	2,000,000	2,085,000
Analysis	900,000	850,000	900,000
Total	$4,750,000	$4,750,000	$4,800,000

Distribution of Program Amount by Installation:

	1965	1966	1967
NASA Headquarters	$4,750,000	$4,750,000	$4,800,000

BASIS OF FUND REQUIREMENTS:

Identification

The Identification effort is carried out by NASA personnel; specialists from research institutes, universities and industry; and, by scientists and engineers working for NASA and NASA contractors. These personnel search for ideas, innovations, processes and techniques which appear to have potential for non-aerospace application and report them quickly to NASA Headquarters. These reports are now coming in at the rate of 1,200 per year and with the present emphasis on the implementation of the New Technology Reporting Clause

in NASA contracts the rate of reporting is expected to increase. The identification effort also includes the identification of incremental advances in technology. Research institutes, universities and private companies identify these incremental advances in technology by reviewing broad areas of space research and developing state-of-the-art summaries, called Technology Surveys. During FY 1965, contracts for 12 surveys were negotiated. This program will be continued at about the same level during FY 1966 and FY 1967.

Evaluation

The technical information reported to Headquarters is forwarded to a group of Research Institutes and evaluated for novelty, technical feasibility and relevance to non-aerospace industry. A preliminary review is conducted by the Illinois Institute of Technology Research Institute. Innovations of merit are then evaluated in detail by that Institute and one of four other contractors: Arthur D. Little, Batelle Memorial Institute, Stanford Research Institute, and Southwest Research Institute. The product of this evaluation is a flow of new items, processes and techniques having non-aerospace potential. These processes are then made available in one of several publications: Tech Briefs, Technology Utilization Notes, or Technology Utilization Handbooks. Tech Briefs are one to two page bulletins about innovations, published in this format in order that the new developments may reach the potential user as quickly as possible. The Technology Utilization Reports, Notes and Handbooks are more comprehensive publications resulting from in-depth evaluations by research contractors and preparation of more complete information on the subjects covered. Although the current emphasis on new technology reporting is expected to increase the rate of documents coming into the system, the funding requested for FY 1967 will permit continuation of this evaluation effort at about the same level as for FY 1966 and FY 1965.

Dissemination

Dissemination activities are focused on exploiting the normal channels of communication that are in existence or which can be developed. Two general techniques of dissemination are employed. The first is by mailing lists consisting of over 8,000 industrial companies and individuals who receive information in some cases on all Technology Utilization publications, and in others only those in their technical areas of interest. The second form of dissemination is through experimental regional dissemination centers. The first experimental regional program was established in January, 1962, with the Midwest Research Institute (MRI) at Kansas City, Missouri. MRI has employed a broad, generalized approach in disseminating ideas and innovations to over 1,000 industrial firms in the Midwest area. During FY 1967, MRI will continue the basic program and develop new programs for working more closely with the Midwestern industry on a problem solving basis, using computer support from the Aerospace Research Applications Center (ARAC) at Indiana University. This center was established in January, 1963. It offers three basic services: (1) Industrial Applications Service, a weekly dissemination to companies of the Technology Utilization publications with follow-up applications engineering service, (2) Selective Dissemination Service,

a bi-weekly computer read-out of the new additions to the NASA magnetic tapes to provide companies with current announcements of items coming into the information system; and, (3) Retrospective Search Service, which are responses to special technical questions, accomplished by computer searching of the entire file of NASA documents (now totalling approximately 200,000 items). During FY 1964 and FY 1965, six Centers in addition to MRI and ARAC were established. These are at Wayne State University (Detroit); the University of Pittsburgh; University of Maryland; Southeastern State College at Durant, Oklahoma; the North Carolina Science and Technology Research Center; and the University of New Mexico. These Centers are serving over 120 member companies with more than 3,000 firms receiving some degree of service. Fiscal year 1967 funds will be used to support current programs at these Centers with appropriate modifications and improvements; and also provide support for several pilot projects with other agencies. In addition, two new experimental dissemination centers are planned.

Analysis

In recognition of the much broader impact of NASA programs than simply that of a major one in advancing science and technology, support is given to a study program to analyze the impact of the space program on the regional and local economy, and on industries, private institutions and different types of manpower. The principal aim here is to have researchers assist in characterizing NASA's impact as it has affected their regions and to develop analyses which lead to consideration of improved policies within the constraints of existing legislation. Under one grant, for example, a study is being made of the distribution of subcontracts under the Gemini program, regional differences in the distribution of NASA and the other Federal expenditures, the role of Defense/Space programs in the national economy, and the supply and demand for scientific manpower. These and similar studies will be conducted during FY 1967 to enhance NASA's understanding of the implications of the space program.

A recognition of the need to solve critical management problems and possibly to develop wholly new techniques for managing such a large and complex research and development enterprise as the NASA led to the support of study areas that include the organization and management of large R&D projects, the diversified roles of the research director, the government-industry contracting system, conditions under which the transfer of new technology takes place in the economy, and top level policy and decision-making in large R&D organizations. During FY 1967 NASA will continue to support a modest program of research on such management problems, the solution of which will promote increased management efficiency both within the agency and within those industries with whom NASA has contacts.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

JOHN F. KENNEDY SPACE CENTER, NASA

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Office of Space Science and Applications Projects:	
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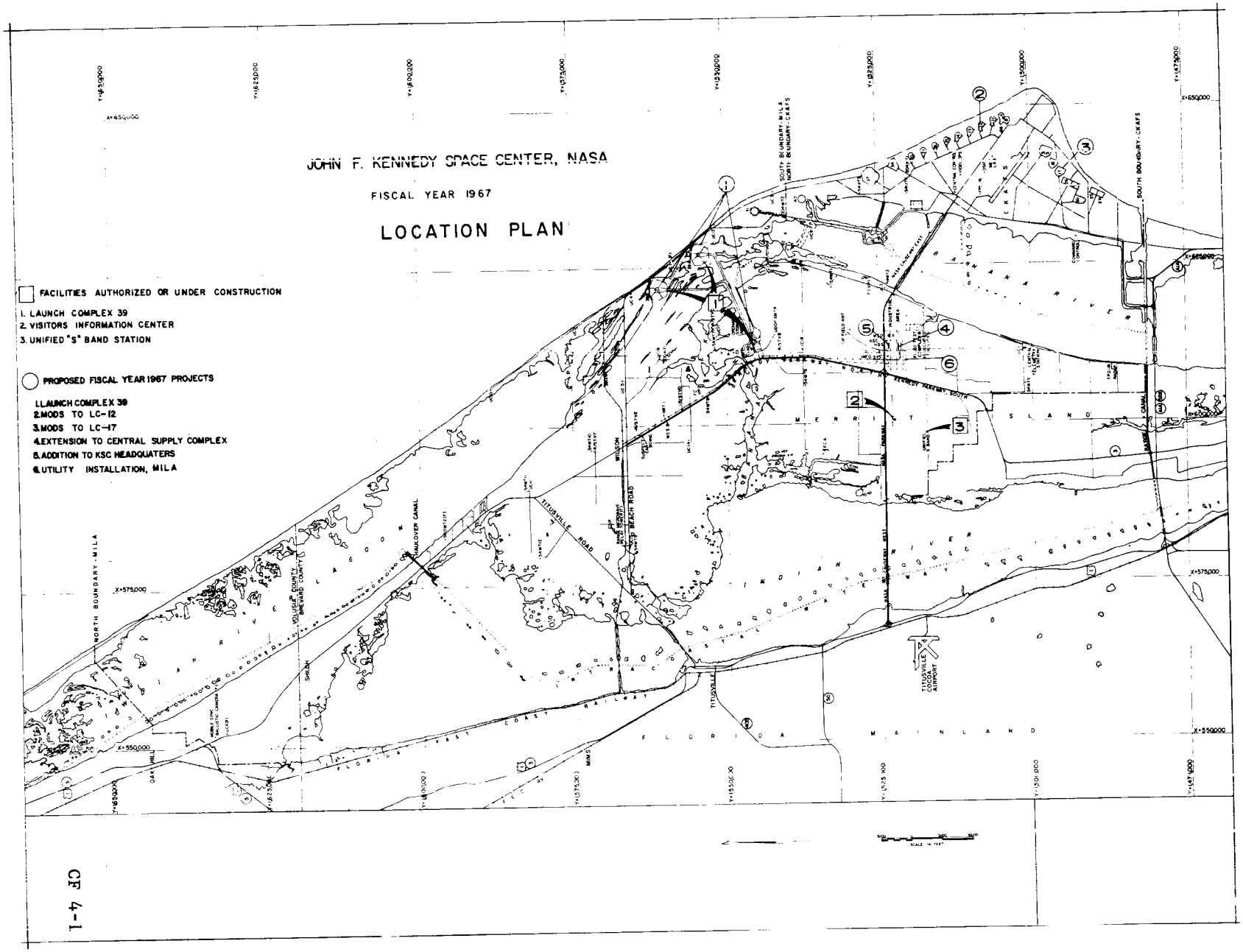
JOHN F. KENNEDY SPACE CENTER, NASA
FISCAL YEAR 1967
LOCATION PLAN
FACILITIES AUTHORIZED OR UNDER CONSTRUCTION
1. LAUNCH COMPLEX 39
2. VISITORS INFORMATION CENTER
3. UNIFIED "S" BAND STATION
PROPOSED FISCAL YEAR 1967 PROJECTS
1. LAUNCH COMPLEX 39
2. MODS TO LC-12
3. MODS TO LC-17
4. EXTENSION TO CENTRAL SUPPLY COMPLEX
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6. UTILITY INSTALLATION, MILA
NORTH BOUNDARY - MILA
SOUTH BOUNDARY - MILA
NORTH BOUNDARY - CKAFS
SOUTH BOUNDARY - CKAFS
TITUSVILLE ROAD
WILSON
BEACH ROAD
MALDVER CANAL
TITUSVILLE
TITUSVILLE COCOA AIRPORT
KENNEDY PARKWAY SOUTH
MERRITT ISLAND
INDIAN RIVER
FLORIDA MAINLAND
FLORIDA EAST COAST RAILWAY
VOLUSIA COUNTY
BREVARD COUNTY
X=575,000
X=550,000
X=650,000
Y=1,650,000
Y=1,625,000
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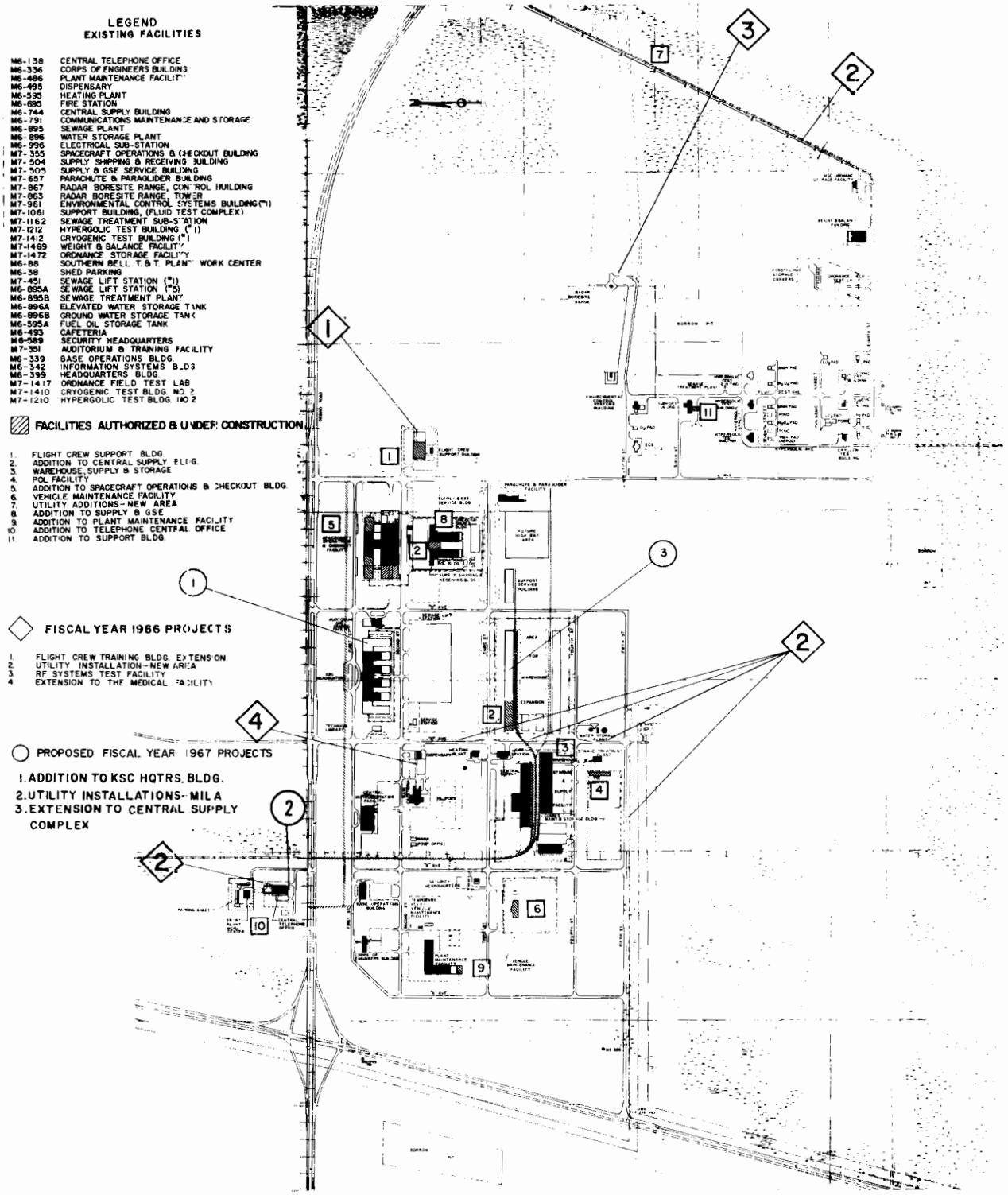
JOHN F. KENNEDY SPACE CENTER

FISCAL YEAR 1967 ESTIMATES

LOCATION PLAN



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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 1967 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION	COGNIZANT PROGRAM OFFICE FOR INSTALLATION	LOCATION OF INSTALLATION	COUNTY	NEAREST CITY
John F. Kennedy Space Center, NASA	Manned Space Flight	Merritt Island, Florida	Brevard	Cocoa Beach

INSTALLATION MISSION

The Center conducts overall planning and supervision of the integration, test, checkout, and launch of NASA space vehicle systems at the Eastern Test Range (ETR) and Merritt Island, and provides support services for all NASA elements located in the area.

PERSONNEL STRENGTH	FY 1965	FY 1966	FY 1967
NASA PERSONNEL *(End of Year)*	2491	2666	2796
CONTRACTOR AND OTHER PERSONNEL	8192	13847	14535
TOTAL ALL PERSONNEL	10683	16513	17331

LAND	NO. ACRES
NASA-OWNED	84,305
OTHER GOVERNMENT AGENCY-OWNED	121
NON-FEDERAL *(Leases, easements)*	3,351
TOTAL LAND	87,777
TOTAL CAPITAL INVESTMENT* *(Including NASA-Owned Land) (as of June 30, 1965)*	$ 561,762.0

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 1961 THRU CURRENT YEAR	FY 1967 *(Estimated)*	FUTURE YEARS *(Estimated)*	TOTAL ALL YEARS *(Estimated)*
Launch Complex 39	MSF	418,435.9	29,500.0	-	447,935.9
Extension to Central Supply Complex	MSF	5,857.0	600.0	-	6,457.0
Addition to KSC Headquarters Building	MSF	9,097.5	3,500.0	-	12,597.5
Utility Installations - MILA	MSF	179.0	2,897.0	-	3,076.0
Modifications to Launch Complex 17	SSA	1,921.0	740.0	6,000.0	8,661.0
Modifications to Launch Complex 12	SSA	1,283.0	639.0	5,000.0	6,922.0
ALL OTHER PROJECTS		388,359.6			
TOTALS		825,133.0	37,876.0		

NASA FORM 1029 (REV. JUN 65) PREVIOUS EDITIONS ARE OBSOLETE.

* *Includes work in process.*

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

LAUNCH COMPLEX 39

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: New

FUNDING:

FY 1966 and Prior Years	$418,435,867
FY 1967 Estimate	29,500,000
Total Funding Through FY 1967	$447,935,867

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	----
Construction				$14,840,000
Vehicle assembly building	LS	---	$11,450,000	11,450,000
Launch areas and crawlerways	LS	---	3,390,000	3,390,000
Equipment				$14,660,000
Mobile service structure	LS	---	700,000	700,000
Crawler transporters	LS	---	500,000	500,000
Propellant services	LS	---	3,070,000	3,070,000
Communications and TV	LS	---	4,340,000	4,340,000
Firing accessories	LS	---	2,500,000	2,500,000
Instrumentation	LS	---	3,550,000	3,550,000
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$29,500,000

PROJECT PURPOSE:

To continue the construction of facilities which will be used in direct support of assembly, checkout and launch of the Saturn V space vehicle and Apollo spacecraft.

PROJECT DESCRIPTION:

The project provides for the continuation of construction and activation of Launch Complex 39. The work started in prior years included the basic construction of the Vehicle Assembly Building, Launch Areas, and other facilities, and installation of related equipment and instrumentation. The following items of work will be required:

Vehicle Assembly Building - Fabrication and erection of work platforms, as well as complete outfitting of the building. Activation work will be accomplished which involves adjustments to, relocation of, and modifications to utilities, structures and equipment.

Launch Areas - Installation of redundant power and mechanical systems. In addition, activation work will be accomplished in such areas as the Pad Terminal Connecting Rooms and Environmental Control System Rooms. This consists of mechanical and electrical service extensions in support of vehicle and spacecraft ground support equipment.

Mobile Service Structure - Outfitting of the structure with piping and piping connections to service the Lunar Excursion Module (LEM).

Crawler-Transporter - Complete outfitting of the crawler, and incorporate modifications resulting from the testing program. This includes adjustments to the steering, braking and drive systems.

Propellant Services - Installation of propellant systems equipment in the launch control center and the launch area in accordance with current program requirements. Launch Control Center requirements include the installation of electric panels, a propellant tanking computer system and a digital events evaluator. At the launch areas propellant lines, pumps, valves and related connections will be installed.

Communications - Installation of communications and instrumentation networks to support current program requirements. Included are modifications to the paging system which augment the complex warning system, additions to the operational intercommunications system, and extension of the instrumentation network to include the ground measuring system.

Firing Accessories - Fabrication, installation, checkout and refurbishment after testing of the swing arms which will be mounted on the Launcher Umbilical Towers.

Instrumentation - Procurement, installation and interconnection of measurement recording systems between the Launch Control Center and the High Bay area. These systems will record vehicle measurements such as vibration, acoustics, meteorological data and radio frequency checkout.

PROJECT JUSTIFICATION:

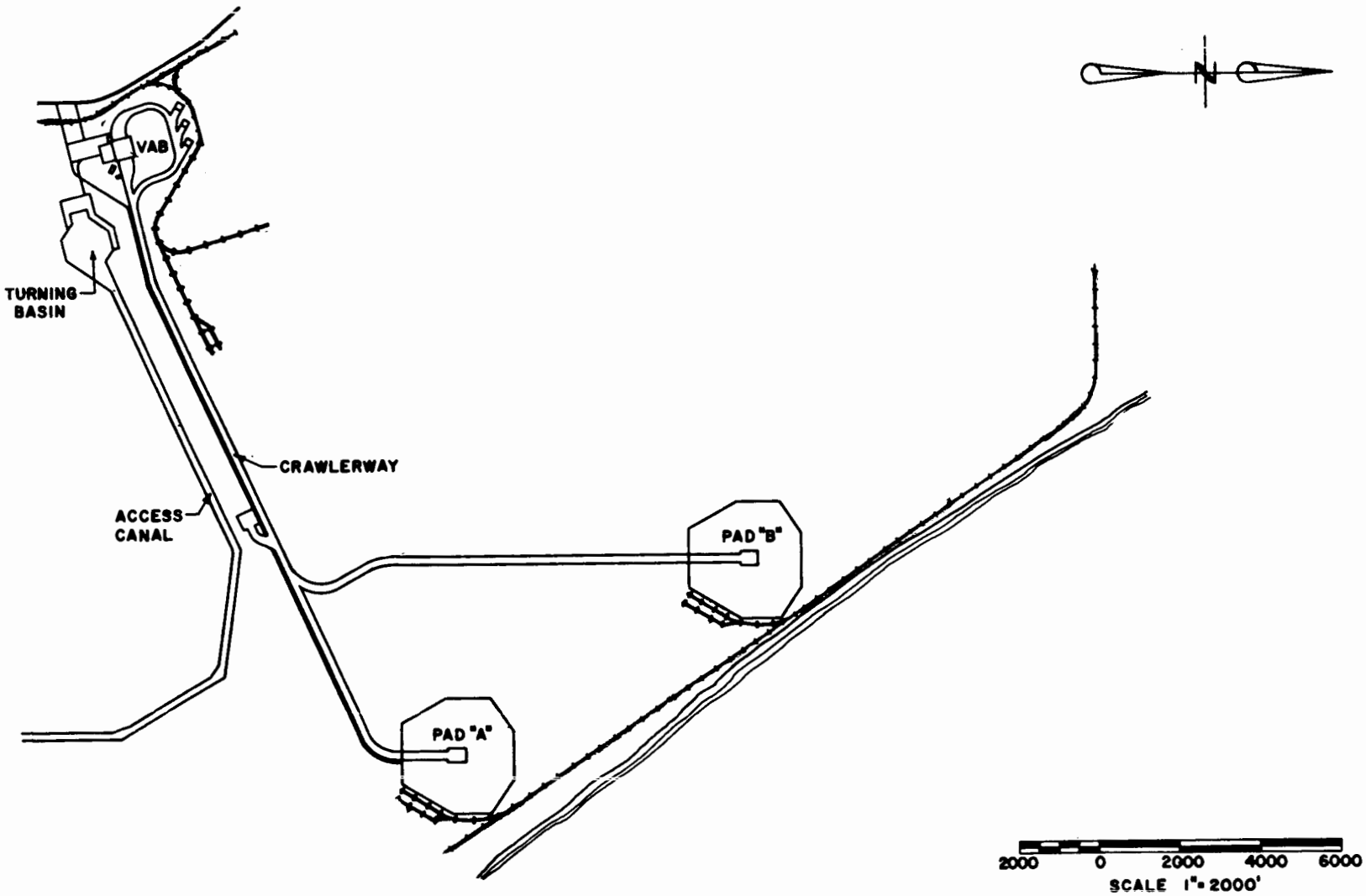
This project will continue the construction and outfitting of all elements of the complex necessary for assembly, checkout and launch of the Apollo/Saturn V space vehicle. It will also permit adaptation of all facilities and ground service equipment to the final configuration of the launch vehicle and spacecraft. This will require adjustments, relocations and modifications to utilities, structures and equipment.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: It is estimated that $5-10 million will be required on a yearly basis to meet technical modifications dictated by specific test requirements.

JOHN F. KENNEDY SPACE CENTER, NASA

FISCAL YEAR 1967 ESTIMATES

LAUNCH COMPLEX NO. 39



CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

EXTENSION TO CENTRAL SUPPLY COMPLEX

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: Extension

FUNDING:

FY 1966 and Prior Years	$5,857,000
FY 1967 Estimate	600,000
Total Funding Through FY 1967	$6,457,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$532,000
Utilities	LS	---	$34,000	34,000
Building	Sq. Ft.	50,520	9.86	498,000
Equipment				68,000
Bins, racks, etc.	LS	---	68,000	68,000
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$600,000

PROJECT PURPOSE:

This project will provide for construction of additional storage space phased to meet the requirements of the current program at the Kennedy Space Center.

PROJECT DESCRIPTION:

The project will provide an extension to existing storage facilities. Construction features will include a concrete frame structure with masonry curtain walls, and a steel frame roof similar to existing warehouse facilities. The structure will provide 50,520 square feet of enclosed storage area. Essential utilities will be included.

PROJECT JUSTIFICATION:

An addition to the Kennedy Space Center Supply Complex is required to keep pace with increases in Center population and contractor activities. Approximately 417,000 square feet will be required by the end of Calendar Year 1967 whereas only 366,374 square feet will be available.

Warehouse space currently available for the Kennedy Space Center is as follows:

Merritt Island Launch Area	309,140 square feet
Cape Kennedy	42,234 square feet
Vacated Residential Structures	15,000 square feet
	366,374 square feet

All existing space is being used to capacity for the storage of common use items and in support of launch contractors (spare parts for facilities, stage, and spacecraft hardware). The Center is currently utilizing all Air Force storage facilities on the Cape that are not presently required by the Air Force. Several of these buildings are converted hangars and temporary structures. In addition, approximately 15,000 square feet of former residences have been converted to storage. These former dwellings, which were acquired as part of the Merritt Island Land Purchase, are highly unsatisfactory since maintenance costs are excessive, security problems are severe, and the scattered nature of these buildings give rise to an inefficient operation.

Requirements for storage space were based upon an analysis of similar operations by the Air Force, and inputs by stage, spacecraft and support contractors. From these studies the following "Indicators" were developed which established the magnitude of warehouse space required.

The number of line items requiring storage will increase from 26,000 to 70,000

The volume of material to be handled will increase from 1,270 tons per month to an estimated 2,000 tons per month

The Center population to be supported will increase from 10,000 to 17,000

A direct extrapolation of the "Indicators" leads to the conclusion that warehouse space requirements must be doubled. However, by "second-decking" of supply bins, by reducing inventories through more frequent reordering of common supply items, and through the use of exterior storage whenever possible, the deficiency has been reduced to approximately 50,000 square feet by the end of 1967. The 42,000 square feet of space available in Air Force Cape storage facilities as well as the 15,000 square feet of former residences will be utilized for slow moving storage even with the construction of the proposed extension.

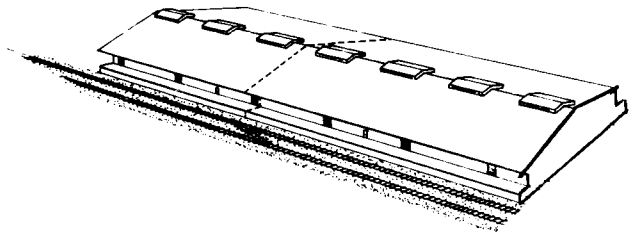
ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT:

Additional space requirements will be dependent on the scope of future years' programs.

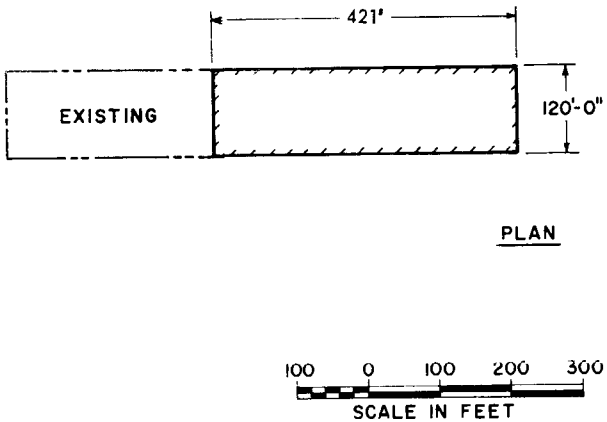
JOHN F. KENNEDY SPACE CENTER, NASA

FISCAL YEAR 1967 ESTIMATES

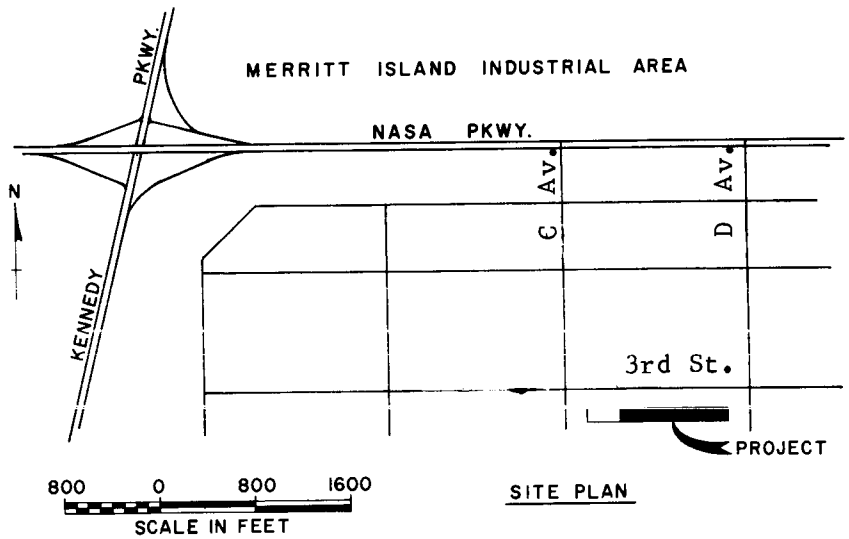
EXTENSION TO CENTRAL SUPPLY COMPLEX



PERSPECTIVE



PLAN



SITE PLAN

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CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

ADDITION TO KSC HEADQUARTERS BUILDING

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: Extension

FUNDING:

FY 1966 and Prior Years	$9,097,524
FY 1967 Estimate	3,500,000
Total Funding Through FY 1967	$12,597,524

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$3,330,000
Site Preparation	LS	---	$72,000	72,000
Utilities	LS	---	221,000	221,000
Building	Sq. Ft.	116,000	26.18	3,037,000
Equipment				$150,000
Communications	LS	---	70,000	70,000
Office equipment	LS	---	80,000	80,000
Design	---	---	---	---
		Subtotal		$3,480,000
Fallout Shelter	---	---	---	20,000
		TOTAL		$3,500,000

PROJECT PURPOSE:

This project will provide 116,000 square feet of engineering and administrative type space which will alleviate a personnel housing problem resulting from an increase in personnel through the Fiscal Year 1967-68 time period.

PROJECT DESCRIPTION:

Approximately 116,000 gross square feet (87,000 net square feet) of engineering and administrative space at the Kennedy Space Center will be constructed as additions to the Kennedy Space Center Headquarters Building. These additions will house 988 personnel. Two wings, each two stories in height, will be constructed with reinforced concrete frame and masonry curtain walls. All interior and exterior utilities, access roads and parking facilities are also included.

PROJECT JUSTIFICATION:

By the end of Calendar Year 1967 the need for engineering and administrative type space at the Kennedy Space Center will assume critical proportions. Currently, a total of 7,123 personnel require administrative type space at the Center. However, during Fiscal Year 1967, the need for such space will increase to 11,473 personnel. Facilities currently in existence, under construction, or programmed will provide space for only 7,271 personnel. Thus, a deficiency of 4,202 spaces will exist during this time period.

The population factors outlined above were developed through an evaluation of ceilings for NASA personnel, while contractor personnel needs were based on negotiated contracts, and/or known resources ceilings for the time period. The following is a listing of NASA and contractor personnel who will require space, as well as the basis for estimate:

Organization	Administrative Space Requirements	Basis for Estimate
NASA	2,091	Established ceilings
Other Government	106	Agency projections
Support Contractors	5,102	Negotiated contracts
Stage Contractors	4,174	Negotiated contracts, or forecasts based on contracts currently under negotiation.
Total	11,473	

In order to alleviate the deficiency of 4,202 spaces, the following alternative courses of action have been considered:

Construct a new facility to provide space for 988 personnel resulting in an overall Center factor of 89 square feet per person. Since this

factor is far below accepted standards, it will be necesary to overcrowd all permanent facilities, and continue maximum use of trailers and substandard structures. This is considered to be the most effective and economical alternative.

Lease 116,000 square feet of commercial space. The annual cost (at $4.50 per square foot) will be $522,000. Since the cost of a new building can be amortized in about seven years, this is not considered to be an economical alternative.

Purchase additional trailers. The Center, by the end of 1967, will have in operation a total of 96,000 square feet of trailer space. If the proposed building addition is not constructed, an equivalent amount of trailer space (116,000 SF) must be purchased. This will require about 290 additional trailers having a useful life of eight years, at a total cost of $1,595,000. Installation costs will amount to $87,000. Since trailers are basically an ineffective and inefficient method for housing a permanent complement, this too is not considered to be an economical or effective alternative.

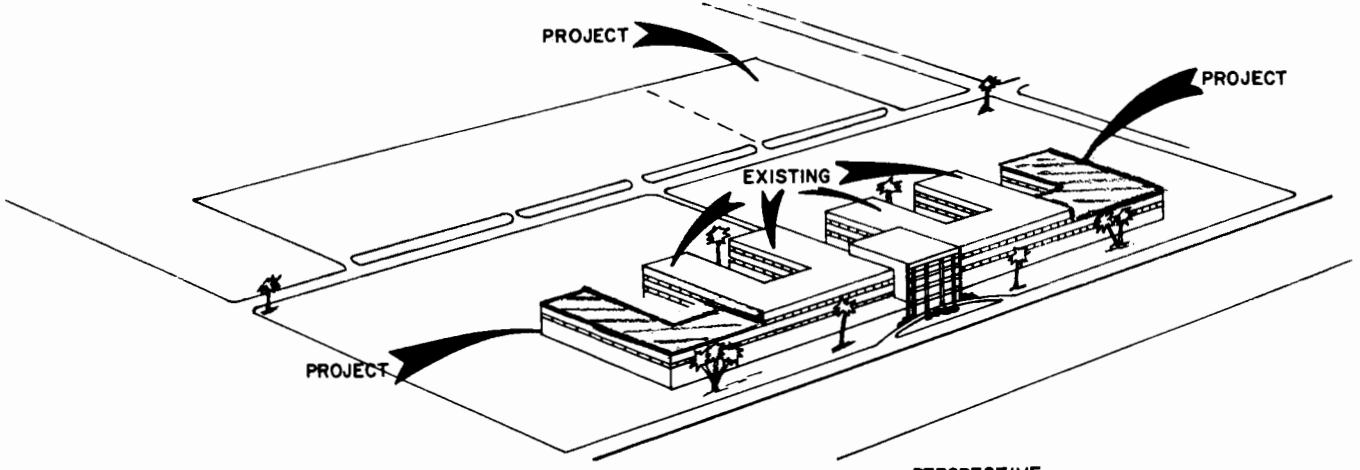
ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT:

Any additional construction will be requested on a phased basis to provide for deficiencies as they occur in the future.

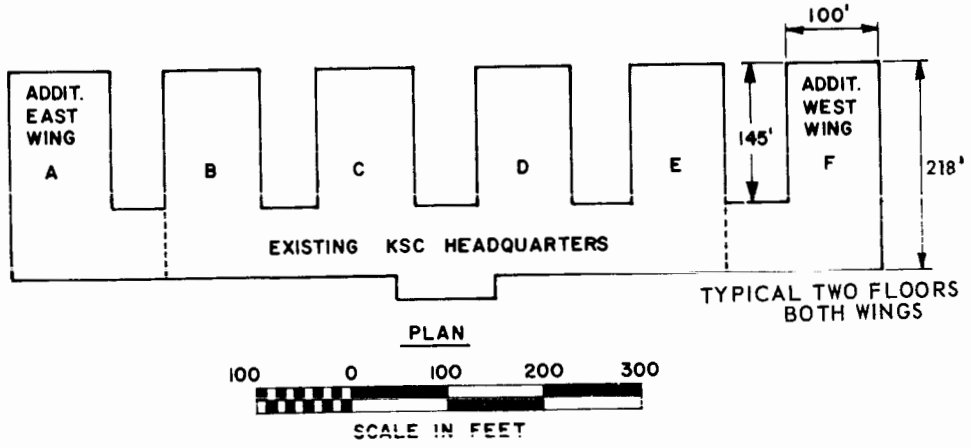
JOHN F. KENNEDY SPACE CENTER, NASA

FISCAL YEAR 1967 ESTIMATES

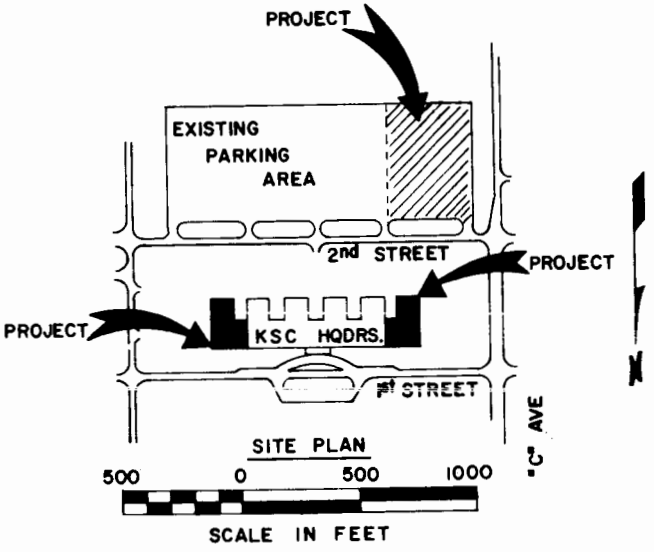
ADDITION TO KSC HEADQUARTERS BLDG.



PERSPECTIVE



PLAN



SITE PLAN

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

UTILITY INSTALLATIONS - MILA

AUTHORIZATION LINE ITEM: John F. Kennedy Space Center, NASA

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Merritt Island, Brevard County, Florida

COGNIZANT NASA INSTALLATION: John F. Kennedy Space Center, NASA

TYPE OF CONSTRUCTION PROJECT: Extension

FUNDING:

FY 1966 and Prior Years	$179,000
FY 1967 Estimate	2,897,000
Total Funding Through FY 1967	$3,076,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$1,281,000
Electrical system extensions				1,199,000
13.2 KV distribution line	LF	(31,700)	($10.63)	(337,000)
69 KV circuit breakers	LS	---	(703,000)	(703,000)
Supervisory system and fault indicators	LS	---	(159,000)	(159,000)
Addition to central telephone office				82,000
Utilities	LS	---	(17,000)	(17,000)
Building	Sq. Ft.	(2,000)	(32.50)	(65,000)
Equipment				$1,616,000
Wideband channelizing	LS	---	621,000	621,000

	Unit of Measure	Quantity	Unit Cost	Total Cost
Testing and switching center				995,000
Wideband data and video	LS	---	(458,000)	(458,000)
Timing distribution	LS	---	(3,000)	(3,000)
Voice and voiceband data	LS	---	(397,000)	(397,000)
Recording	LS	---	(72,000)	(72,000)
Administrative telephone	LS	---	(15,000)	(15,000)
Teletype and fascimile	LS	---	(50,000)	(50,000)
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$2,897,000

PROJECT PURPOSE:

This project will provide the necessary additions to existing electrical distribution and communications systems consistent with the development of the John F. Kennedy Space Center, NASA.

PROJECT DESCRIPTION:

Electric Power - additions to the electrical system will include:

Tie-lines in the 13.2 Kilovolt (KV) distribution system between (a) the Fluid Test Area and the Central Telemetry Facility, and (b) the Frequency Control and Analysis Building and the Unified "S" Band Facility.

The installation of oil circuit breakers on the primary side of the industrial and instrumentation transformers in the Launch Complex 39 and the Merritt Island Industrial Area substations.

A supervisory control system and fault indicator devices on the existing 13.2 KV distribution system.

Communications - the expansion of the base communication system consists of:

Installation of wideband channelization equipment for multiplexing (dividing into more than one channel) 40 existing cable lines between Merritt Island and Cape Kennedy into two data channels each.

Construction of an addition to the existing Central Telephone Office, containing approximately 2,000 square feet.

Procurement and installation of Test and Switching Center equipment which consists of additional and/or enlarged audio, video and wideband monitoring, test, patching and switching equipment to be located at the Central Telephone Office. The equipment will be used for monitoring, testing, switching and recording of wideband data, voice band data, administrative telephone, teletype, facsimile and television circuits and displaying the status of all circuits in operation. The test and switching center consolidates test and switching capabilities, provides a central point for reporting trouble, insures that circuit criteria are met, and establishes responsibility for circuit control for all launch critical circuits.

PROJECT JUSTIFICATION:

The expansion of the utility systems is required to meet the orderly development of the Merritt Island Launch Area.

Electric Power:

The tie-lines from the Fluid Test Area to the Central Telemetry Facility, and from the Frequency Control and Analysis Building to the "S" Band Facility are necessary to provide a loop which will prevent interruption of operations if a power outage should occur in any single power line supplying these facilities. This will eliminate a possible loss of data due to power failure in a launch critical facility. A loss of power in either the Central Telemetry Facility, Frequency Control and Analysis Facility, or the "S" Band Facility would require a hold on any launch operation from the Kennedy Space Center.

Oil circuit breakers must be installed as protective devices on the primary side of the transformers. The equipment will restrict the trouble to the particular transformer circuit concerned. It will preclude voltage fluctuations on the other circuits in the systems and assure constant instrumentation power for better reliability.

The supervisory control system and fault indicators are required to provide a fast and efficient method for location and isolation of faults and outages in the electrical distribution system. These outages must be identified and repaired as early as possible to reduce the effects on launch critical facilities.

Communications:

The wideband channelization system is necessary to increase the transmission capability to meet increased requirements for wideband data

and television circuits without the more costly installation of additional lines. Without this system or the installation of additional lines, adequate wideband circuits between the Central Telephone Office and the launch facilities at Cape Kennedy will not be available to support current launch programs. Certain simultaneous operations, such as spacecraft checkout, simulated count down, and launch from various complexes, cannot be performed.

The addition to the Central Telephone Office is necessary to house the Test and Switching Center equipment.

The installation of the test and switching equipment in a central location eliminates confusion and duplication in reporting and clearing trouble by manual means, permits maximum circuit flexibility, and establishes a single point of responsibility. This comprehensive knowledge of operational circuits is dictated by the quick response, approximately fifteen minutes, which is demanded in restoring a communications outage during prelaunch and launch operations.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: This project will provide the necessary utilities required for the facilities to be constructed in the FY 67 time frame. Additional utilities will be required to support future facilities.

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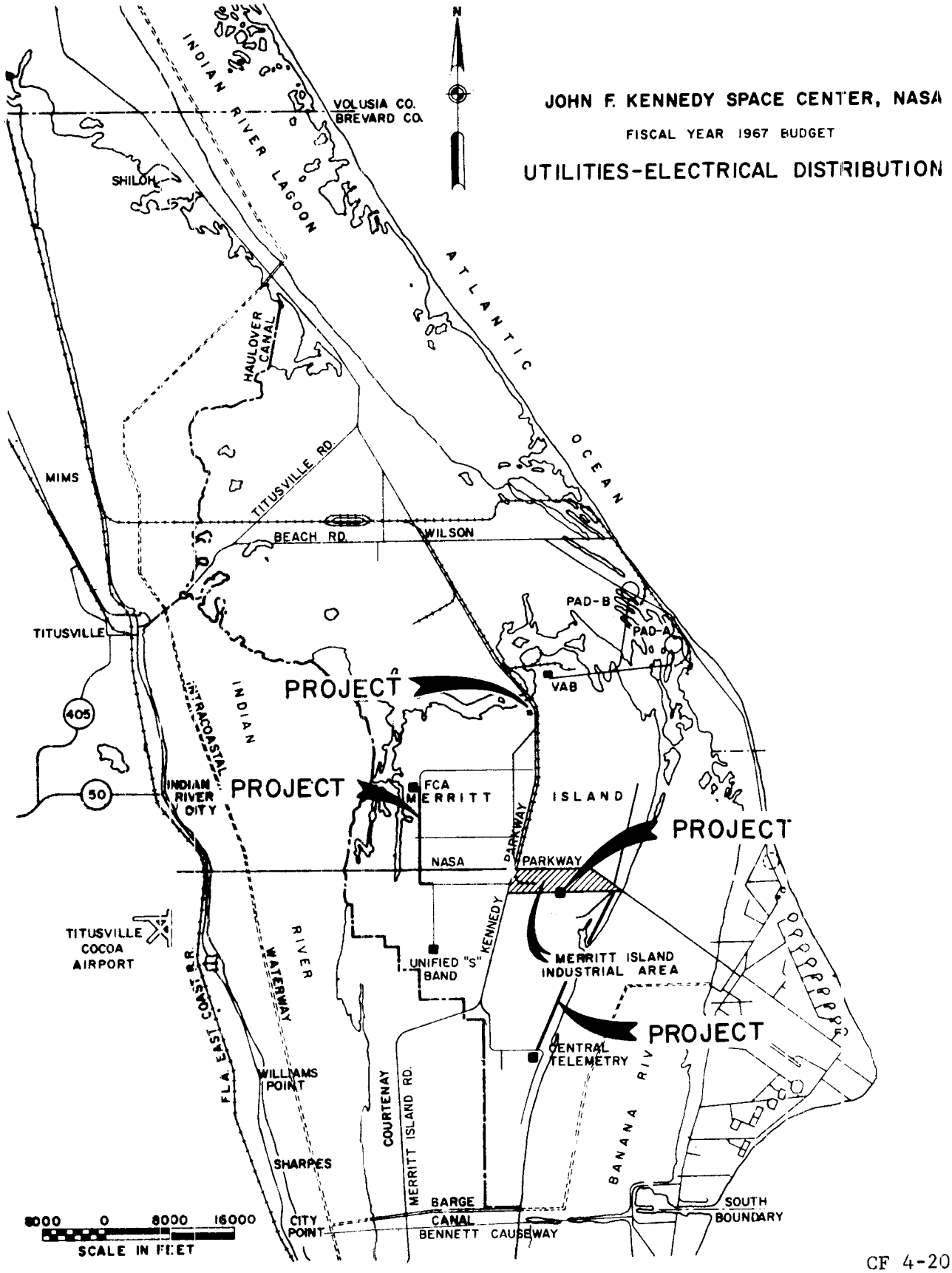
JOHN F. KENNEDY SPACE CENTER, NASA
FISCAL YEAR 1967 BUDGET
UTILITIES-ELECTRICAL DISTRIBUTION
N
VOLUSIA CO.
BREVARD CO.
INDIAN RIVER LAGOON
SHILOH
ATLANTIC OCEAN
HAULOVER CANAL
TITUSVILLE RD.
MIMS
BEACH RD.
WILSON
PAD-B
PAD-A
TITUSVILLE
VAB
PROJECT
INDIAN
INTRACOASTAL
405
50
INDIAN RIVER CITY
PROJECT
FCA
MERRITT
ISLAND
PROJECT
NASA
PARKWAY
PARKWAY
KENNEDY
TITUSVILLE COCOA AIRPORT
RIVER
WATERWAY
UNIFIED "S" BAND
MERRITT ISLAND INDUSTRIAL AREA
PROJECT
CENTRAL TELEMETRY
FLA. EAST COAST R.R.
WILLIAMS POINT
COURTENAY
MERRITT ISLAND RD.
BANANA RIV
SHARPES
BARGE CANAL
SOUTH BOUNDARY
CITY POINT
BENNETT CAUSEWAY
8000 0 8000 16000
SCALE IN FEET

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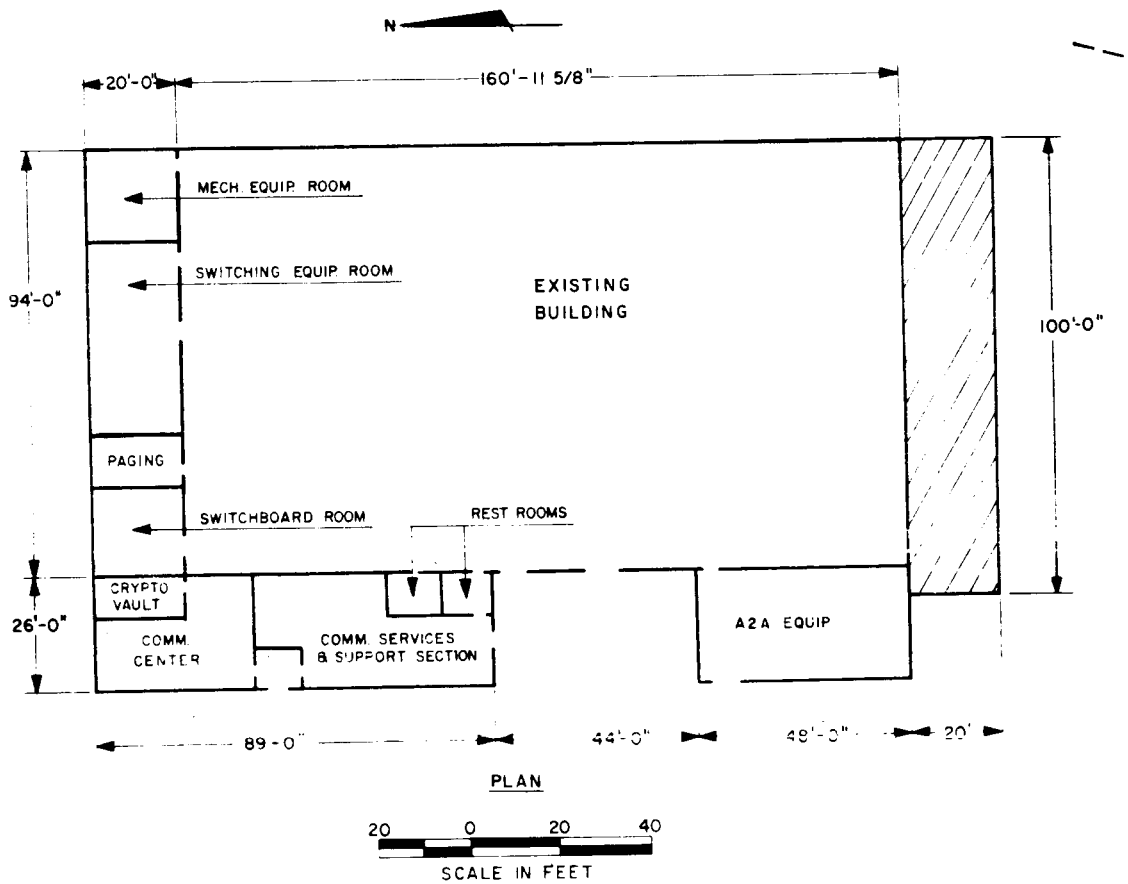
JOHN F. KENNEDY SPACE CENTER, NASA

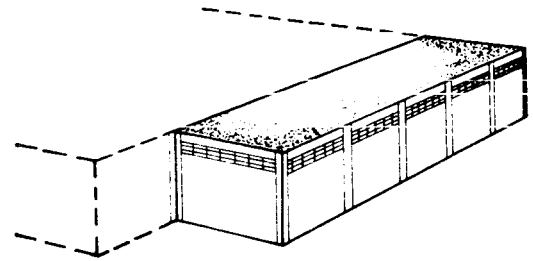
FISCAL YEAR 1967 ESTIMATES

UTILITY INSTALLATIONS - MILA

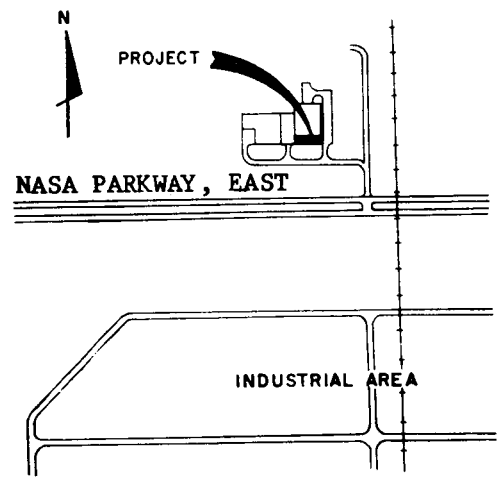
(ADDITION TO CENTRAL TELEPHONE OFFICE)



PLAN



PERSPECTIVE



SITE PLAN

400 0 400 800

SCALE IN FEET

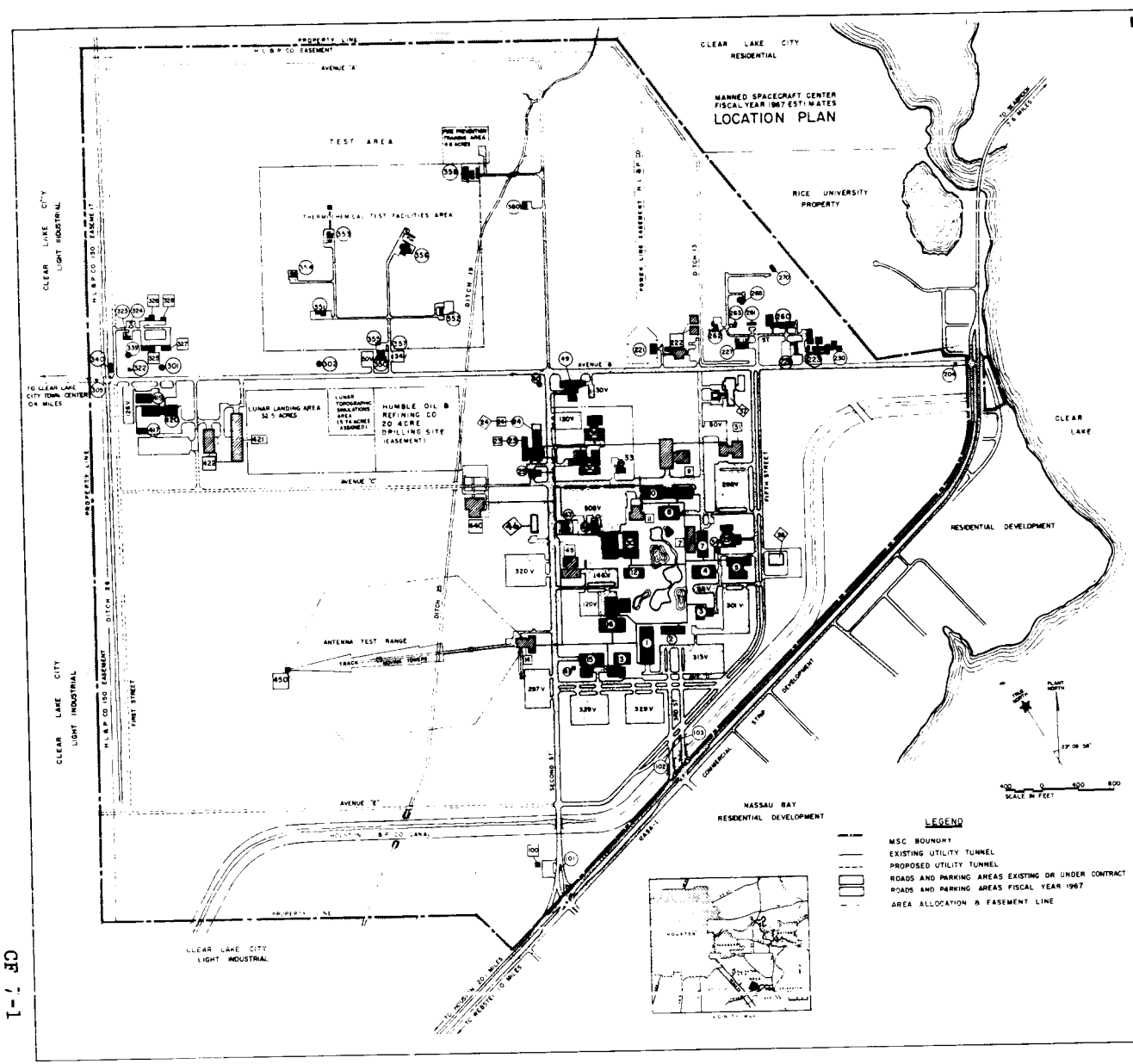
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

MANNED SPACECRAFT CENTER

	Page No.
Location plan	CF 7-1
Summary	CF 7-2
Office of Manned Space Flight Projects:	
Lunar sample receiving laboratory	CF 7-3
Flight crew training facility	CF 7-12
Engineering building	CF 7-16
Center support facilities	CF 7-21



(1) EXISTING FACILITIES (FY-62,63,64)

1 AUDITORIUM FY 62
2 PROJECT MANAGEMENT FY 62
3 CENTRAL CAFETERIA FY 62
4 FLIGHT OPERATIONS OFFICE FY 62
5 MISSION SIMULATION AND TRAINING FACILITY FY 64
7 LIFE SYSTEMS LABORATORY FY 62
8 TECHNICAL & ENGINEERING SERVICES OFFICE FY 62

10 TECHNICAL SERVICES SHOP FY 62

12 CENTRAL DATA OFFICE FY 62
13 SYSTEMS EVALUATION LABORATORY FY 62

15 INSTRUMENTATION AND ELECTRONIC SYSTEMS LABORATORY FY 62
16 SPACECRAFT RESEARCH OFFICE AND LABORATORY FY 62,64
23 CENTRAL H&C COOLING TOWER FY 62,63,64
24 CENTRAL HEATING AND COOLING PLANT FY 62,63,64
28 FIRE STATION FY 63
29 FLIGHT ACCELERATION FACILITY FY 63
30 MISSION CONTROL CENTER FY 63

32 SPACE ENVIRONMENT SIMULATION LABORATORY FY 62,65
33 ULTRA HIGH VACUUM SPACE CHAMBER FACILITY FY 64
34 FLIGHT ACCELERATION MOTOR-GENERATOR BUILDING FY 63
36 E.S.C. CONTRACTOR SUPPORT FACILITY FY 62
40 ELEVATED WATER TANK FY 62
41 GAS STORAGE FY 62

47 SOUTHWESTERN BELL TELEPHONE BUILDING NA
48 EMERGENCY POWER BUILDING (MCC-H) FY 63
49 VIBRATION AND ACOUSTIC TEST FACILITY FY 64

101 GUARDHOUSE FY 64
102 GUARDHOUSE FY 64
103 GUARDHOUSE FY 64
204 GUARDHOUSE FY 64
221 ELECTRICAL SUBSTATION FY 62

223 SEWAGE TREATMENT PLANT FY 62,64
226 FIELD CONSTRUCTION OFFICE FY 62,64
227 PRINTING AND REPRODUCTIONS FACILITY FY 65
230 CREW SYSTEMS BIOLOGICAL FACILITY FY 64
260 TRANSLATION AND DOCKING FACILITY FY 63
261 RADIOLOGICAL CALIBRATION AND WASTE STORAGE FACILITY FY 63,64
262 ARC JET, RADIANT HEATING AND ACOUSTIC TEST FACILITY FY 63
263 HEALTH PHYSICS LABORATORY FY 64
265 RADIATION AND FIELDS ACCELERATOR LABORATORY FY 65
270 SOLAR TELESCOPE FACILITY FY 65
301 WATER WELL NO. 1 FY 62
302 WATER WELL NO. 2 FY 62
305 GUARDHOUSE FY 64
322 WATER TREATMENT FY 62
323 FILTER CLEANING AND STORAGE FACILITY FY 65
324 CLASSIFIED WASTE DISINTEGRATOR FACILITY FY 65
339 GROUND WATER STORAGE TANK FY 62
340 GAS METERING STATION FY 62
350 THERMOCHEMICAL TEST FACILITY FY 63
351 THERMOCHEMICAL SPACE CHAMBER FY 63
352 ELECTRO-EXPLOSIVE DEVICES FY 63
353 REACTION CONTROL TEST FACILITY FY 63
354 SPACE POWER SYSTEMS TEST FACILITY FY 63
355 CHEMICAL STORAGE BUILDING FY 63
356 COMPONENTS TEST FACILITY FY 63
357 THERMOCHEMICAL TEST AREA GATE HOUSE FY 63
358 THERMOCHEMICAL PROPELLANT WASTE TREATMENT FY 63
380 HAZARDOUS MATERIAL STORAGE FACILITY FY 64
416 INTERIM OFFICE SUPPORT FACILITY FY 65
417 GARAGE FY 62
419 SUPPORT OFFICE FY 62
420 SUPPORT SHOP AND WAREHOUSE FY 62

(7) FACILITIES AUTHORIZED OR UNDER CONTRACT

7 LIFE SYSTEMS LABORATORY FY 65
9 TECHNICAL SERVICE FACILITY FY 65
11 BRANCH CAFETERIA FY 65
14 ANECHOIC CHAMBER TEST FACILITY FY 65
23 CENTRAL H&C COOLING TOWER FY 65
24 CENTRAL HEATING & COOLING PLANT FY 65
31 LUNAR MISSION & SPACE EXPLORATION FACILITY FY 65
32 SPACE ENVIRONMENT SIMULATION LABORATORY FY 65,66
33 ULTRA HIGH VACUUM CHAMBER FACILITY FY 64
45 PROJECT ENGINEERING FACILITY FY 64
100 SECURITY CONTROL CENTER FY 65
222 ATMOS RE-ENTRY MAT & STRUCTURES EVAL FACILITY FY 64
325 MAINTENANCE SHOP FACILITY FY 65
326 ROADS AND GROUNDS EQUIPMENT MAINTENANCE FACILITY FY 65
327 MSC WORK CONTROL CENTER FY 65
328 ROADS AND GROUNDS MATERIAL STORAGE FACILITY FY 65
[illegible] COMMISSARY SUPPORT WAREHOUSE FY 65
440 ELECTRONIC SYSTEMS COMPATABILITY
450 ANTENNA SERVICE BUILDING & TOWER FY 64
421 MISSION SUPPORT WAREHOUSE FY 66

(18) PROPOSED FISCAL YEAR 1967 PROJECTS

46 ENGINEERING BLDG
24 ADDITION TO CENTRAL HEATING & COOLING PLANT

35 FLIGHT CREW TRAINING FACILITY
37 LUNAR SAMPLE RECEIVING LABORATORY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY

CONSTRUCTION OF FACILITIES

FISCAL YEAR 19 67 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION	COGNIZANT PROGRAM OFFICE FOR INSTALLATION	LOCATION OF INSTALLATION	COUNTY	NEAREST CITY
Manned Spacecraft Center	Manned Space Flight	Houston, Texas	Harris	Houston

INSTALLATION MISSION

The Manned Spacecraft Center has as its primary mission the development of spacecraft for manned space flight programs. The Center is also responsible for manned space flight operations and conduct of astronaut training.

PERSONNEL STRENGTH	FY 1965	FY 1966	FY 1967
NASA PERSONNEL *(End of Year)*	4431	4928	4866
CONTRACTOR AND OTHER PERSONNEL	3112	5078	5366
TOTAL ALL PERSONNEL	7543	10006	10232

LAND	NO. ACRES
NASA-OWNED	1600
OTHER GOVERNMENT AGENCY-OWNED	
NON-FEDERAL *(Leases, easements)*	
TOTAL LAND	1600
TOTAL CAPITAL INVESTMENT* *(Including NASA-Owned Land) (as of June 30, 19 65)*	$ 241,093.5

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 1962 THRU CURRENT YEAR	FY 19 67 *(Estimated)*	FUTURE YEARS *(Estimated)*	TOTAL ALL YEARS *(Estimated)*
Lunar Sample Receiving Laboratory	MSF	495	9,100		9,595
Flight Crew Training Facility	MSF	60	1,100		1,160
Engineering Building	MSF	145	2,600		2,745
Center Support Facilities	MSF	56	1,000		1,056
ALL OTHER PROJECTS		85,659			
TOTALS		86,415	13,800		

NASA FORM 1029 (REV. JUN 65) PREVIOUS EDITIONS ARE OBSOLETE.

* *Includes work in process.*

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

LUNAR SAMPLE RECEIVING LABORATORY

AUTHORIZATION LINE ITEM: Manned Spacecraft Center

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Houston, Harris County, Texas

COGNIZANT NASA INSTALLATION: Manned Spacecraft Center

TYPE OF CONSTRUCTION PROJECT: New

FUNDING:

FY 1966 and Prior Years	$495,000
FY 1967 Estimate	9,100,000
Total Funding Through FY 1967	$9,595,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$5,924,900
Site preparation	LS	---	$385,900	385,900
Utilities	LS	---	126,700	126,700
Building	Sq. Ft.	86,800	39.52	3,430,300
Sample receiving laboratory	LS	---	(2,337,400)	(2,337,400)
Low level radiation counting lab	LS	---	(355,600)	(355,600)
Crew reception building	LS	---	(737,300)	(737,300)
Special construction features	LS	---	1,982,000	1,982,000
Biological barrier systems	LS	---	(1,324,900)	(1,324,900)
Shielding and underground structure	LS	---	(475,700)	(475,700)
Radon absorption system	LS	---	(181,400)	(181,400)

	Unit of Measure	Quantity	Unit Cost	Total Cost
Equipment				$3,175,100
Vacuum systems	LS	---	$1,430,000	1,430,000
Biological cabinet and support equipment	LS	---	1,181,000	1,181,000
Low level radiation counting equipment	LS	---	398,400	398,400
Medical equipment	LS	---	165,700	165,700
Design	---	---	---	---
Fallout Shelter	---	---	---	-0-
		TOTAL		$9,100,000

PROJECT PURPOSE:

This project will provide a central laboratory complex where samples of materials brought to earth by lunar exploration teams may be received, quarantined, processed, undergo limited experiments, and be distributed to the scientific community for further analysis; and where a simultaneous quarantine of the returned spacecraft, astronauts and associated personnel can be effected.

PROJECT DESCRIPTION:

The facility will house all functions required to receive, process and distribute samples of lunar materials and to facilitate the necessary quarantine of lunar exploration teams and spacecraft. It will incorporate all special features necessary to maintain strict quarantine standards while a variety of limited experiments are performed within a rigidly controlled environment prior to processing the samples for distribution. Principal features of this laboratory will include a gross area of approximately 86,800 square feet divided into three separate but connected structures; a two story sample laboratory of 57,500 square feet, a partially underground low level radiation counting laboratory of 7,300 square feet, and a single story crew reception building of 22,000 square feet. Specific features of each building are as follows:

Sample Receiving Laboratory (57,500 SF) - This will be a two story steel frame structure with precast concrete wall panels which will consist of the sample laboratory, support laboratories and offices. The sample laboratory will be a limited access area surrounded by a biological barrier necessary to meet the stringent quarantine requirements imposed on the samples and to prevent contamination by terrestrial organisms. Special air handling equipment and techniques will be used to maintain the integrity of the biological barrier. The

sample laboratory will house vacuum chambers and biological experimentation cabinets for receiving, decontaminating and opening the sample containers. Equipment will be available to isolate the samples while under test for biological life, or other substances that may be infectious, toxic or harmful to man, animal or plantlife. Facilities will also be installed for cataloguing and preparing the samples for distribution to universities and laboratories for further detailed scientific analysis.

Low Level Radiation Counting Laboratory (7,300 SF) - This laboratory will consist of two sections; an underground (approximately 50 feet below surface) ultra-low-level counting facility, and an above ground service facility. The size of the underground laboratory will be approximately 2,500 square feet. It will house a control room and radiation counting equipment which will be located in an area shielded by a low count material such as olivine or dunite enclosed in a low count metal shield. The above ground facility will be a standard steel frame, precast concrete structure with a gross area of approximately 4,800 square feet, which will be connected to the Sample Receiving Laboratory by means of a 70 foot enclosed corridor. This facility will house all mechanical and electrical equipment, maintenance areas and offices to support the radiation counting laboratory.

Crew Reception Building (22,000 SF) - This will be a single story building of steel frame construction with precast concrete wall panels. The building will provide living quarters and medical facilities for the returned astronauts, astronaut medical team and supporting personnel. Space will be provided for storage of the spacecraft and the spacecraft recovery isolation van and trailer. These areas will be surrounded by a biological barrier. This building will also be connected to the Sample Receiving Laboratory by means of a 28 foot enclosed corridor.

PROJECT JUSTIFICATION:

This project is required to provide the quarantine capability for lunar samples, the lunar exploration team, and the spacecraft, upon their return to earth from a lunar mission. Requirements for specific areas are as follows:

Sample Receiving and Low Level Radiation Counting Laboratories - One of the more significant aspects of the Apollo scientific program is the return of samples of lunar material. These samples will undergo analysis by outstanding scientists at universities and other recognized laboratories. The possibility, however, of contaminating the earth with pathogenic organisms from the moon requires that the samples be quarantined at a central location while tests are made to establish the presence

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or absence of pathogens. A central point of distribution is also required to assure that the samples are catalogued and identified properly as they are received, divided and distributed. During the quarantine period it is important that time-dependent scientific experiments, such as low level radiation counting, be commenced as quickly as possible since valuable data could be lost through delay. This requires that such experiments take place at the Sample Receiving Laboratory.

While many of the facility features and equipment are applications of existing technology, several represent true extensions of present capabilities. For example, low level radiation counting apparatus will incorporate a sensitivity ten times greater than the best now existing. The extra-high vacuum chamber will permit essential operations in an environment which will minimize the possibility of contamination from earth sources.

The need for a facility of this type has been recognized by the scientific community. Within NASA various panels have made extensive studies and noted the need in special reports. External to NASA, the Space Science Board of the National Academy of Sciences has endorsed an approach as proposed by this project.

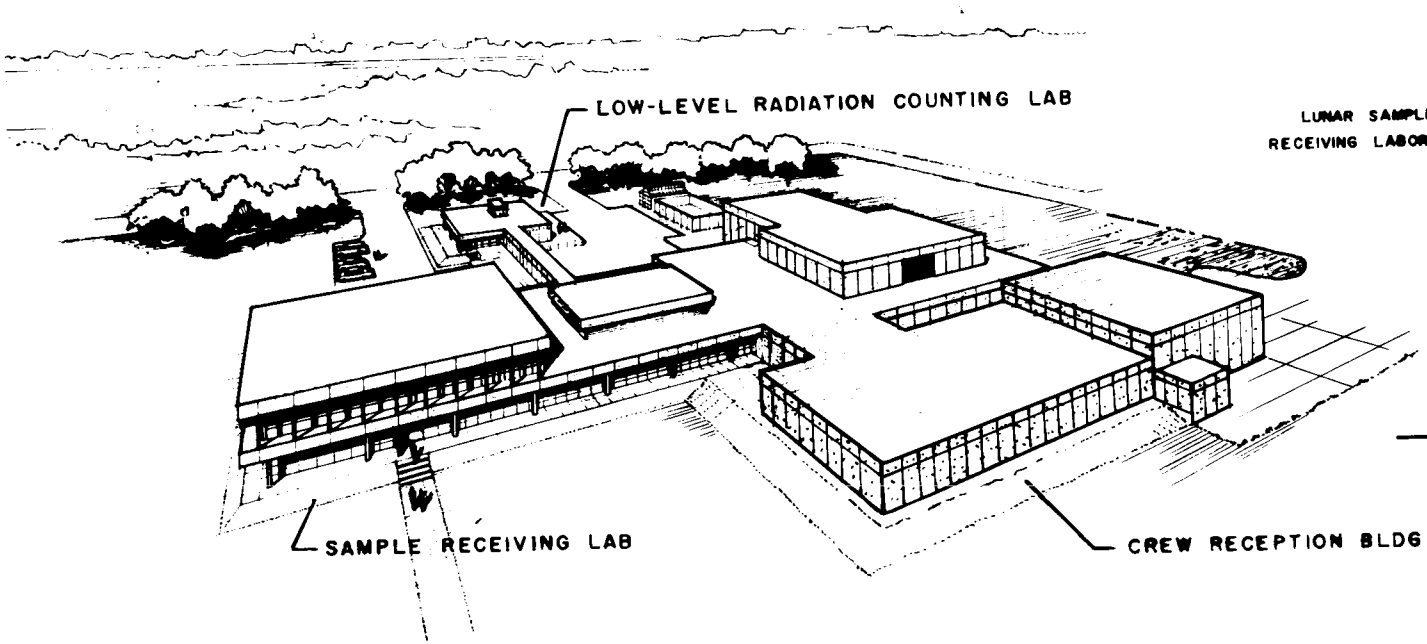
Crew Reception Building - In order to provide for the quarantine requirements of the Public Health Service, a Crew Reception Building is necessary. Upon return to earth, the spacecraft, astronauts, and the astronaut medical team must be placed into a spacecraft recovery isolation van and transported, under strict quarantine, from the recovery area to the Crew Reception Building where, during the quarantine period, they will reside, undergo medical examinations and participate in experiments. Only after favorable completion of all necessary biological quarantine clearance tests will the astronauts and equipment be released.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT:

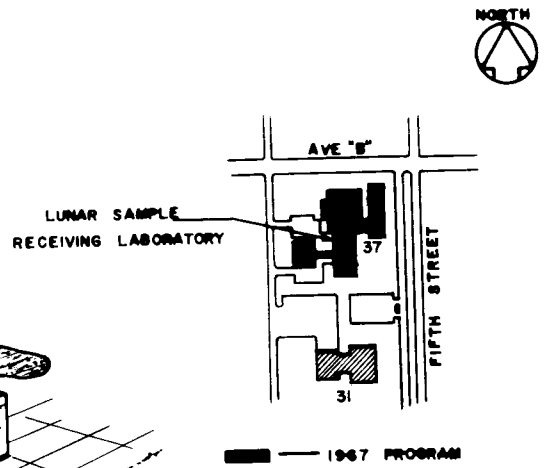
Based on current program requirements, no future year funding is anticipated.

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

LUNAR SAMPLE RECEIVING LABORATORY



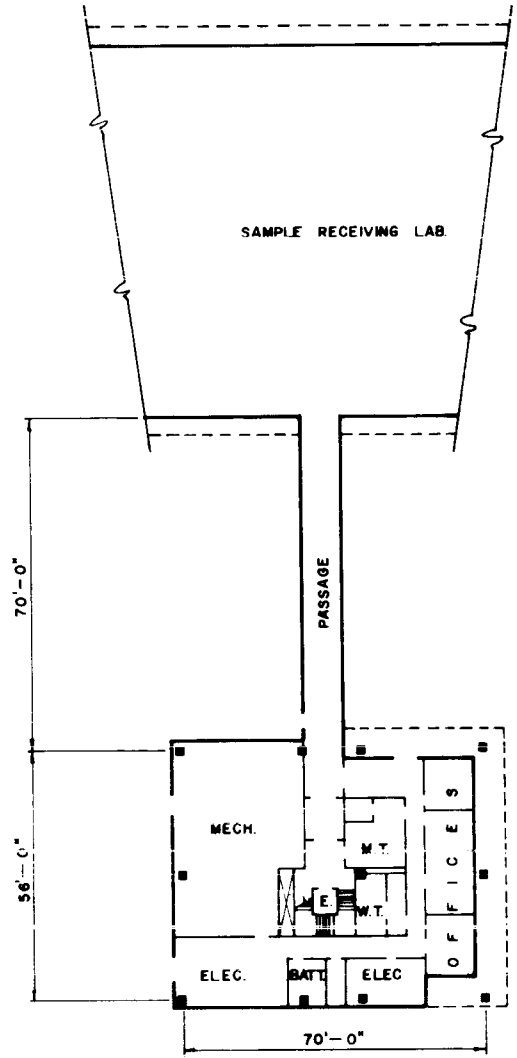
PERSPECTIVE



PARTIAL SITE PLAN

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

LUNAR SAMPLE RECEIVING LABORATORY

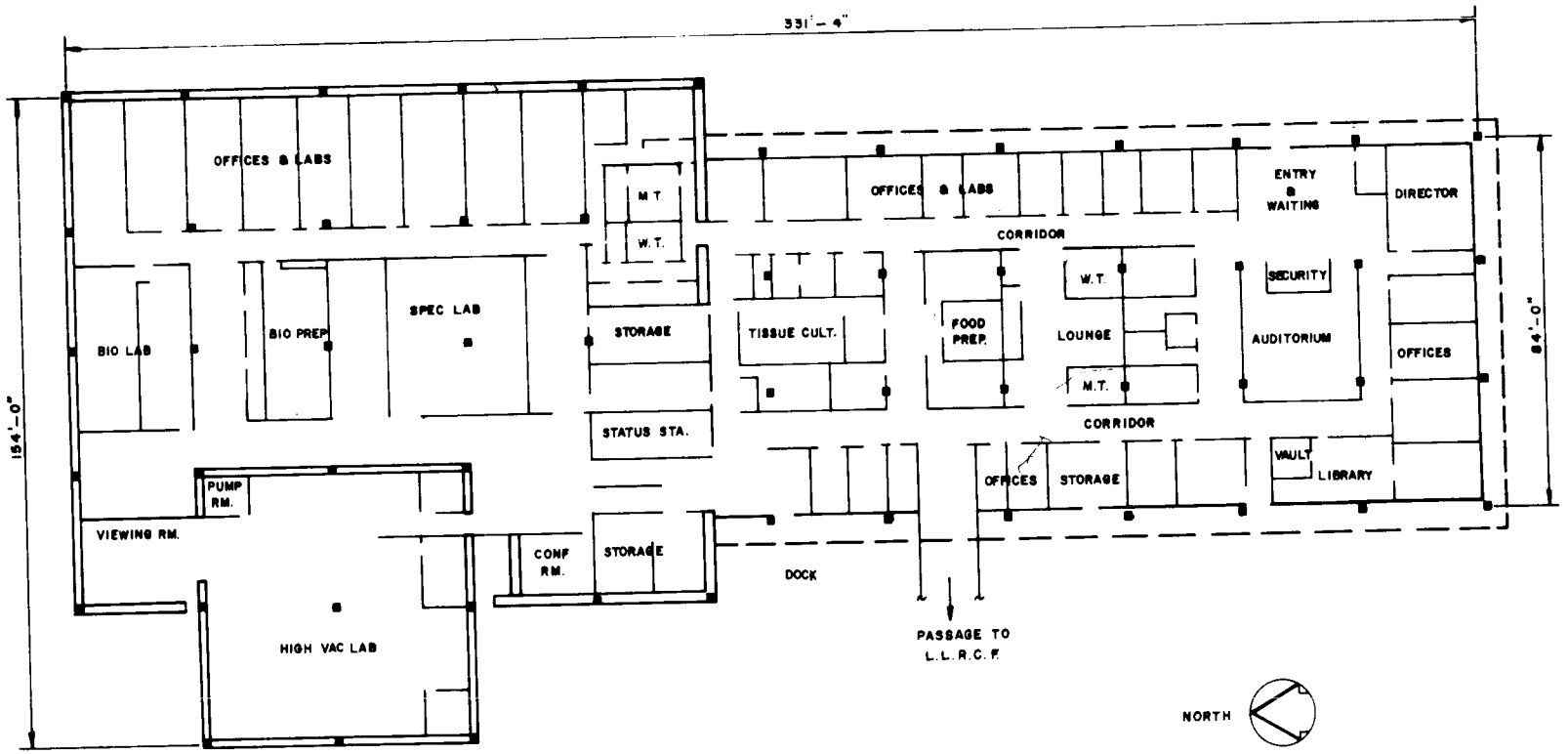


FLOOR PLAN

LOW-LEVEL RADIATION COUNTING LABORATORY

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

LUNAR SAMPLE RECEIVING LABORATORY

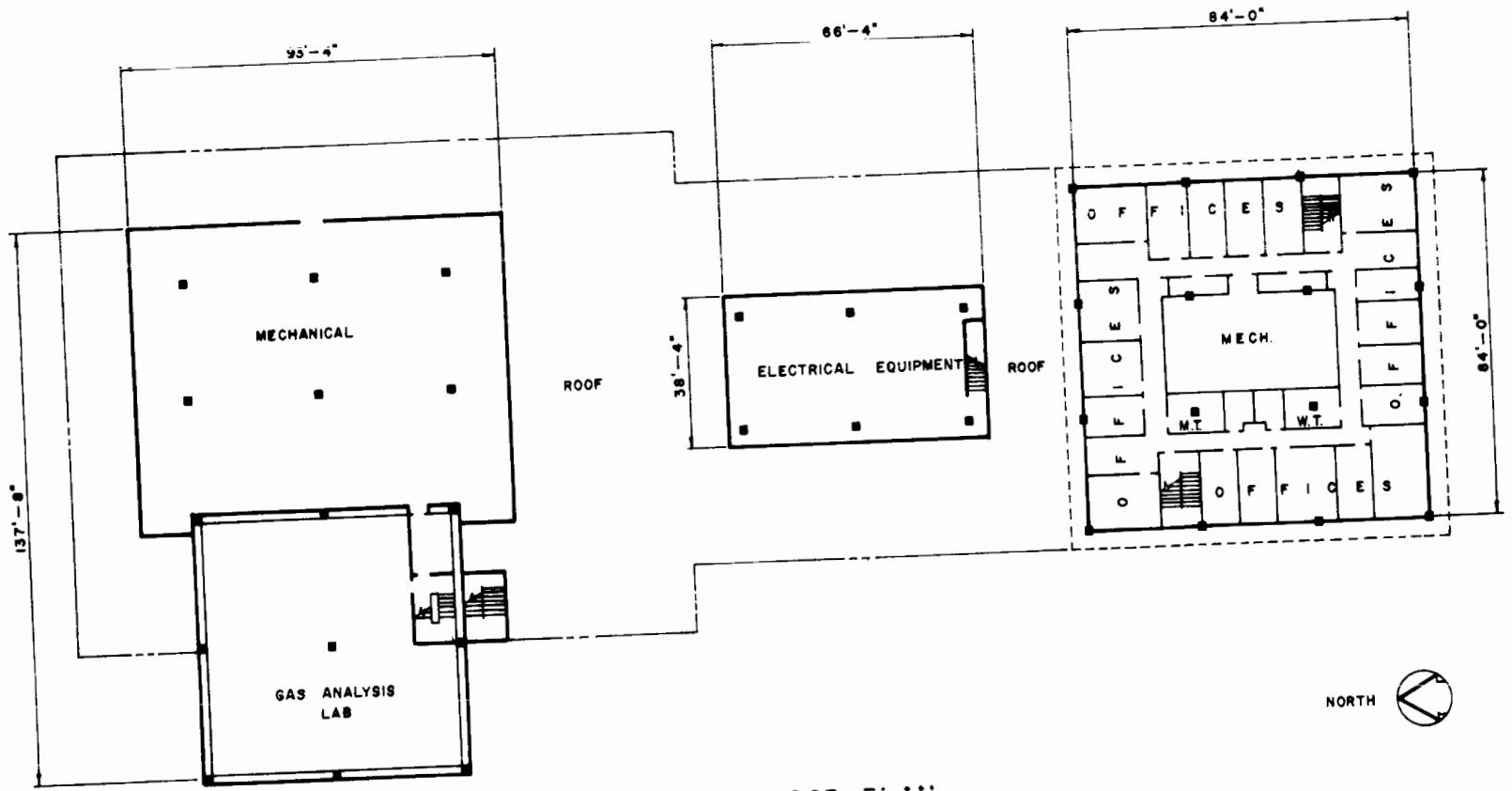


FIRST FLOOR PLAN

SAMPLE RECEIVING LABORATORY

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

LUNAR SAMPLE RECEIVING LABORATORY



SECOND FLOOR PLAN

SAMPLE RECEIVING LABORATORY

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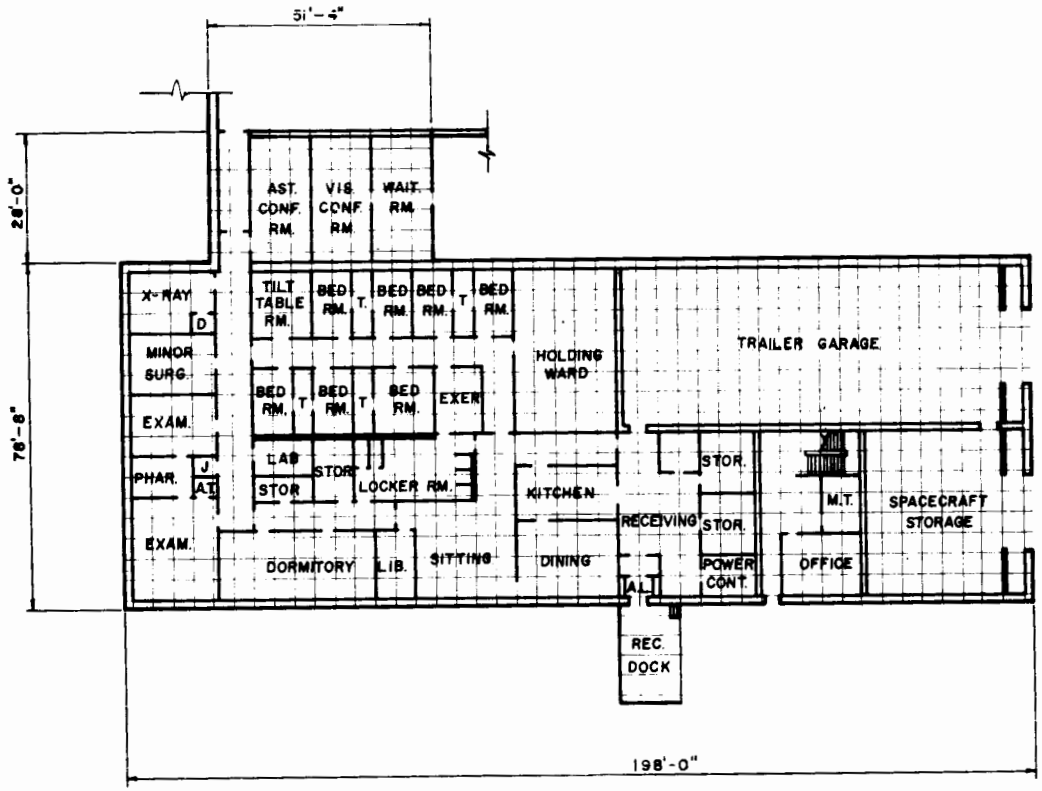
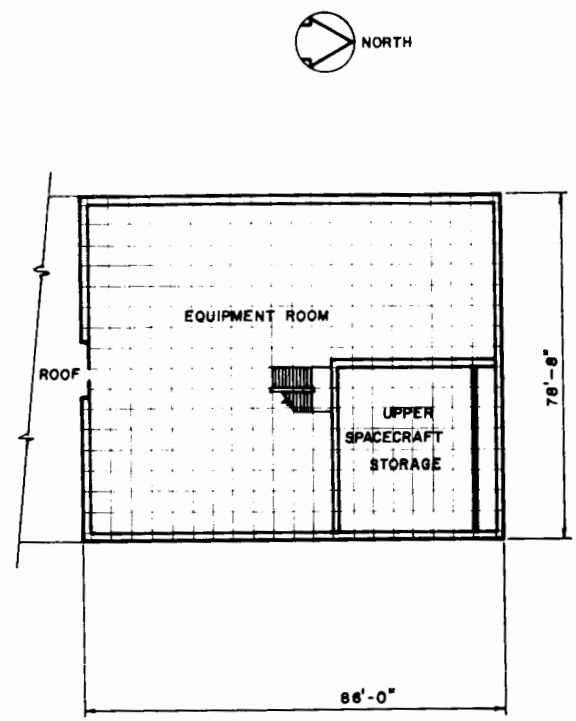
SCALE IN FEET

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

LUNAR SAMPLE RECEIVING LABORATORY





CF 7-11

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SCALE IN FEET

FIRST FLOOR PLAN

CREW RECEPTION BLDG.

SECOND FLOOR PLAN

CREW RECEPTION BLDG.

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

FLIGHT CREW TRAINING FACILITY

AUTHORIZATION LINE ITEM: Manned Spacecraft Center

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Houston, Harris County, Texas

COGNIZANT NASA INSTALLATION: Manned Spacecraft Center

TYPE OF CONSTRUCTION PROJECT: New

FUNDING:

FY 1966 and Prior Years	$60,000
FY 1967 Estimate	1,100,000
Total Funding Through FY 1967	$1,160,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$1,071,000
Site preparation	LS	---	$27,900	27,900
Utilities	LS	---	250,000	250,000
Building	Sq. Ft.	22,300	26.82	598,100
Elevated flooring	LS	---	35,000	35,000
Air handling system	LS	---	160,000	160,000
Equipment	---	---	29,000	29,000
Design	---	---	---	---
Fallout Shelter	---	---	---	-0-
		TOTAL		$1,100,000

PROJECT PURPOSE:

This project will provide additional capability for training astronauts through the use of Apollo spacecraft simulators.

PROJECT DESCRIPTION:

The project will provide the necessary space and supporting facilities for one Command Module Mission Simulator, and a Lunar Excursion Module (LEM) Mission Simulator. Associated with the simulator areas will be crew stations, instructor's stations and computer complexes. Facilities and space will also be made available for simulator maintenance, off-line equipment storage, optical equipment maintenance, a suit room, debriefing area, and library facilities for film graphics, card-tapes and engineering drawings.

Architectural features will include a two story high bay simulator area constructed of precast concrete panels with a gross area of approximately 22,300 square feet.

All utilities will be included. Chilled water and steam will be furnished by the Central Heating and Cooling Plant.

PROJECT JUSTIFICATION:

Flight crew training in support of the Apollo program requires training in the control and operation of spacecraft. Thus, facilities, adequate in terms of numbers and types, are needed for simulation of the Command Module and the Lunar Excursion Module missions.

Facilities are now available for one set of Apollo Spacecraft Mission Simulators and Trainers in the Mission Simulation and Training Facility. These facilities are adequate for launch schedules through Calendar Year 1967. However, by Calendar Year 1968, flight schedules will call for launches at two month intervals. In order to provide the crews needed for this frequency level, additional simulators and the necessary housing must be made available. Current schedules indicate that this facility must be included in the Fiscal Year 1967 Program in order to be available for the two month schedule cycle.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT:

Based on current program requirements, no future year funding is anticipated.

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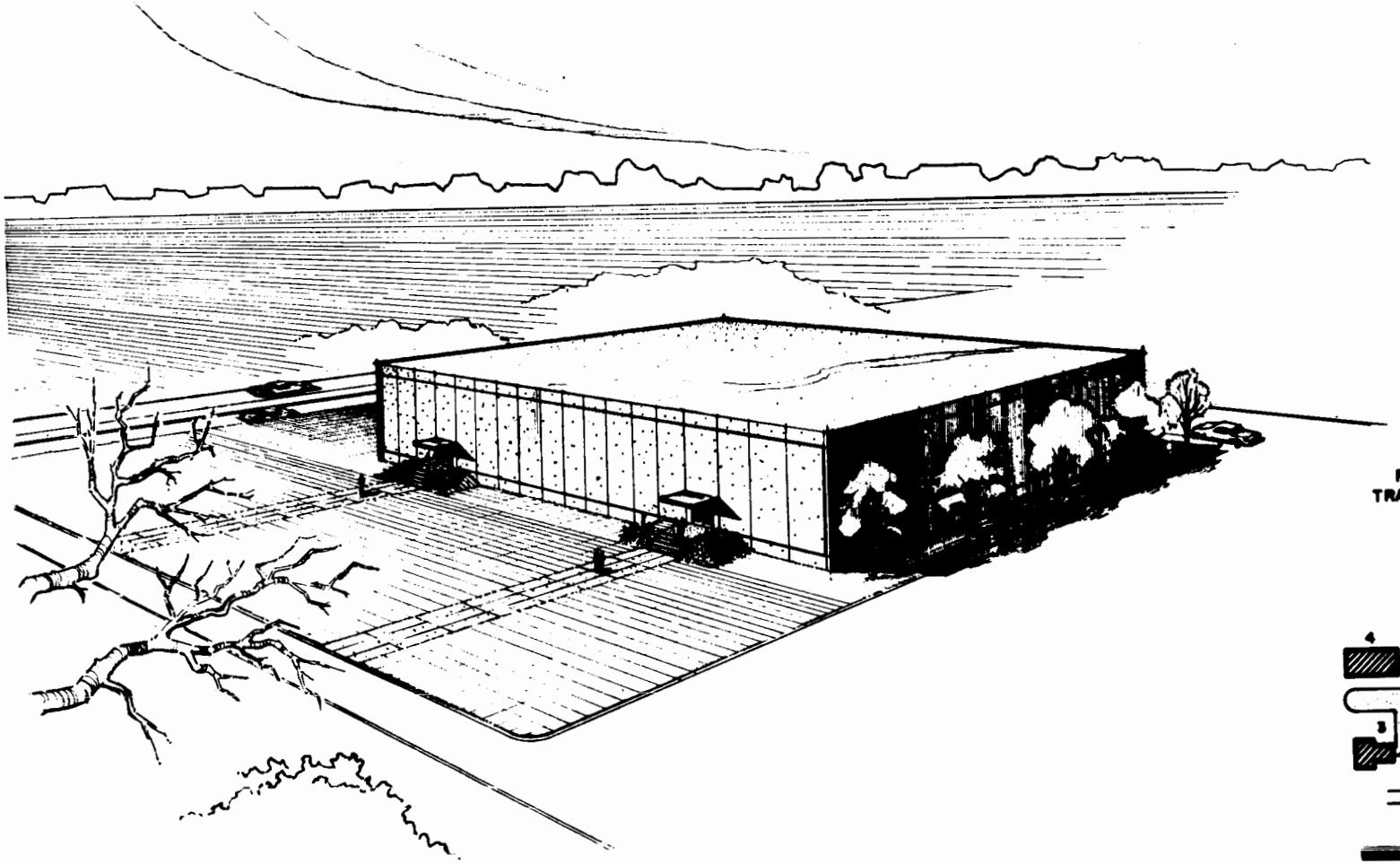
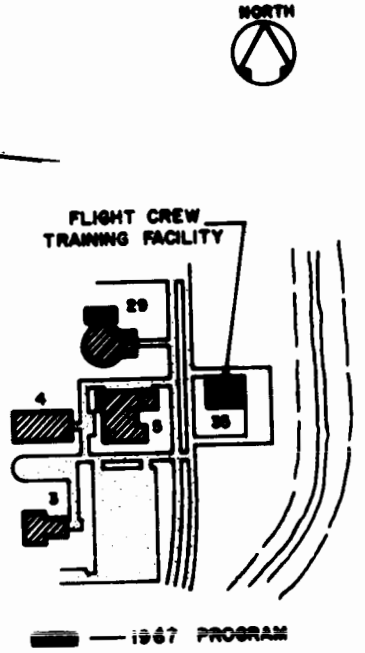
MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

FLIGHT CREW TRAINING FACILITY



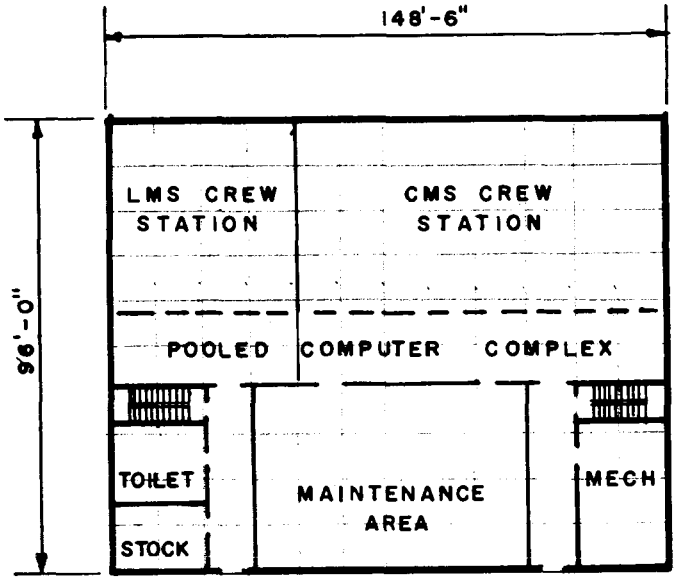
PERSPECTIVE



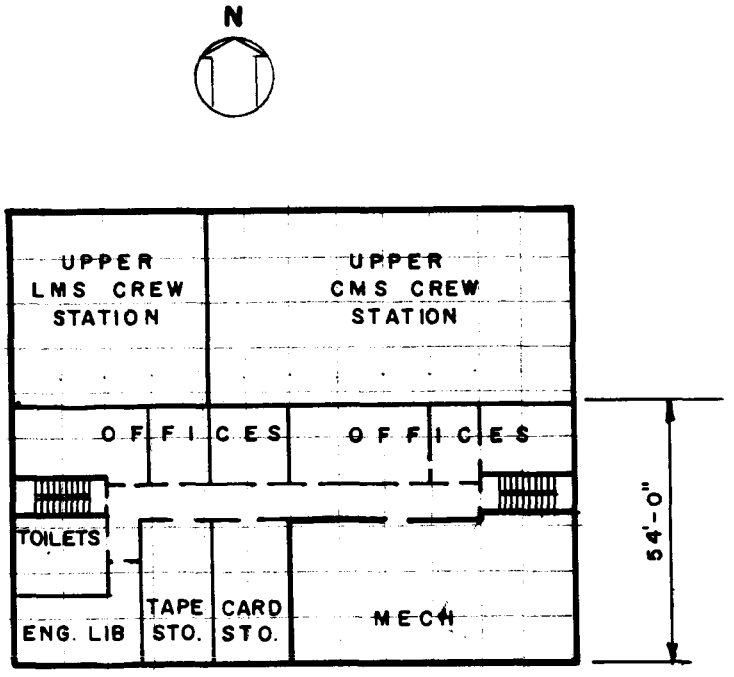
PARTIAL SITE PLAN

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

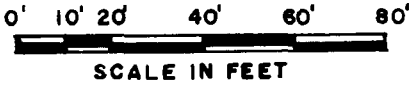
FLIGHT CREW TRAINING FACILITY



FIRST FLOOR PLAN



SECOND FLOOR PLAN



CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

ENGINEERING BUILDING

AUTHORIZATION LINE ITEM: Manned Spacecraft Center

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Houston, Harris County, Texas

COGNIZANT NASA INSTALLATION: Manned Spacecraft Center

TYPE OF CONSTRUCTION PROJECT: New

FUNDING:

FY 1966 and Prior Years	$145,000
FY 1967 Estimate	2,600,000
Total Funding Through FY 1967	$2,745,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$2,600,000
Site preparation	LS	---	$43,300	43,300
Utilities	LS	---	171,400	171,400
Building	Sq. Ft.	90,112	26.47	2,385,300
Equipment	---	---	---	---
Design	---	---	---	---
Fallout Shelter	---	---	---	-0-
		TOTAL		$2,600,000

PROJECT PURPOSE:

This project will provide the Manned Spacecraft Center with administrative type space for Center functions associated with manned space flight mission operations, and the development, test, and evaluation of manned spacecraft systems and subsystems.

PROJECT DESCRIPTION:

The building will be a five story, steel frame precast concrete structure, with a gross area of approximately 90,112 square feet (67,580 net square feet). It will accommodate 704 engineering and administrative personnel. A mechanical room will be provided on the roof and chilled water and steam will be provided from the Central Heating and Cooling Plant.

PROJECT JUSTIFICATION:

The construction of adequate housing for Manned Spacecraft Center personnel has not kept pace with population growth. Firm estimates for the Fiscal Year 1967 time period, based on ceilings established within resources estimates and contracts, either negotiated or currently under negotiation, indicate that engineering-administrative space will be required for 4,065 NASA and other Government agency personnel and 2,838 contractor personnel, for a total of 6,903 spaces. Construction up to and including Fiscal Year 1966 will result in the availability of 528,000 net square feet of space which is not adequate to meet the total requirements. Approximately 550 personnel will continue to be housed in substandard facilities at Ellington Air Force Base. To alleviate the remaining deficiency one or a combination of the following alternatives must be implemented:

Rehabilitate additional, substandard World War II barracks type structures at Ellington Air Force Base.

Lease commercial properties adjacent to Clear Lake, or within the City of Houston.

Construct a new engineering facility which will provide space for 704 personnel resulting in an overall Center factor of 96 square feet per person.

An analysis of the problem leads to the conclusion that the third alternative is the most economical means for meeting housing requirements on a long term basis. It will also result in greater effectiveness and higher productivity of personnel by minimizing dispersion and dislocation of organizational functions.

Increasing the number of personnel at Ellington Air Force Base would require the rehabilitation of additional, substandard, World War II barracks type structures. Experience indicates that the rehabilitation of substandard space to meet this requirement would necessitate an initial expenditure of

$706,230. This estimate does not include the cost of repairs to roads and utilities, or the cost of additional services such as cafeterias, industrial medicine and transportation to and from Clear Lake. Consideration must also be given to the basic unsatisfactory housing these facilities would provide and the high cost required to maintain even minimum standards of safety and habitability.

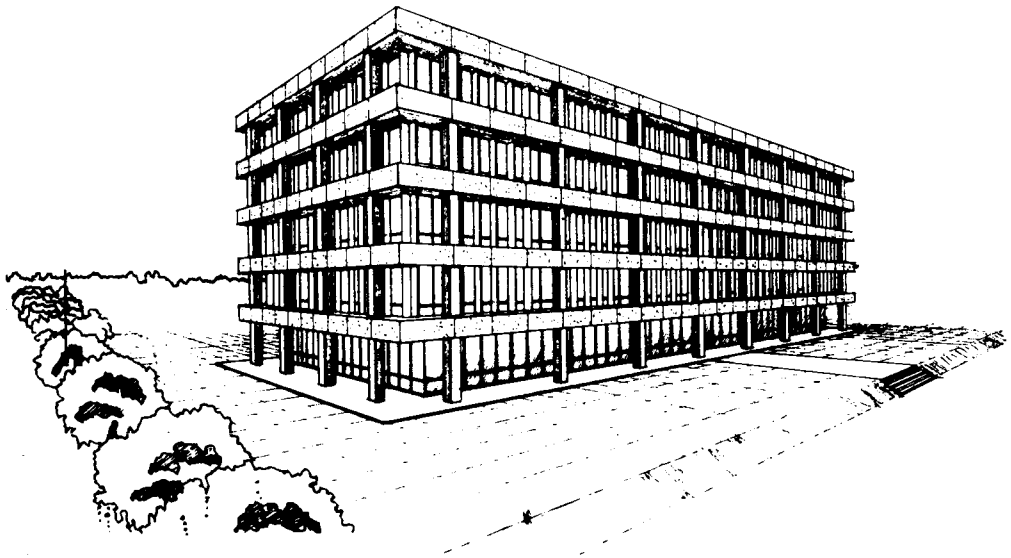
Leasing is also considered to be less economical and effective than construction of a new building. The rental for commercial properties in the Clear Lake area is in excess of $5.00 per square foot per annum; therefore, the cost of a new building can be amortized in about six years. If there are no commercial properties available in the Clear Lake area, the acquisition of facilities within the City of Houston would be necessary. The loss of productivity and efficiency resulting from excess travel time (forty-five minutes each way) is a very important factor that militates against such a scheme.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT:

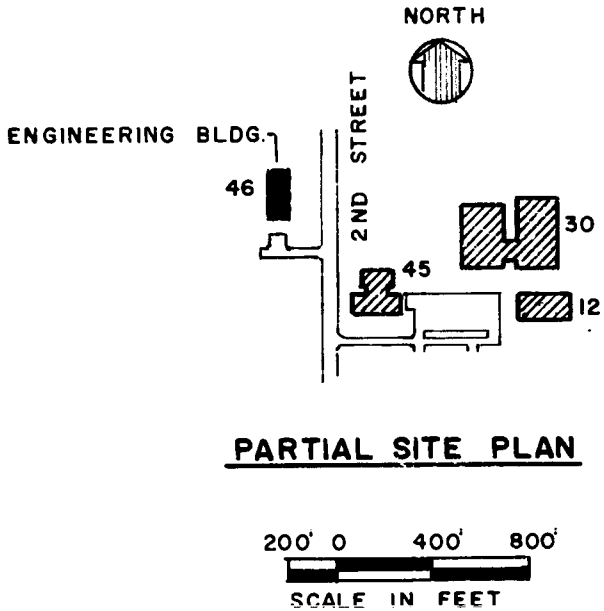
Any additional construction will be requested on a phased basis to provide for deficiencies as they occur in the future.

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

ENGINEERING BUILDING



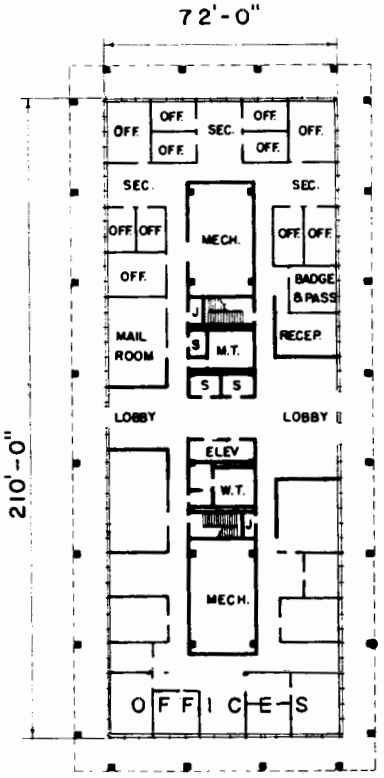
PERSPECTIVE



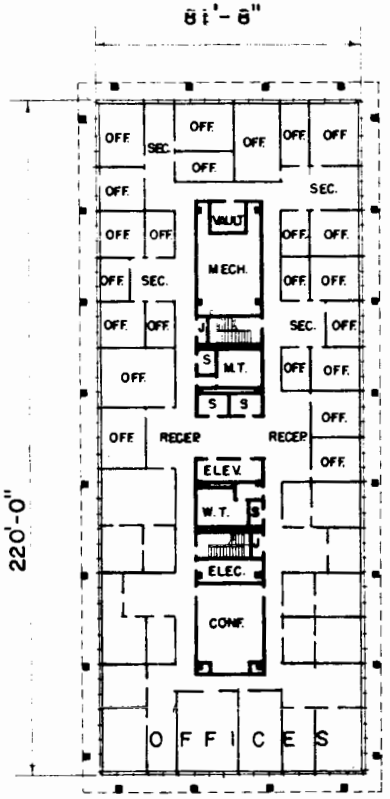
PARTIAL SITE PLAN

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

ENGINEERING BUILDING

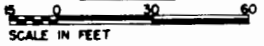


FIRST FLOOR PLAN



TYPICAL FLOOR PLAN
SECOND THRU FIFTH

PLANS



CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

CENTER SUPPORT FACILITIES

AUTHORIZATION LINE ITEM: Manned Spacecraft Center

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Houston, Harris County, Texas

COGNIZANT NASA INSTALLATION: Manned Spacecraft Center

TYPE OF CONSTRUCTION PROJECT: Extension

FUNDING:

FY 1966 and Prior Years	$56,000
FY 1967 Estimate	1,000,000
Total Funding Through FY 1967	$1,056,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$354,400
Electrical distribution system extension	LS	---	$148,300	148,300
Central heating and cooling plant extension	Sq. Ft.	8,200	23.96	196,500
Site preparation	LS	---	9,600	9,600
Equipment				$645,600
Boiler and accessories	LS	---	235,100	235,100
Chiller and accessories	LS	---	360,500	360,500
Central mechanical control system	LS	---	50,000	50,000
Design	---	---	---	---

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	Unit of Measure	Quantity	Unit Cost	Total Cost
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$1,000,000

PROJECT PURPOSE:

This project will provide for necessary additions to existing heating, air conditioning and electrical systems consistent with the development of the Manned Spacecraft Center.

PROJECT DESCRIPTION:

Central Heating and Cooling Plant Extension - This extension will include an addition of approximately 8,200 square feet to the Central Heating and Cooling Plant and the installation of one 60,000 pound/hour steam boiler and one 2,000 ton centrifugal refrigeration unit. Accessory equipment such as a cooling tower, operating and safety controls and piping will be provided. The construction will match the existing steel frame, precast concrete structure. In addition, the existing central mechanical control system will be expanded.

Electrical Distribution System Extension - This extension will provide for the installation of two new 12,470 volt feeders from the main sub-station to the FY 1967 Engineering Building.

PROJECT JUSTIFICATION:

Central Heating and Cooling Plant Extension - Through previous programs a steam capacity of 260,000 pound/hour was provided. The current demand is 238,000 pound/hour of steam which results in an operating factor of 91.5%. Upon completion of the projects included in this program the steam demand will be 272,000 pounds/hour. Therefore, additional boiler capacity is required. In order to approach the maximum operating efficiency of a boiler (83-87%) one 60,000 pound/hour boiler will be sufficient. This will result in an operating factor of 85%. Concurrently, the demand for chilled water will increase to 14,175 tons versus an availability of 14,000 tons. To meet this demand one 2,000 ton centrifugal refrigeration unit is required. This capacity will also allow for continued normal operation if one unit must be temporarily removed for maintenance or repairs.

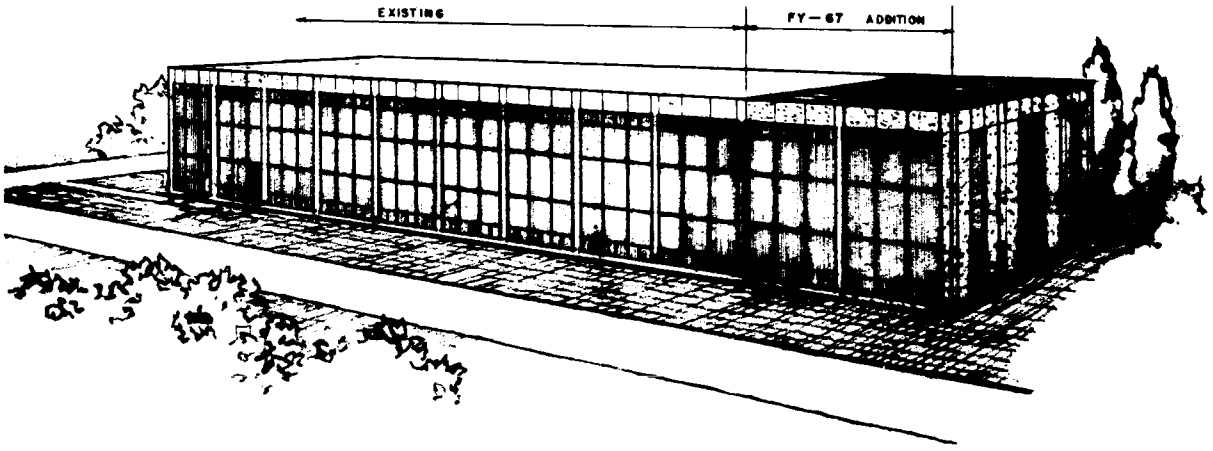
Electrical Distribution System Extension - The existing electrical feeders serving the proposed site for the FY 1967 Engineering Building are operating at maximum capacity. Additional electrical feeders must be provided from the main sub-station to furnish electrical power to this new facility.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT:

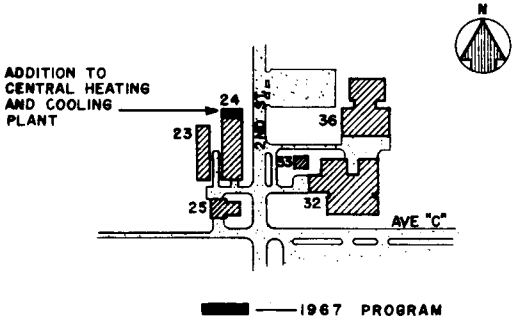
It is anticipated that additional funds will be required to support any future construction programs.

MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

CENTER SUPPORT FACILITIES



PERSPECTIVE

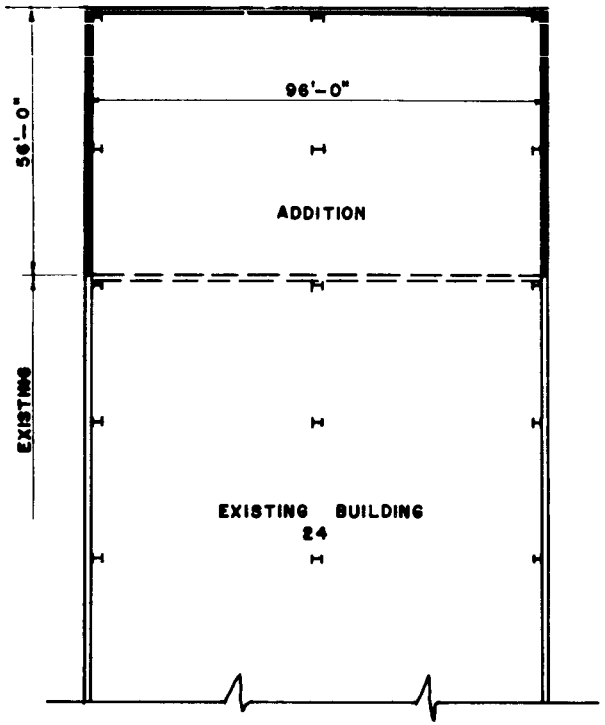


PARTIAL SITE PLAN

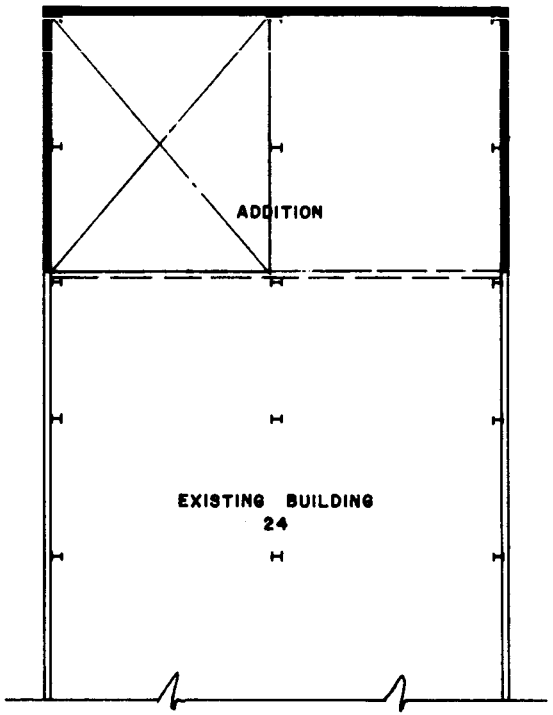
MANNED SPACECRAFT CENTER
FISCAL YEAR 1967 ESTIMATES

CENTER SUPPORT FACILITIES

FY-67



FIRST FLOOR PLAN



SECOND FLOOR PLAN

ADDITION TO CENTRAL HEATING AND COOLING PLANT — PLANS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

MARSHALL SPACE FLIGHT CENTER

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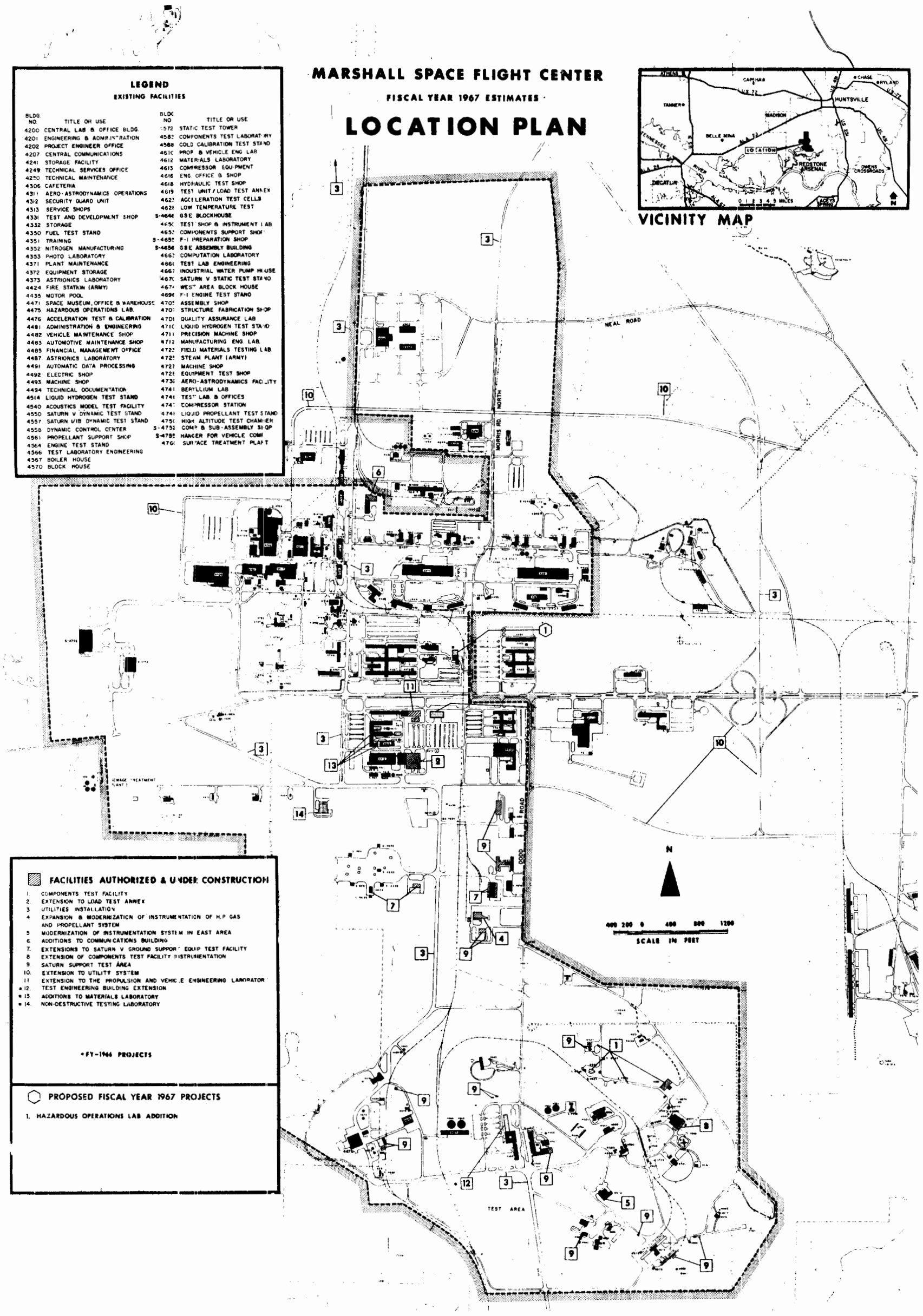
Office of Manned Space Flight Project:	
Hazardous operations laboratory addition	CF 8-3

MARSHALL SPACE FLIGHT CENTER

FISCAL YEAR 1967 ESTIMATES

LOCATION PLAN



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 1967 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION	COGNIZANT PROGRAM OFFICE FOR INSTALLATION	LOCATION OF INSTALLATION	COUNTY	NEAREST CITY
Marshall Space Flight Center	Manned Space Flight	Huntsville, Alabama	Madison	Huntsville, Alabama

INSTALLATION MISSION

The mission of the Marshall Space Flight Center is to develop launch vehicles, engines and vehicle systems for Manned Space Flight programs. The Center also performs advanced studies and research in the general field of astronautics.

PERSONNEL STRENGTH	FY 1965	FY 1966	FY 1967
NASA PERSONNEL *(End of Year)*	7431	7074	6975
CONTRACTOR AND OTHER PERSONNEL	5588	5381	5335
TOTAL ALL PERSONNEL	13019	12455	12310

LAND	NO. ACRES
NASA-OWNED	
OTHER GOVERNMENT AGENCY-OWNED	1797
NON-FEDERAL *(Leases, easements)*	64
TOTAL LAND	1861
TOTAL CAPITAL INVESTMENT* *(Including NASA-Owned Land) (as of June 30, 1965)*	$ 319,555

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 1961 THRU CURRENT YEAR	FY 1967 *(Estimated)*	FUTURE YEARS *(Estimated)*	TOTAL ALL YEARS *(Estimated)*
Hazardous Operations Laboratory Addition	MSF	691	581		1,272
ALL OTHER PROJECTS		139,295			
TOTALS		139,986	581		

NASA FORM 1029 (REV. JUN 65) PREVIOUS EDITIONS ARE OBSOLETE.

* *Includes work in process.*

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

HAZARDOUS OPERATIONS LABORATORY ADDITION

AUTHORIZATION LINE ITEM: Marshall Space Flight Center

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Huntsville, Madison County, Alabama

COGNIZANT NASA INSTALLATION: Marshall Space Flight Center

TYPE OF CONSTRUCTION PROJECT: Extension

FUNDING:

FY 1966 and Prior Years	$691,000
FY 1967 Estimate	581,000
Total Funding Through FY 1967	$1,272,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$463,000
Building	Sq. Ft.	5,790	$25.39	147,000
Special air conditioning	LS	---	98,000	98,000
Special power	LS	---	93,000	93,000
Special piping	LS	---	49,000	49,000
Site development	LS	---	26,000	26,000
Utilities	LS	---	42,000	42,000
Sheltered test pad	Sq. Ft.	900	8.89	8,000
Equipment				$118,000
Dewars and laboratory equipment	LS	---	118,000	118,000
Design	---	---	---	---

	Unit of Measure	Quantity	Unit Cost	Total Cost
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$581,000

PROJECT PURPOSE:

This project will provide safe and adequate laboratory space for the development of improved instrumentation associated with hazardous fuels, acoustic loads, and vehicle fire detection systems and to continue development and improvement of primary power sources.

PROJECT DESCRIPTION:

The project provides for the construction of a 5,790 square foot addition to the Hazardous Operations Laboratory. The addition will be subdivided into six separate test preparation rooms. Test cells adjoining the laboratory will be used in conjunction with experiments involving RP-1 fuel, temperature, acoustics, plasma, flame, liquid hydrogen and fuel cells.

In addition, a 900 square foot covered test pad with a hydrogen storage tank will be provided north of the building for testing and calibration of measuring systems using liquid hydrogen. The preparation rooms will be of concrete block construction with air conditioning, tile floors and acoustical ceilings. The test cells will be constructed of reinforced concrete. Due to the hazardous materials that are used in the test area, all electrical installations will be explosion proof and special air conditioning will be installed to provide a minimum of twenty air changes per hour.

Special laboratory services will be provided, including special electrical power, compressed air, nitrogen, gaseous and liquid hydrogen and oxygen. Equipment will include test dewars and laboratory benches.

PROJECT JUSTIFICATION:

This facility is required for the development of accurate and reliable in-flight instrumentation. Such instrumentation is of prime importance to the space program since it affords the only means of evaluating performance. As more complex space projects are formulated, space vehicles with greater design sophistication will have to be fabricated. More sensitive instrumentation will be required to monitor the new performance characteristics under progressively difficult environmental conditions. To carry out its managerial role in connection with propulsion and flight vehicle systems, Marshall Space Flight Center must have the capability of evaluating and validating the performance and accuracy of instrumentation offered by many manufacturers in order to determine the products that are most suited for

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incorporation into space vehicle systems. The Center must also have the capability of conducting research and development leading to improved sensors and measuring probes as well as determining methods of properly evaluating these products.

At the present time, this effort is severely hampered because the Center does not have facilities for conducting work in the areas of improved instrumentation associated with fuels, acoustics, vibration, high temperature thermal sensing and the improvement of power sources. Limited work on acoustics and vibration instrumentation is now carried out in a portion of an existing laboratory; however, the full capability of the sound generating equipment cannot be employed due to the structural characteristics of the building and the hazard that would be imposed on the occupants. Work with RP-1 fuels is now done in a small wood frame building which is badly crowded and lacks even the minimal safeguards that are normally provided for this type of work.

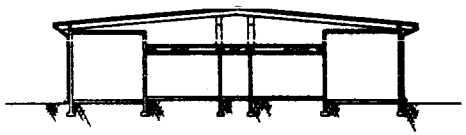
The addition to the Hazardous Operation Laboratory will provide the space required for the several areas of investigation and will incorporate the safety features that are needed to safeguard operating personnel and occupants of nearby areas.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: None

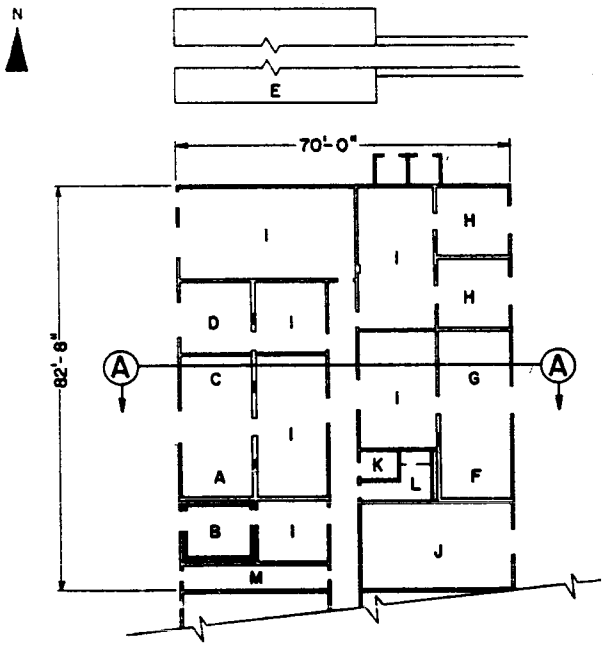
MARSHALL SPACE FLIGHT CENTER

FISCAL YEAR 1967 ESTIMATES

HAZARDOUS OPERATIONS LABORATORY ADDITION



SECTION A-A

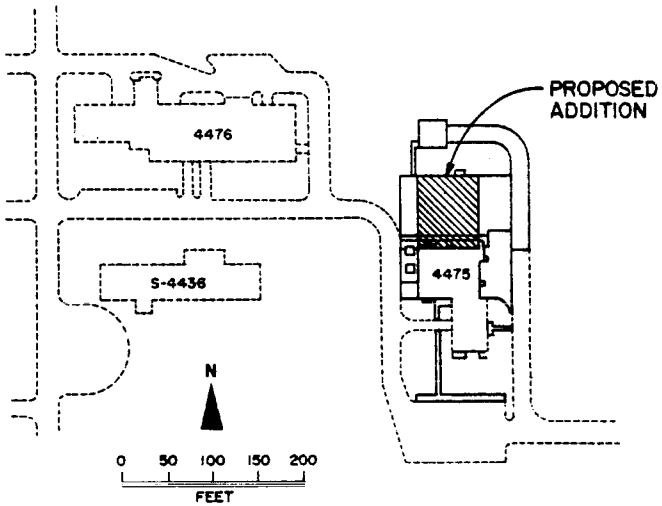


FLOOR PLAN

LEGEND

- A TEMPERATURE TEST CELLS
- B ACOUSTIC TEST CELL
- C PRESSURE TEST CELL
- D R.P.I. TEST CELL
- E LH_2 PAD
- F PLASMA TEST CELL
- G FLAME TEST CELL
- H FUEL CELL TEST CELLS
- I PREPARATION ROOMS
- J MECHANICAL EQUIPMENT ROOM
- K JANITOR ROOM
- L REST ROOM
- M BOTTLE STORAGE ROOM

PERSPECTIVE



SITE PLAN

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

MICHOUD ASSEMBLY FACILITY

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Summary.....	CF 9-2
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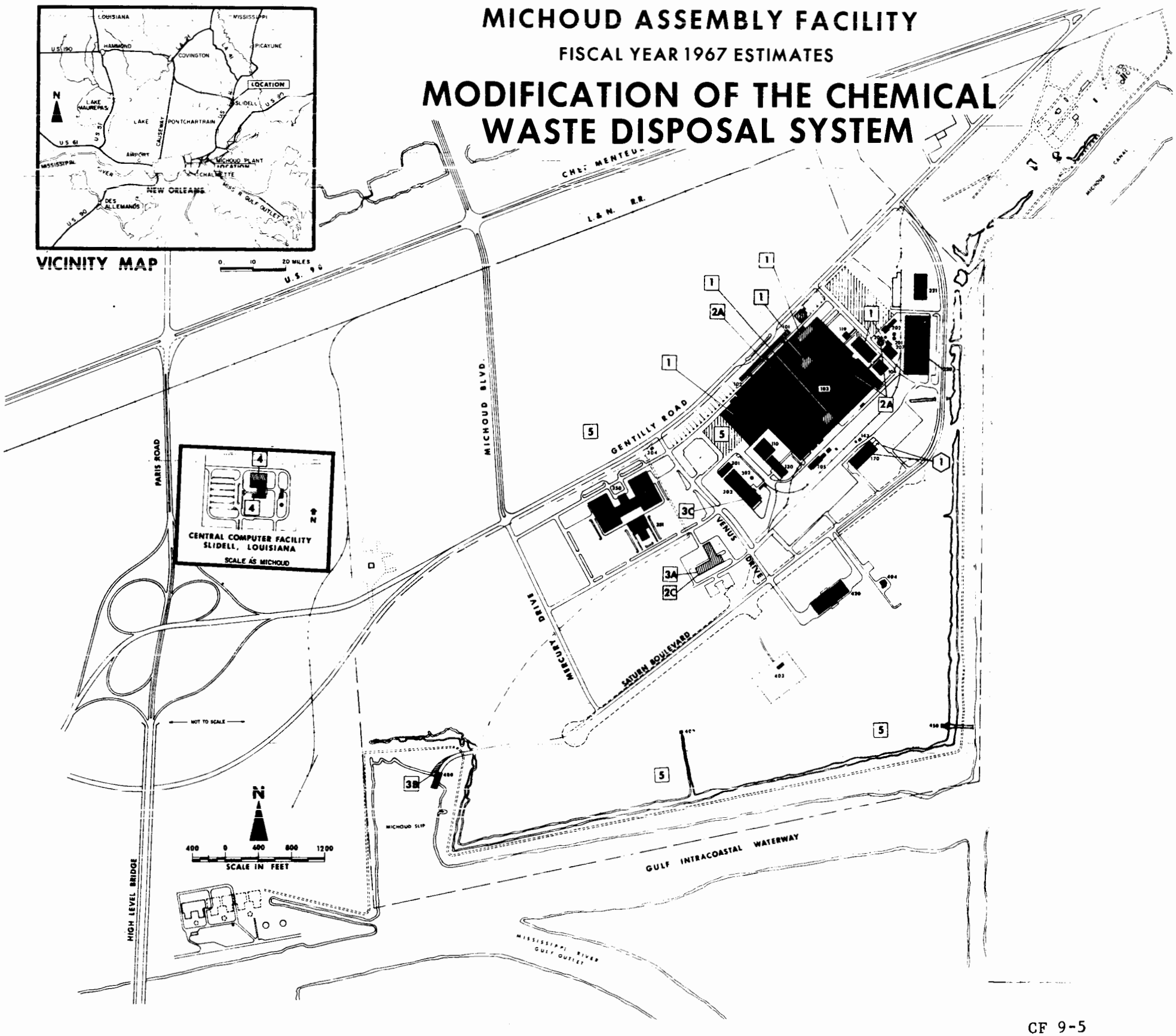
Modification of the chemical waste disposal system.....	CF 9-3

MICHOUD ASSEMBLY FACILITY

FISCAL YEAR 1967 ESTIMATES

MODIFICATION OF THE CHEMICAL WASTE DISPOSAL SYSTEM



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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

MISSISSIPPI TEST FACILITY

	Page No.
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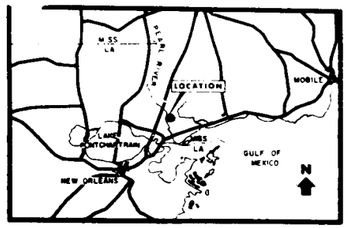
Summary	CF 10-2
Office of Manned Space Flight Project:	
Facilities to support S-IC and S-II test program	CF 10-3

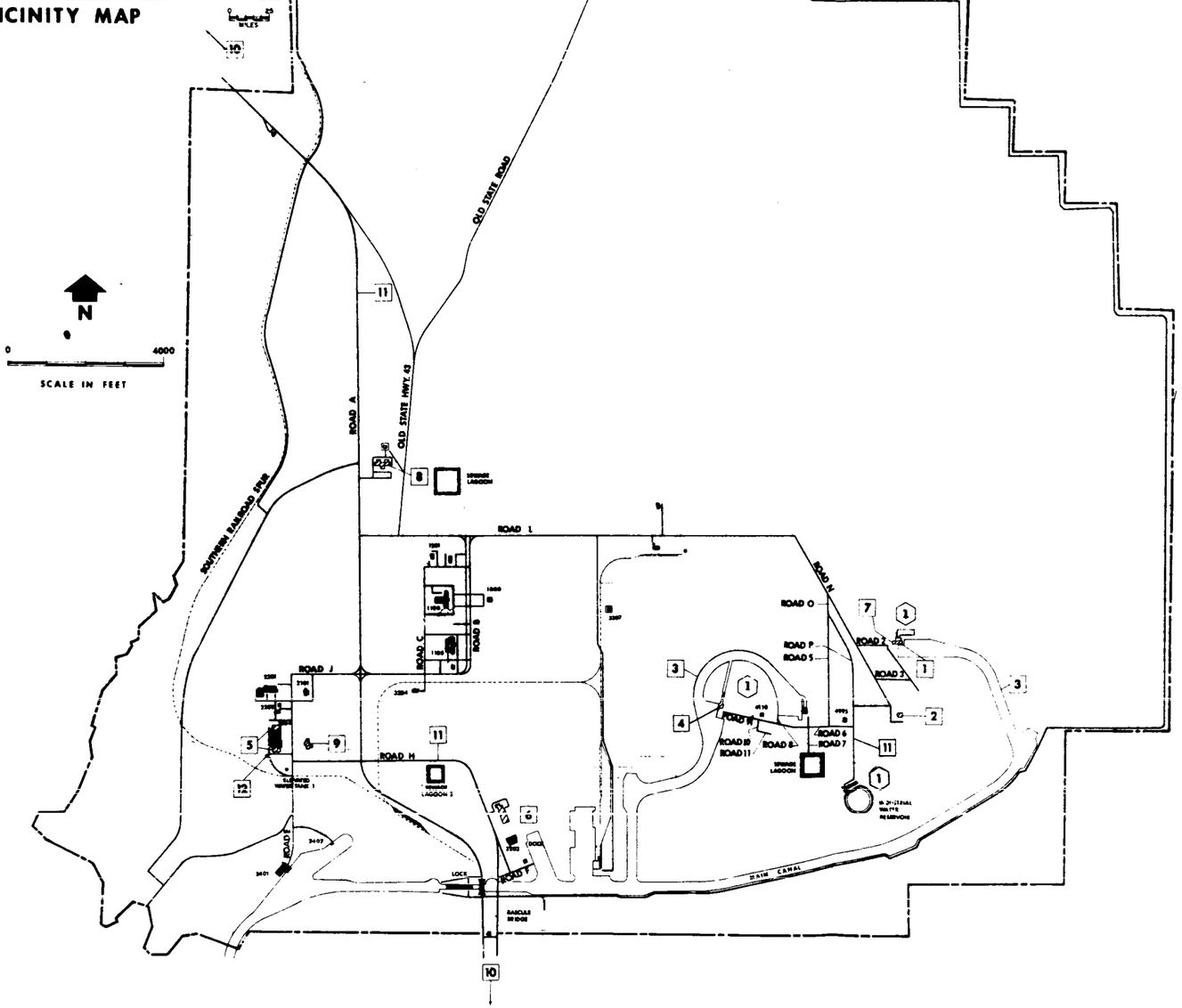
MISSISSIPPI TEST FACILITY

FISCAL YEAR 1967 ESTIMATES

LOCATION PLAN



VICINITY MAP



LEGEND

● EXISTING FACILITIES

1000	DATA HANDING CENTER
1100	LAB AND ENGINEERING BUILDING
1105	ELECTRONICS, INSTRUMENTATION & MATERIALS LAB
1110	ACOUSTICS BUILDING
1200	TEST AREA CONTROL CENTER
1201	TELEPHONE BUILDING
2101	EMERGENCY SERVICE BUILDING
2201	SITE MAINTENANCE BUILDING
2202	COMPRESSED GAS CYLINDER STORAGE BUILDING
2203	INFLAMMABLE MATERIALS STORAGE BUILDING
2204	WAREHOUSE
2205	TEST MAINTENANCE BUILDING
2401	CONSTRUCTION DOCK
2402	RP-1 TRANSFER DOCK
3101	SECURITY CONTROL CENTER (SOUTH)
3201	CRYOGENICS BARGE SERVICE BUILDING
3202	S-IC STAGE STORAGE BUILDING
3204	CENTRAL HEATING PLANT
3305	CENTRAL COMPRESSOR BUILDING
3307	RP-1 CENTRAL STORAGE
4110	S-II CONTROL CENTER
4122	S-II TEST STAND (FIRST)
4400	HIGH PRESSURE INDUSTRIAL WATER PUMPING STATION
4995	DATA ACQUISITION CENTER
	BASCULE BRIDGE
	INDUSTRIAL WATER RESERVOIR
	NAVIGATION LOCK
	ELEVATED WATER TANK NR 1
	SEWAGE LAGOONS
	RAILROADS
	DOCK
7001	SECURITY CONTROL CENTER (NORTH)
8201	METEOROLOGICAL BUILDING

CONSTRUCTION

☐ FACILITIES AUTHORIZED AND UNDER CONSTRUCTION

1	S-IC TEST STAND (FIRST POSITION 220-B)
2	S-IC TEST CONTROL CENTER
3	TEST AREA WATERWAYS
4	S-II TEST STAND (SECOND)
5	WAREHOUSE ADDITIONS
6	S-II STAGE CHECKOUT AND STORAGE FACILITY
7	S-IC TEST STAND (SECOND POSITION 220-A)
8	COMPONENTS SERVICE FACILITIES
9	MOBILE EQUIPMENT OPERATIONS BUILDING
10	ACCESS ROADS (OUTSIDE FEE AREA)
11	AREA ROADS
12	SALVAGE MATERIALS STORAGE BUILDING

⬡ PROPOSED FISCAL YEAR 1967 PROJECTS

FACILITIES TO SUPPORT S-IC AND S-II TEST PROGRAM

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 1967 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION	COGNIZANT PROGRAM OFFICE FOR INSTALLATION	LOCATION OF INSTALLATION	COUNTY	NEAREST CITY
Mississippi Test Facility	Manned Space Flight	Pearl River, Miss.	Hancock	Bay St. Louis, Miss.

INSTALLATION MISSION

The mission of the Mississippi Test Facility is the static test firing of large vehicle stages and propulsion systems.

PERSONNEL STRENGTH	FY 1965	FY 1966	FY 1967
NASA PERSONNEL *(End of Year)*	43	120	120
CONTRACTOR AND OTHER PERSONNEL	1729	3440	2513
TOTAL ALL PERSONNEL	1772	3560	2633

LAND	NO. ACRES
NASA-OWNED	20,996
OTHER GOVERNMENT AGENCY-OWNED	
NON-FEDERAL *(Leases, easements)*	117,874
TOTAL LAND	138,870
TOTAL CAPITAL INVESTMENT* *(Including NASA-Owned Land) (as of June 30, 1965)*	$ 164,854

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 1963 THRU CURRENT YEAR	FY 1967 *(Estimated)*	FUTURE YEARS *(Estimated)*	TOTAL ALL YEARS *(Estimated)*
Facilities to Support S-IC and S-II Test Program	MSF	133,355	1,700		135,055
ALL OTHER PROJECTS		101,867			
TOTALS		235,222	1,700		

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* *Includes work in process.*

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CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

FACILITIES TO SUPPORT S-IC AND S-II TEST PROGRAM

AUTHORIZATION LINE ITEM: Mississippi Test Facility

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Hancock County, Mississippi

COGNIZANT NASA INSTALLATION: Marshall Space Flight Center

TYPE OF CONSTRUCTION PROJECT: Modifications and Extensions

FUNDING:

FY 1966 and Prior Years	$133,355,000
FY 1967 Estimate	1,700,000
Total Funding Through FY 1967	$135,055,000

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$1,095,000
S-IC dual test stand	LS	---	$77,000	77,000
High pressure water system	LS	---	556,000	556,000
High pressure gas system	LS	---	462,000	462,000
Equipment				$605,000
Tech system, S-IC stand and Test Control Center	LS	---	371,000	371,000
Tech system, 2nd S-II stand and Test Control Center	LS	---	167,000	167,000
Data Acquisition Facility	LS	---	67,000	67,000
Design	---	---	---	---

	Unit of Measure	Quantity	Unit Cost	Total Cost
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$1,700,000

PROJECT PURPOSE:

This project will provide additions and modifications to the Saturn V facilities to accommodate changes in the test programs for the S-IC and S-II stages.

PROJECT DESCRIPTION:

The project provides for modifications to the S-IC dual stand flame deflectors, additions to the high pressure water and high pressure gas systems and the procurement and installation of additional data acquisition equipment in the S-IC stand, the 2nd S-II stand, the Test Control Centers and the Data Acquisition Facility.

The water deluge system which serves the flame deflectors on the S-IC stand will be improved by the addition of 20,000 - 5/32 inch holes in the manifold plates of each deflector. The joints between the bottoms and sides of the deflectors will be modified so that cooling water can be applied directly to these areas. A 33,385 gallon per minute (GPM) pump will be installed in the High Pressure Industrial Water Facility to provide additional cooling water. Two 1,500 cubic foot 6,000 pounds per square inch (psi) gas storage vessels will be added to satisfy requirements for helium and nitrogen at the S-II test stand. X-Y recorders, signal conditioning equipment with the required power supply and cable assemblies will be installed in the S-IC test stand, the second S-II stand, the Test Control Centers and the Data Acquisition Facility.

PROJECT JUSTIFICATION:

During 1965 the S-IC All Systems Stage (S-IC-T) was successfully fired at Huntsville, the S-II Battleship stage was tested at Santa Susana and the All Systems S-II Stage (S-II-T) is currently undergoing tests at the Mississippi Test Facility. The experience gained from these testing programs dictates certain changes in the S-IC and S-II facilities at the Mississippi Test Facility (MTF).

During tests conducted at Marshall Space Flight Center (MSFC) it was found that the flame patterns varied from initial predictions and portions of the deflector became overheated. To correct this condition additional water outlets were provided in the manifold plates. As the MTF deflectors are patterned after the deflector on the S-IC stand at MSFC the same problem will occur. To assure that the needed cooling is provided at the proper location the additional water outlets will not be drilled until the first firing has taken place and the resulting flame pattern has been established.

The additional 33,385 GPM pump is needed to supply the required cooling water flow for S-IC test stand deluge system. Based on successive tests at MSFC, it is known that a flow of 359,500 gallons per minute is required for proper cooling of the flame deflector. The existing ten pump plant has a rated capacity of 333,850 gallons per minute. During initial operation the required flow will be provided by running the pumps above normal speeds. This, however, is an interim solution which requires all pumps to be in service at the time of test. An additional pump will provide the needed capacity, allow repair or maintenance to be undertaken in a normal manner and will safeguard against testing delay. The foundation and a portion of the piping for an additional pump was provided as part of the existing High Pressure Industrial Water Facility.

The experience gained during the testing of the S-II battleship stage demonstrated the need for greater quantities of both nitrogen and helium for purging, cleaning, pressurizing the fuel tank and lines, and operating the controls. The existing high pressure gas system cannot provide the needed supply unless ten hours is allowed between vehicle checkout and firing for the recharging of the gas storage vessels. Holds of this duration tend to invalidate the checkout operation and jeopardize the success of the test. With the installation of two additional storage vessels, recharging of the system will not be necessary. Tests will progress directly from checkout to firing and the total test time will be shortened.

To achieve greater reliability and improved performance of flight vehicles, more measurements of temperatures, pressures, and flow are needed than can be obtained with the instrumentation that is now installed in the test stands. To provide this information it is necessary that additional types of recorders, together with signal conditioning equipment, power and associated cabling be installed in the Test Stands, Test Control Centers, and the Data Acquisition Facility.

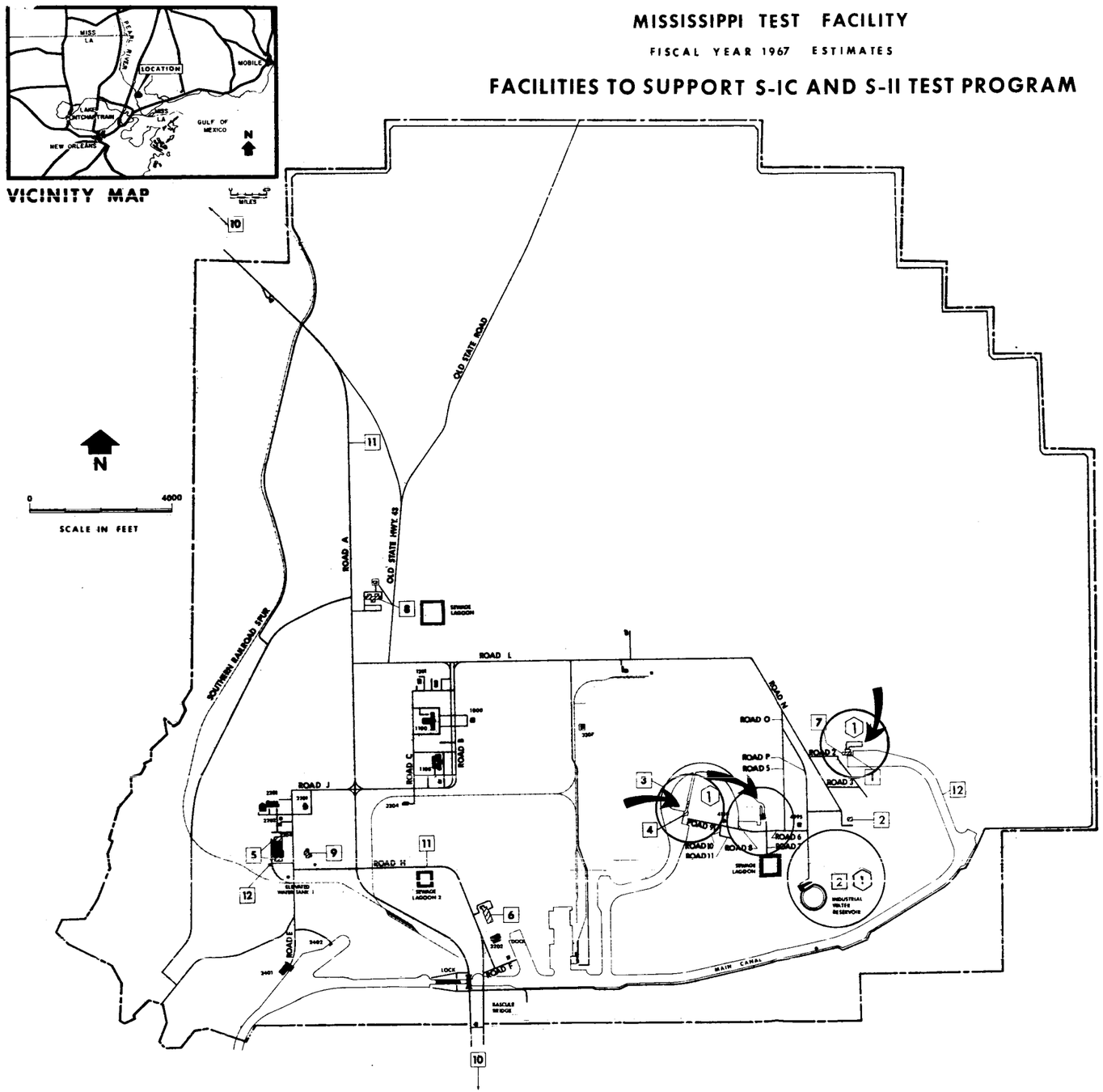
ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT:

None for this project. An estimated $1.5 million per year will be required for changes to the test stands and supporting systems resulting from changes in booster configuration and test programs.

MISSISSIPPI TEST FACILITY

FISCAL YEAR 1967 ESTIMATES

FACILITIES TO SUPPORT S-IC AND S-II TEST PROGRAM



CF 10-6

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

VARIOUS LOCATIONS

	Page No.
Summary	CF 12-1
Office of Manned Space Flight Project:	
Facilities for S-IVB stage program	CF 12-2
Office of Space Science and Applications Projects:	
Launch vehicle service tower	CF 12-7
Aerobee 350 launch facility	CF 12-12
Spin test facility	CF 12-17
Office of Tracking and Data Acquisition Project:	
Water distribution and sewage disposal systems	CF 12-23

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY
CONSTRUCTION OF FACILITIES
FISCAL YEAR 19 67 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION	COGNIZANT PROGRAM OFFICE FOR INSTALLATION	LOCATION OF INSTALLATION	COUNTY	NEAREST CITY
Various Locations	Various	Not Applicable	Not Applicable	Not Applicable

INSTALLATION MISSION

PERSONNEL STRENGTH	FY 1965	FY 1966	FY 1967
NASA PERSONNEL *(End of Year)*			
CONTRACTOR AND OTHER PERSONNEL			
TOTAL ALL PERSONNEL	Not Applicable		

LAND	NO. ACRES
NASA-OWNED	
OTHER GOVERNMENT AGENCY-OWNED	
NON-FEDERAL *(Leases, easements)*	Not
TOTAL LAND	Applicable
TOTAL CAPITAL INVESTMENT* *(Including NASA-Owned Land) (as of June 30, 1965)*	$ Not Applicable

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 1962 THRU CURRENT YEAR	FY 1967 *(Estimated)*	FUTURE YEARS *(Estimated)*	TOTAL ALL YEARS *(Estimated)*
Facilities for S-IVB Stage Program	MSF	11,496.2	1,100.0	-	12,596.2
Launch Vehicle Service Tower	SSA	145.0	2,443.0	-	2,588.0
Aerobee 350 Launch Facility	SSA	60.0	1,200.0	-	1,260.0
Spin Test Facility	SSA	38.0	745.0	-	783.0
Water Distribution and Sewage Disposal Systems	TDA	146.0	990.0	-	1,136.0
ALL OTHER PROJECTS		608,010.5			
TOTALS		619,895.7	6,478.0		

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* *Includes work in process.*

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

FACILITIES FOR S-IVB STAGE PROGRAM

AUTHORIZATION LINE ITEM: Various Locations

PROGRAM OFFICE FOR THE PROJECT: Office of Manned Space Flight

LOCATION OF PROJECT: Sacramento, California

COGNIZANT NASA INSTALLATION: Marshall Space Flight Center

TYPE OF CONSTRUCTION PROJECT: Extensions

FUNDING:

FY 1966 and Prior Years	$11,496,200
FY 1967 Estimate	1,100,000
Total Funding Through FY 1967	$12,596,200

PROJECT COST ESTIMATE:

	Unit of Measure	Quantity	Unit Cost	Total Cost
Land Acquisition	---	---	---	---
Construction				$744,000
Component test facilities	LS	---	$468,000	468,000
Vibration test facility	LS	---	276,000	276,000
Equipment				$356,000
Electrodynamic shaker	LS	---	280,000	280,000
Hydraulic shaker	LS	---	63,000	63,000
Hydraulic slip table	LS	---	13,000	13,000
Design	---	---	---	---
Fallout Shelter (Not feasible)	---	---	---	None
		TOTAL		$1,100,000

PROJECT PURPOSE:

This facility will provide for the continued development and testing of the S-IVB Stage and its components to meet the Apollo program requirements.

PROJECT DESCRIPTION:

This project provides for the construction of three new component test facilities at the Sacramento Test Center, Sacramento, California. These test facilities will be located in the vicinity of existing Test Stand Alpha 1. Two of the facilities will be used for component cryogenic pressure testing; the third will provide a vibration test capability. The two component cryogenic pressure test facilities, located east of the Alpha 1 Test Stand, will consist of an earth reveted 14 x 14 x 10 foot concrete cell with one open side. A gas heat exchanger will be located to service these two facilities. The vibration test facility located on the apron of Test Stand I will accommodate a 30,000 pound electrodynamic shaker and a 100,000 pound hydroshaker. The facility will consist of a 15 x 25 foot shaker base containing approximately one million pounds of reinforced concrete and a structure of steel framing, metal roof and roll-up canvas siding. The existing high pressure gas, cryogenic, communication, instrumentation systems and utilities will be extended to the three facilities to provide necessary services. Facility control panels, firex additions, transformer and other facility equipment will be required to support the test facilities.

PROJECT JUSTIFICATION:

To assure the continued success of our space program, it is necessary that the reliability of the booster systems be increased to the maximum. Information leading to this end can be obtained from flight data; however, only limited instrumentation can be included in a particular flight package so a full assessment of vehicle behavior is not possible.

To achieve maximum vehicle reliability at reduced costs and at the earliest possible time, the needed investigative work must be carried out in ground test facilities whenever possible. In order to continue the upgrading of the S-IVB booster, three new component test facilities are required for the testing of complete subassemblies and major components, such as full scale common bulkheads, tank domes, propellant ducts, valves and probes, and helium pressure spheres. No facilities exist today which have the required safety features or capacity to perform the hazardous testing of these items as complete units. Current testing is, therefore, restricted to the several portions that comprise the whole. The three new test facilities will correct this deficiency and make it possible to test the complete subassemblies and major components under conditions that simulate the environment to which they will be subjected during actual flight.

The phase out of the S-IV Stage allows this capability to be provided in an economical manner by taking maximum advantage of the facilities which now exist in the Alpha 1 Test Complex. The construction of the three test areas

and the installation of associated test equipment will provide the capability of conducting tests, including vibrational analysis, under cryogenic and sub-atmospheric conditions.

These facilities will also be used in the development of a high performance insulation which will allow vehicle weight reduction and improved performance.

ESTIMATED FUTURE YEAR FUNDING FOR THIS PROJECT: An estimated $1.0 to $2.0 million per year will be required for changes to this test complex resulting from technological advances.

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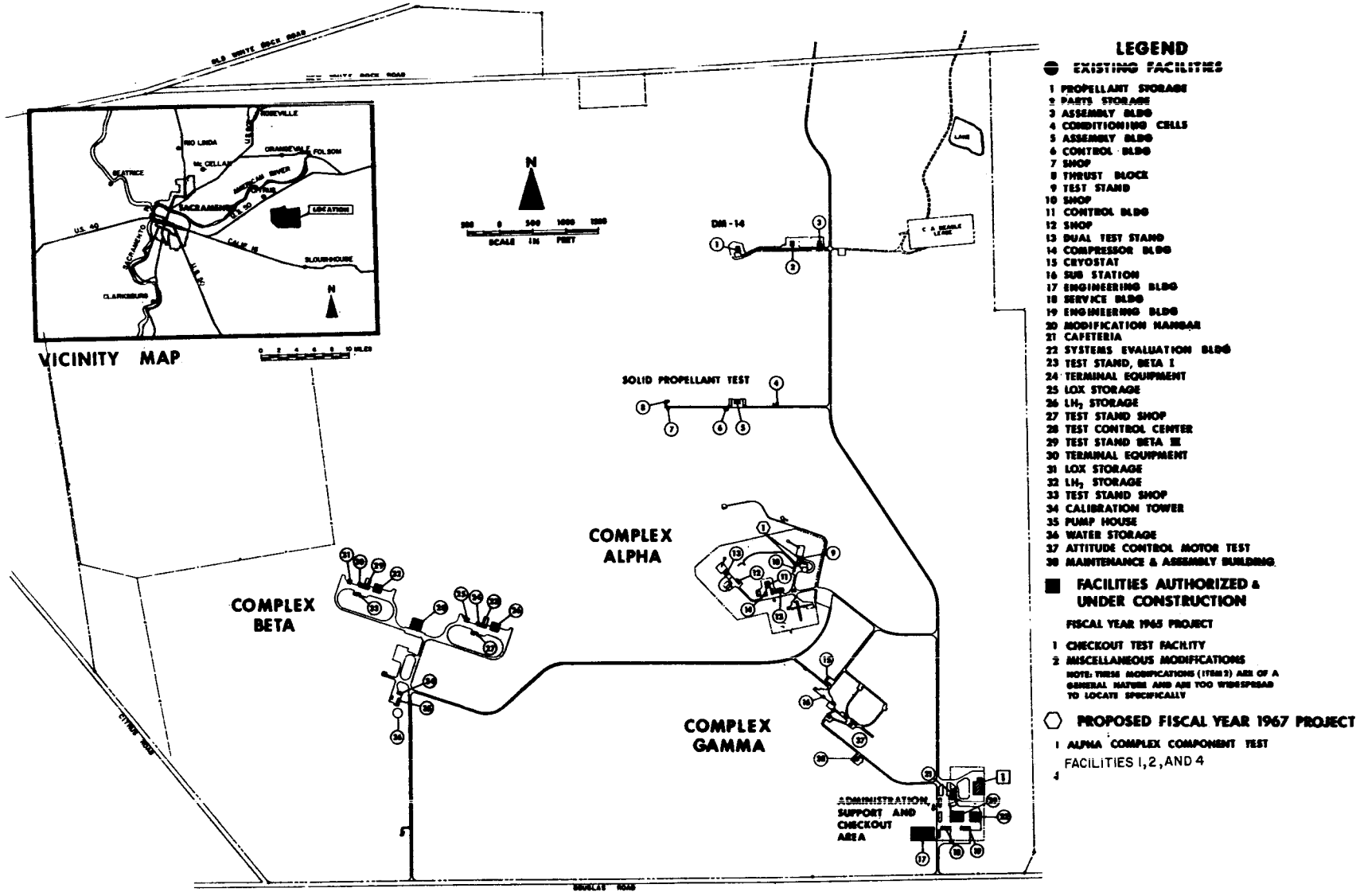
VARIOUS LOCATIONS

FISCAL YEAR 1967 ESTIMATES

FACILITIES FOR S-IVB STAGE PROGRAM

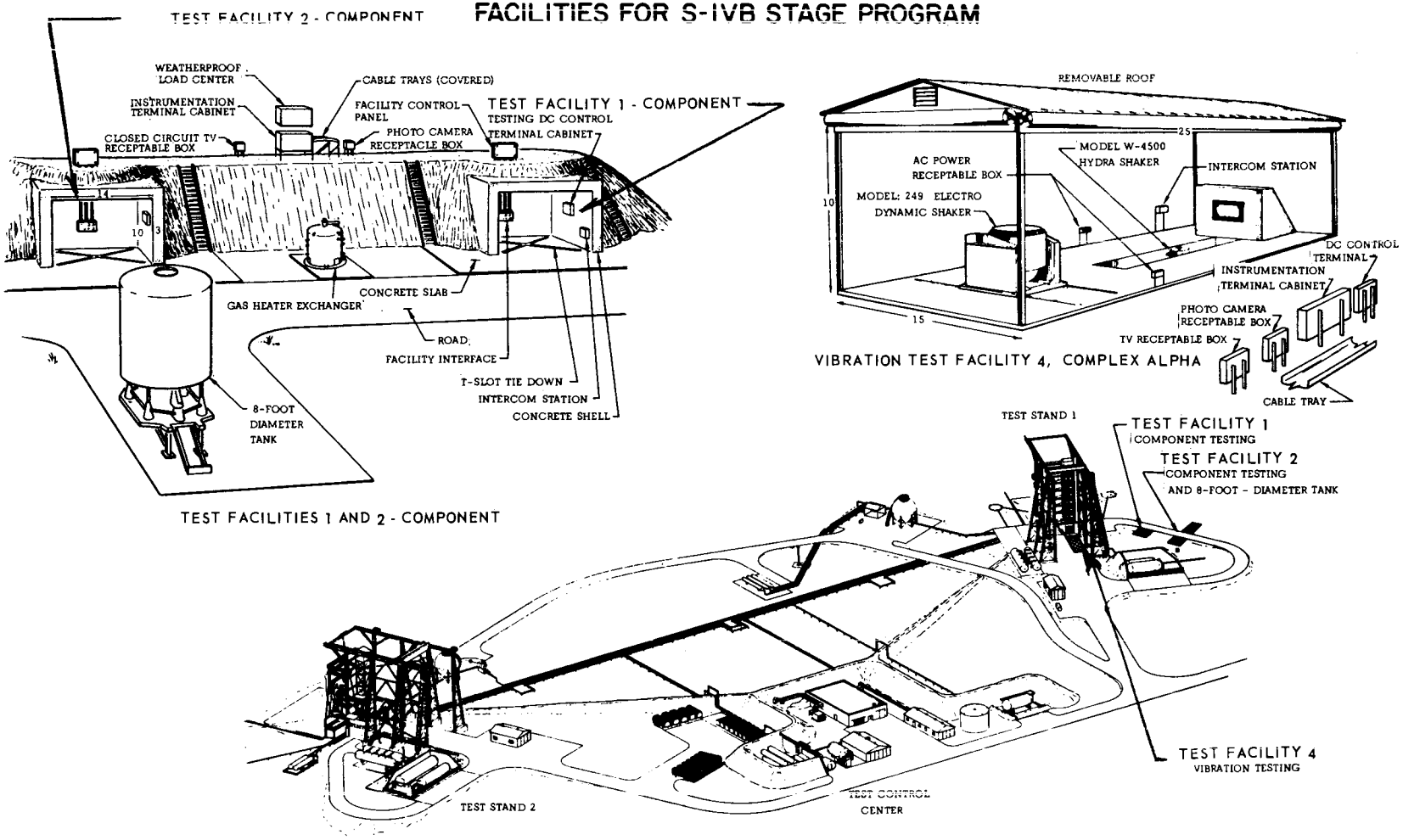


SACRAMENTO, CALIFORNIA

VARIOUS LOCATIONS

FISCAL YEAR 1967 ESTIMATES

FACILITIES FOR S-IVB STAGE PROGRAM



ALPHA COMPLEX COMPONENT TEST FACILITIES 1, 2, and 4

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

FACILITY PLANNING AND DESIGN

	Page No.
Summary	CF 13-1
Office of the Associate Administrator (NASA General)	
Facility planning and design	CF 13-2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INSTALLATION SUMMARY

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 BUDGET ESTIMATES

(Dollars in thousands)

NASA INSTALLATION	COGNIZANT PROGRAM OFFICE FOR INSTALLATION	LOCATION OF INSTALLATION	COUNTY	NEAREST CITY
All	Office of Associate Administrator	---	---	---

INSTALLATION MISSION

See justification.

PERSONNEL STRENGTH	FY 1965	FY 1966	FY 1967
NASA PERSONNEL *(End of Year)*			
CONTRACTOR AND OTHER PERSONNEL			
TOTAL ALL PERSONNEL	Not Applicable		

LAND	NO. ACRES
NASA-OWNED	
OTHER GOVERNMENT AGENCY-OWNED	
NON-FEDERAL *(Leases, easements)*	Not
TOTAL LAND	Applicable
TOTAL CAPITAL INVESTMENT* *(Including NASA-Owned Land) (as of June 30, 1965)*	$ Not Applicable

PROJECT LINE ITEM	COGNIZANT OFFICE	FY 1962 THRU CURRENT YEAR	FY 1967 *(Estimated)*	FUTURE YEARS *(Estimated)*	TOTAL ALL YEARS *(Estimated)*
Facility Planning and Design	AA	46,330	7,000	Not Applicable	Not Applicable
ALL OTHER PROJECTS					
TOTALS		46,330	7,000		

NASA FORM 1029 (REV. JUN 65) PREVIOUS EDITIONS ARE OBSOLETE.

* *Includes work in process.*

CONSTRUCTION OF FACILITIES

FISCAL YEAR 1967 ESTIMATES

FACILITY PLANNING AND DESIGN

The funds requested are used to conduct advance planning and design activities on projects for which construction funds will be requested in subsequent budgets.

The $7.0 million request covers work in the following three areas: (a) $1.5 million for preliminary designs and other special studies, (b) $3.5 million for the preparation of complete plans and specifications of those projects to be included in the FY 1968 fiscal year construction program, and (c) $2.0 million to complete the detailed design plans and specifications for the highly complex two position engine and stage test stand associated with the NERVA program.

The $1.5 million for the first area covers the preparation and upgrading of master plans for the various NASA centers and other NASA installations, unforeseen construction studies, and the preparation of cost estimates and engineering studies which make up the preliminary designs for an estimated $80 to $100 million fiscal year 1969 construction program.

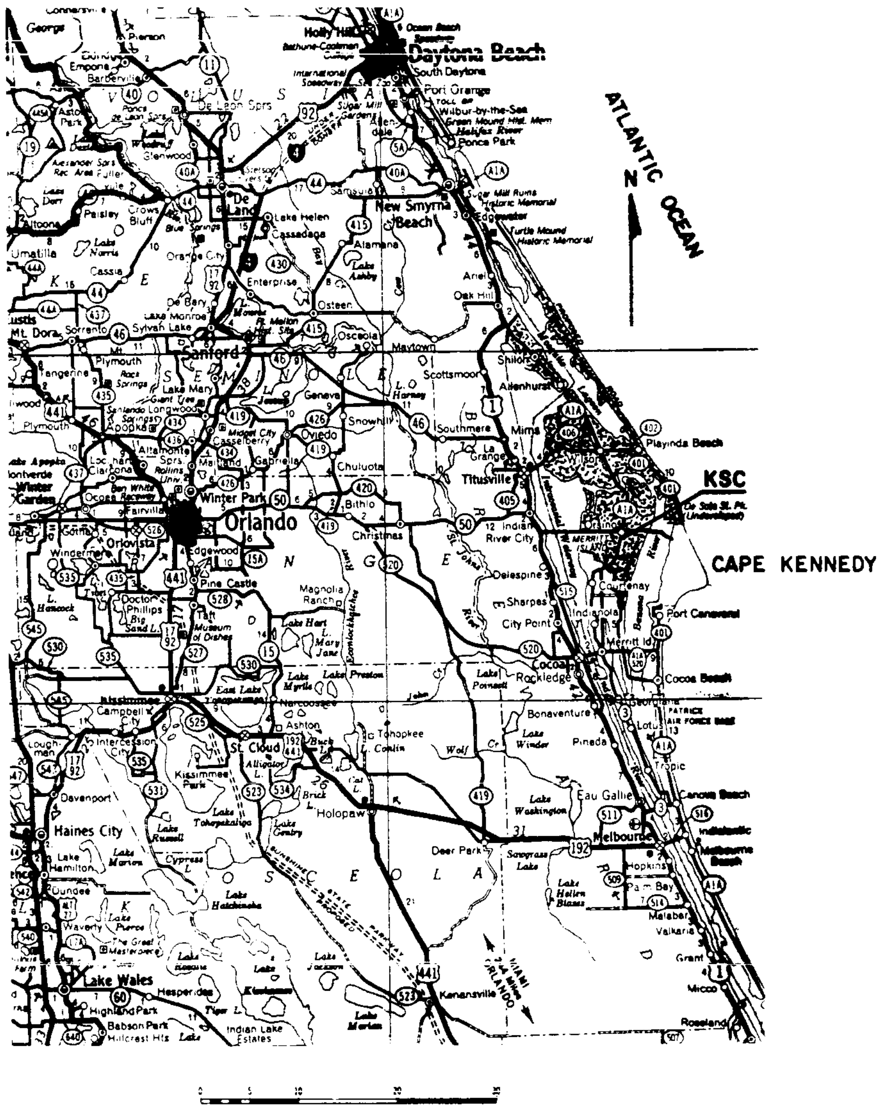
The $3.5 million for the second area covers the preparation of final and complete designs, plans, and specifications for an estimated FY 1968 facility construction activity amounting to a total of $80 to $100 million (excluding the Engine/Stage Test Stand 2-3 facility).

The $2.0 million for the third area covers the engineering and design of the Engine/Stage Test Stand 2-3 test complex which consists of two static test stands, a control center, and ancillary equipment. Each test stand will be capable of testing a nuclear rocket propulsion module in a vertical position during 5000 MW (power) operations. Studies, criteria development and site investigations are in progress and engineering and design will begin shortly. This work has been funded from prior years Facilities Planning and Design funds. $2.0 million are required in fiscal year 1967 to continue the engineering and design of this complex. The $50 million construction costs currently estimated for this test complex are not included in the $80 to $100 million figures shown for the second area requirements.

JOHN F. KENNEDY SPACE CENTER, NASA

FISCAL YEAR 1967 ESTIMATES

VICINITY MAP

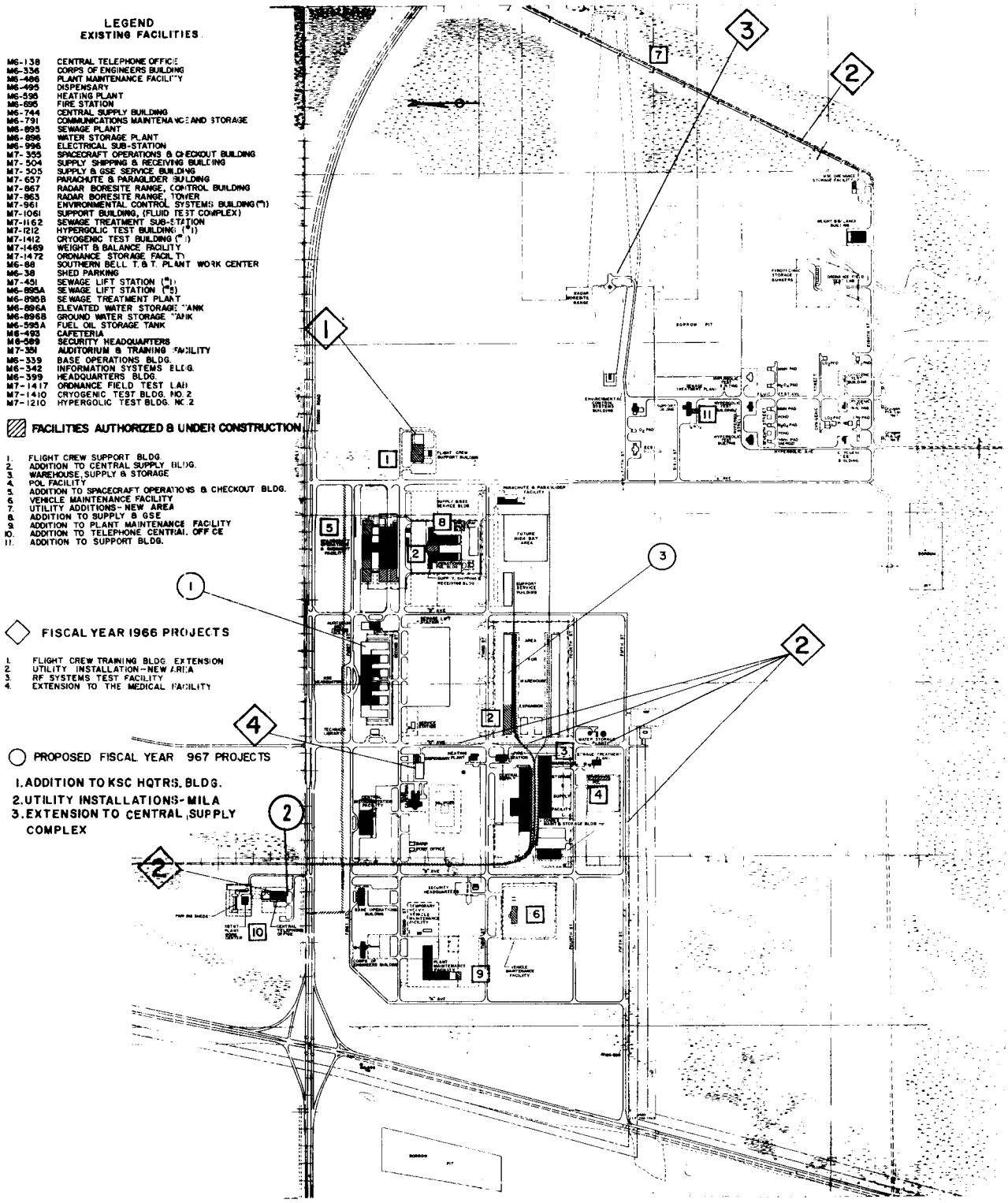


KEY PLAN

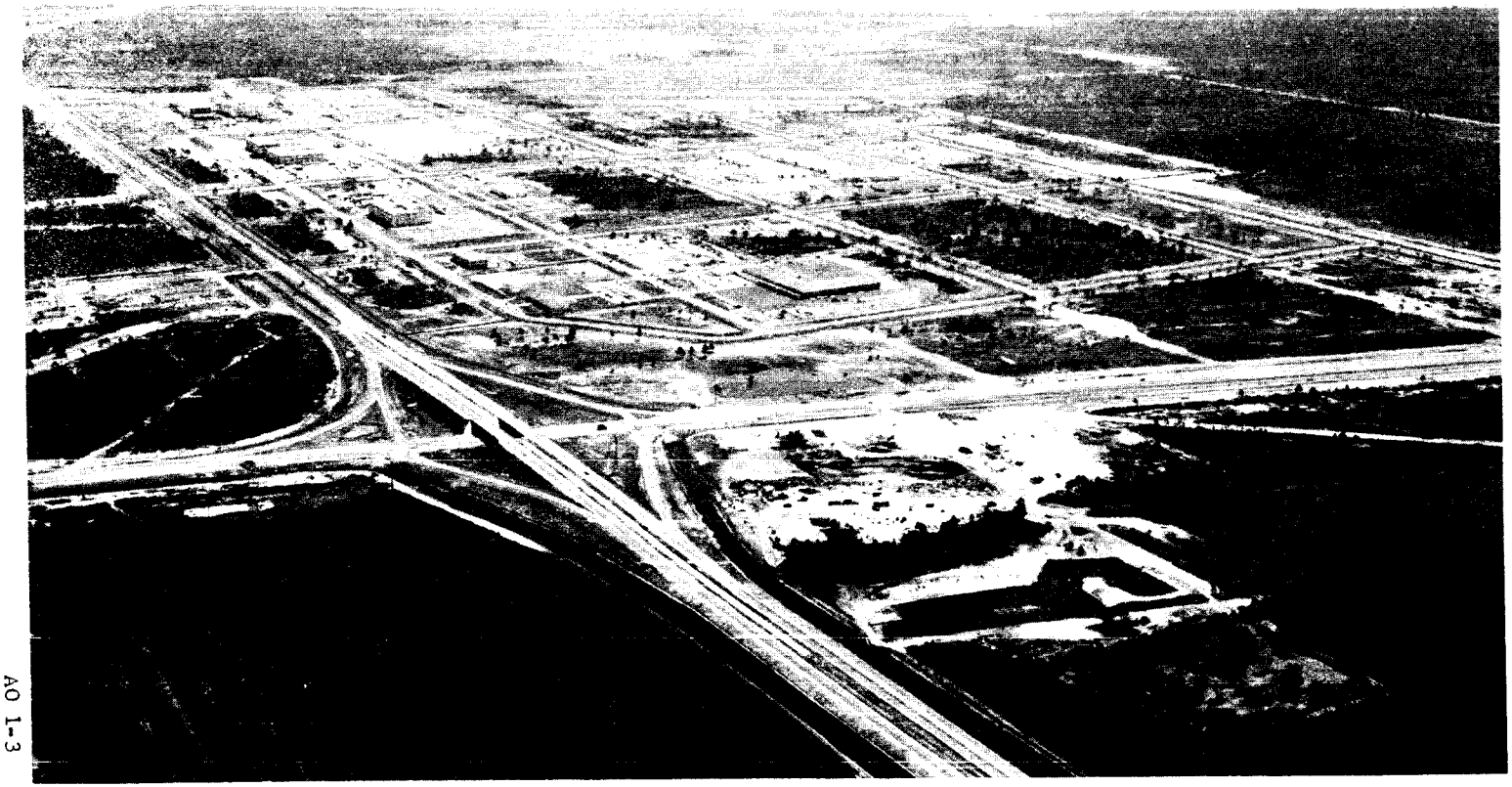
JOHN F. KENNEDY SPACE CENTER

FISCAL YEAR 1967 ESTIMATES

LOCATION PLAN



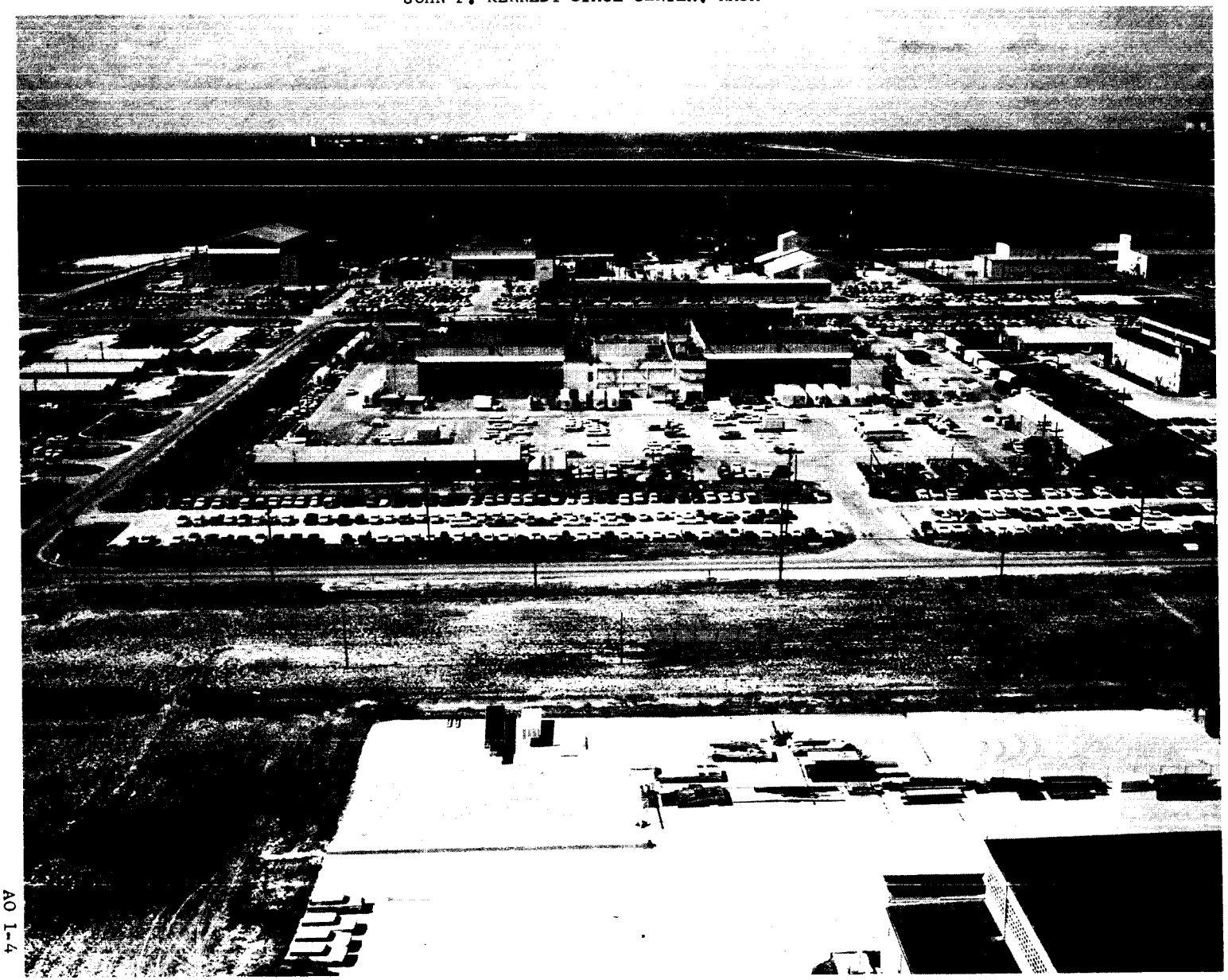
JOHN F. KENNEDY SPACE CENTER, NASA



INDUSTRIAL AREA

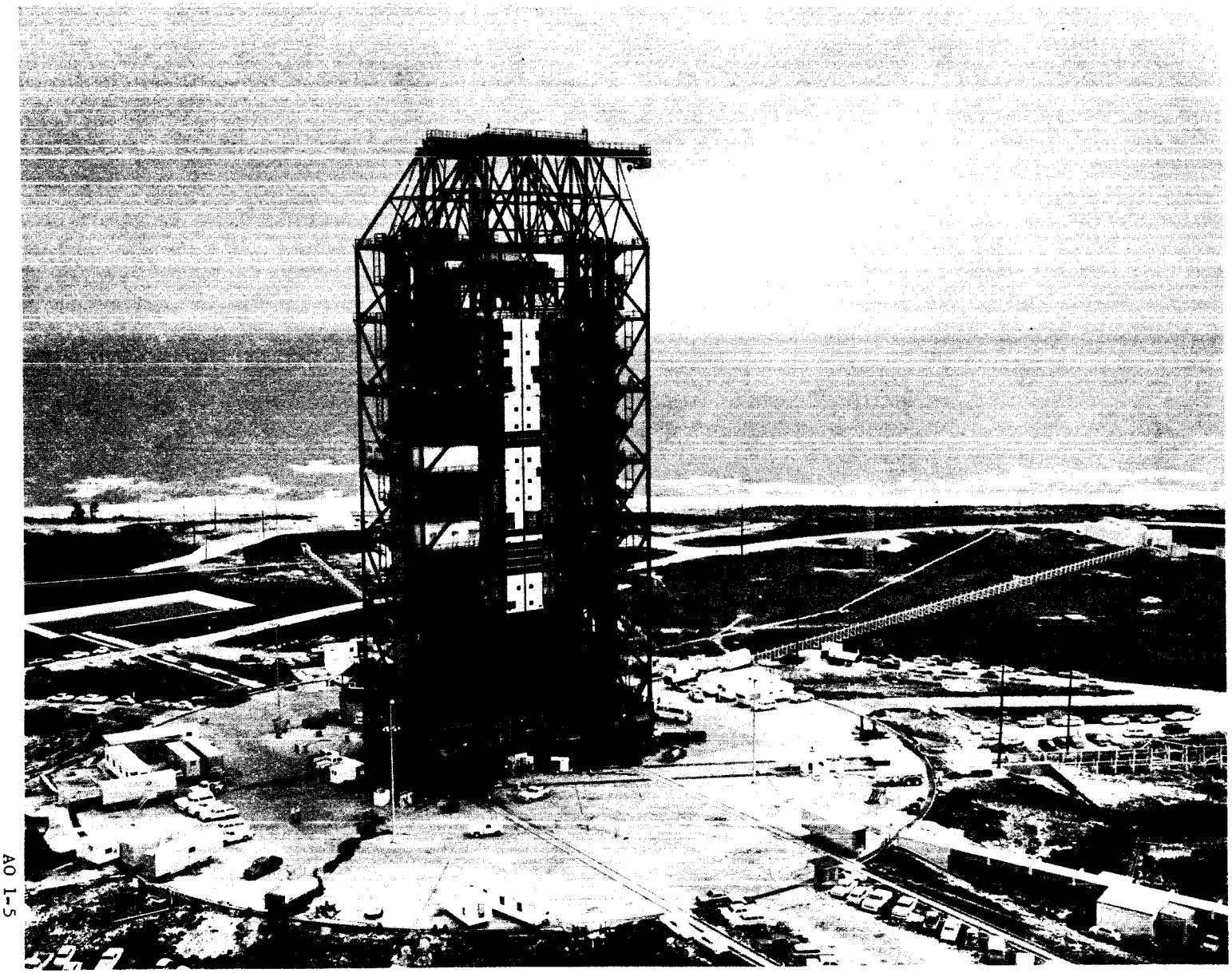
205-653 (1 - 69 - 1E

JOHN F. KENNEDY SPACE CENTER, NASA

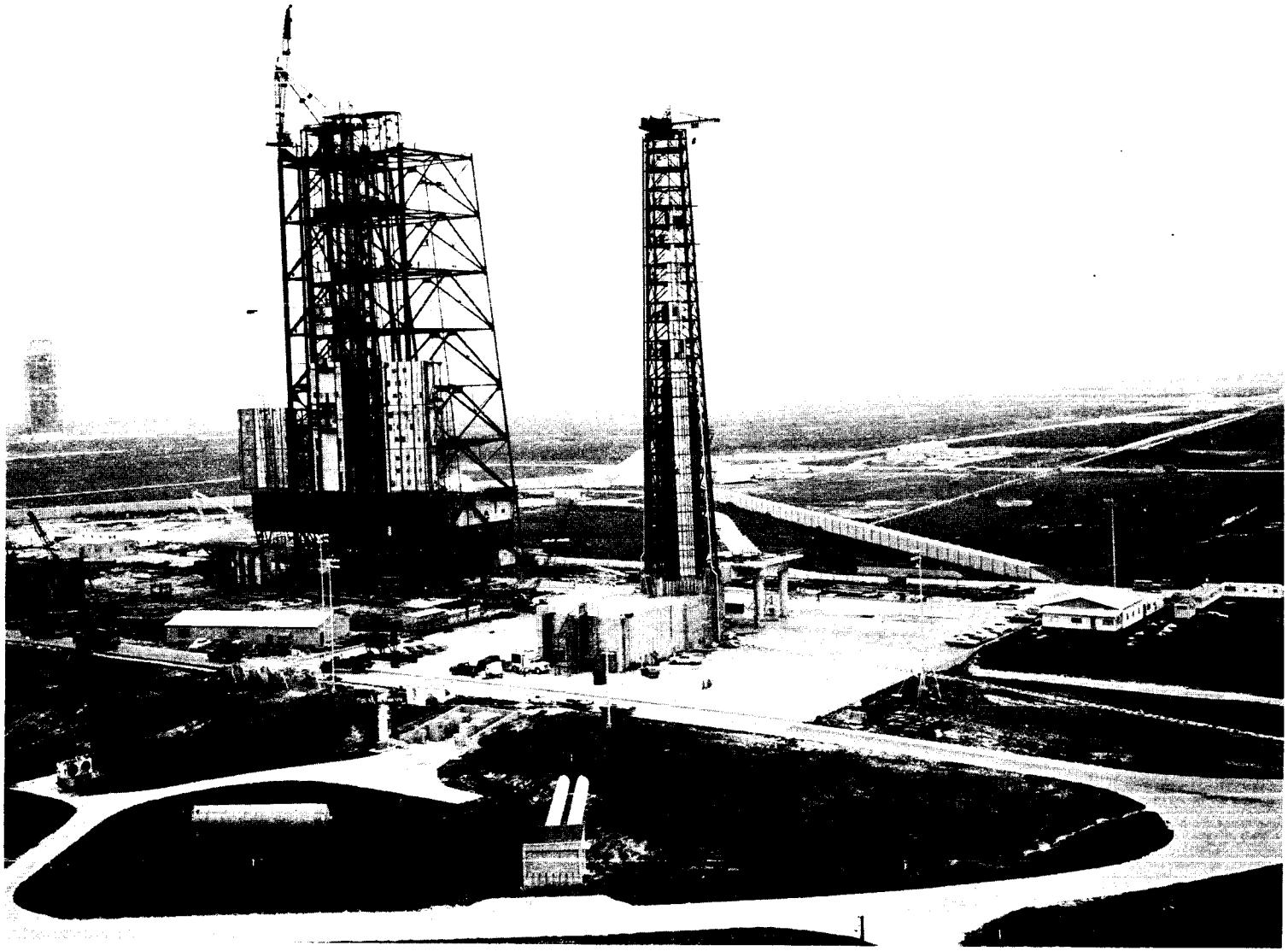


INDUSTRIAL AREA

JOHN F. KENNEDY SPACE CENTER, NASA

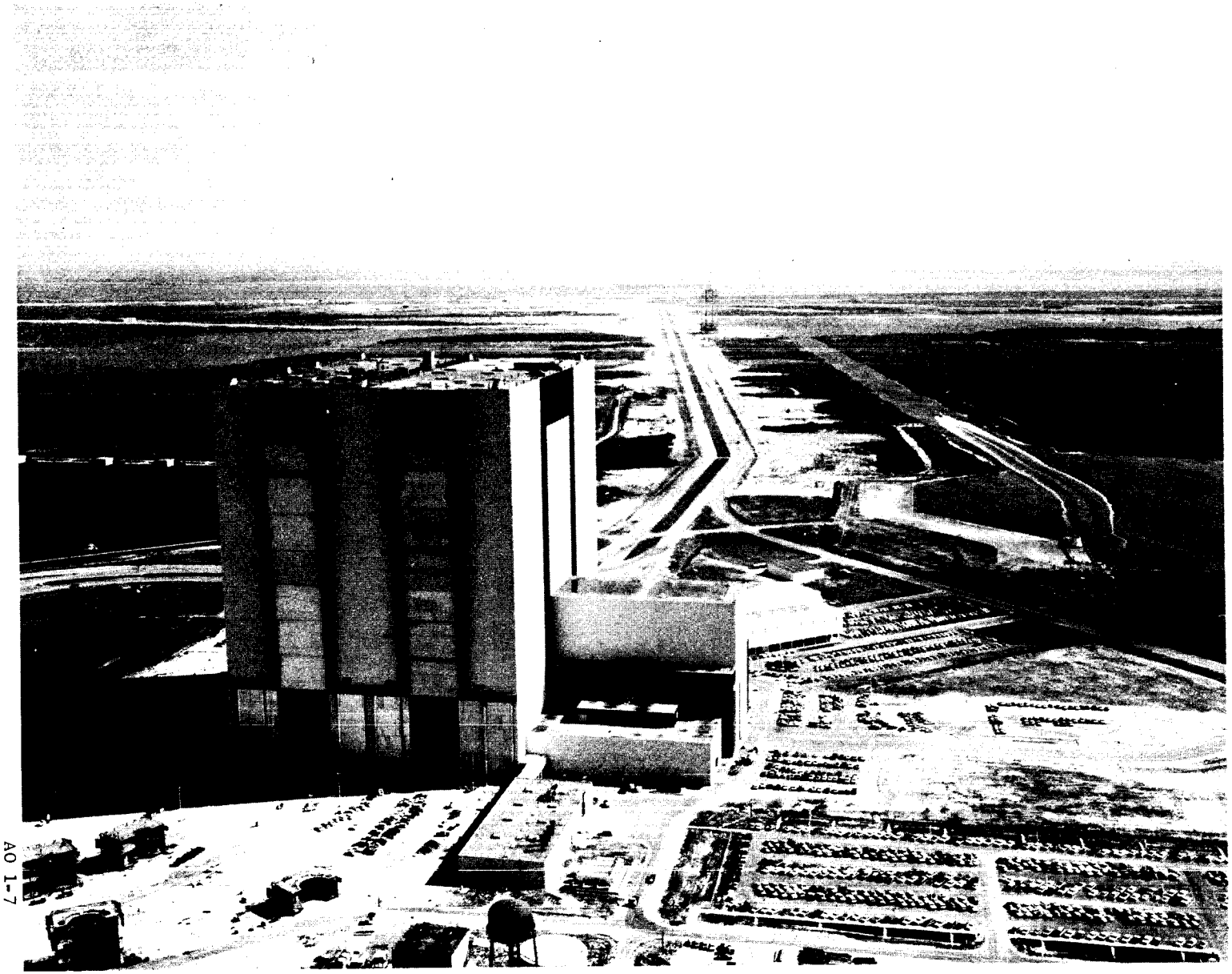


LAUNCH COMPLEX 34



LAUNCH COMPLEX 37

JOHN F. KENNEDY SPACE CENTER, NASA



LAUNCH COMPLEX 39

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ORGANIZATION AND STAFFING CHART

JOHN F. KENNEDY SPACE CENTER, NASA

STAFFING SUMMARY

	66	67
Excepted	17	17
GS-16	16	16
GS-15	85	88
GS-14	213	225
All other GS	2,184	2,300
Wage Board	105	104
Total Permanent	2,620	2,750
Temporary	46	46
Total Positions	2,666	2,796

Note: Includes 34 Permanent Positions assigned to Daytona Beach Operations, not functionally part of Kennedy Space Center.

OFFICE OF THE DIRECTOR

	66	67
Excepted	2	2
GS-16	-	-
GS-15	1	1
GS-14		-
All other GS	6	6
Wage Board	-	-
Total Permanent	9	9

PUBLIC AFFAIRS OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	4	4
All other GS	22	22
Wage Board	-	-
Total Permanent	27	27

TECHNICAL STAFF

	66	67
Excepted	-	-
GS-16	1	1
GS-15	-	-
GS-14	1	1
All other GS	2	2
Wage Board	-	-
Total Permanent	4	4

DIRECTOR PLANS, PROGRAMS AND RESOURCES

	66	67
Excepted	2	2
GS-16	1	1
GS-15	11	13
GS-14	21	23
All other GS	120	123
Wage Board	-	-
Total Permanent	155	162

DIRECTOR QUALITY ASSURANCE & SAFETY

	66	67
Excepted	1	1
GS-16	-	-
GS-15	2	2
GS-14	4	4
All other GS	109	109
Wage Board	-	-
Total Permanent	116	116

DIRECTOR LAUNCH OPERATIONS

	66	67
Excepted	2	2
GS-16	-	-
GS-15	6	6
GS-14	3	3
All other GS	8	16
Wage Board	-	-
Total Permanent	19	27

ASSISTANT DIRECTOR FOR ADMINISTRATION

	66	67
Excepted	2	2
GS-16	-	-
GS-15	6	6
GS-14	24	25
All other GS	435	439
Wage Board	6	6
Total Permanent	473	478

ASSISTANT DIRECTOR FOR ENGINEERING & DEVELOPMENT

	66	67
Excepted	2	2
GS-16	4	4
GS-15	10	10
GS-14	34	35
All other GS	265	269
Wage Board	-	-
Total Permanent	315	320

ASSISTANT DIRECTOR FOR SUPPORT OPERATIONS

	66	67
Excepted	1	1
GS-16	2	2
GS-15	7	7
GS-14	20	21
All other GS	327	332
Wage Board	61	60
Total Permanent	418	423

ASSISTANT DIRECTOR FOR LAUNCH VEHICLE OPERATIONS

	66	67
Excepted	2	2
GS-16	4	4
GS-15	14	14
GS-14	26	28
All other GS	270	296
Wage Board	38	38
Total Permanent	354	382

ASSISTANT DIRECTOR FOR INFORMATION SYSTEMS

	66	67
Excepted	1	1
GS-16	3	3
GS-15	8	8
GS-14	20	22
All other GS	201	211
Wage Board	-	-
Total Permanent	233	245

ASSISTANT DIRECTOR FOR SPACECRAFT OPERATIONS

	66	67
Excepted	1	1
GS-16	1	1
GS-15	10	11
GS-14	33	35
All other GS	292	349
Wage Board	-	-
Total Permanent	337	397

ASSISTANT DIRECTOR FOR UNMANNED LAUNCH OPERATIONS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	8	8
GS-14	20	21
All other GS	97	96
Wage Board	-	-
Total Permanent	126	126

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ADMINISTRATIVE OPERATIONS

FISCAL YEAR 1967 ESTIMATES

JOHN F. KENNEDY SPACE CENTER, NASA

MISSION AND CAPABILITIES:

The John F. Kennedy Space Center, formerly the Launch Operations Directorate of the Marshall Space Flight Center, was organized as a separate center under the Office of Manned Space Flight on July 1, 1962. The center's primary responsibilities are:

1. Planning and supervising the launch preparation, and launch of NASA space vehicle systems at the Kennedy Space Center and the National Eastern and Western Test Ranges.

2. Integrating NASA ground support equipment at the launch site for various space vehicle systems.

3. Designing and constructing NASA facilities at the Kennedy Space Center to meet users functional requirements.

4. Programming, integrating, and fulfilling user requirements for general purpose facilities such as office space, warehouses, maintenance buildings, utilities and roads.

5. Providing administrative services, visitor control services, community and industrial relations, legal, security, purchasing and contracting, transportation, and financial management for all NASA elements located in these areas.

6. Representing NASA in coordinating with the United States Air Force, matters pertaining to launch-phase tracking and data acquisition, and in making arrangements for tracking and data services and support required for operation of all NASA activities at the Eastern and Western Test Ranges.

In January 1963, under NASA-DOD agreement, NASA was designated the executive agent and manager of the Merritt Island Launch Area, which was redesignated by Executive Order, on November 29, 1963, as the John F. Kennedy Space Center.

The consolidation of NASA launch responsibility at the National Eastern and Western Test Ranges, on October 1, 1965, assigned to the Kennedy Space Center launch responsibility for the following unmanned missions: lunar and planetary missions for the Jet Propulsion Laboratory; scientific,

meteorological and communications satellites for Goddard Space Flight Center; Atlas-Centaur and Atlas and Thor-Agena flights for the Lewis Research Center; lunar missions for Langley Research Center; and interplanetary and scientific satellite missions for the Ames Research Center. Launch responsibility for these missions will be under cognizance of the new Unmanned Launch Operations Directorate of Kennedy Space Center.

The Center provides manpower with skills for testing, checkout, and launch of vehicles and associated spacecraft, research and development of launch instrumentation, and design of space vehicle checkout and launch facilities and equipment.

Included in the Center's assigned responsibilities are the launching of Saturn vehicles and Apollo payloads, support of Gemini and Apollo Spacecraft Operations, managing the Kennedy Space Center facilities, and acting as the focal point for all NASA activities at the National Eastern and Western Test Ranges. Responsibilities include design, construction, activation of Launch Complexes 34, 37, and 39, and operation and maintenance of these complexes and Launch Complexes 12, 16, 17, and 36, and related supporting industrial areas. The major activity during FY 1967 will be the pre-launch preparation, launch, and launch support of the Apollo Saturn IB, the Apollo Saturn V, and the Gemini programs, and launch operations at the National Eastern and Western Test Ranges for the Office of Space Science and Applications, and the Office of Advanced Research and Technology.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Authorized Positions, end of year.	2,491	2,666	2,796
Average Number of All Employees...	1,935	2,531	2,653
Administrative Operations.....	$52,416,000	$79,723,000	$98,108,000

INSTALLATION DESCRIPTION:

The Kennedy Space Center is adjacent to the National Eastern Test Range launch area. It is situated approximately 50 miles East of Orlando, Florida, in northeast Brevard County.

The total land area occupied by the installation is approximately 87,777 acres. The land purchases for the center which began about four years ago were approximately 99 per cent complete as of June 1965. The total land to be procured is approximately 84,305 acres, and has been designated the John F. Kennedy Space Center. An additional 12 leased acres provide for radar tracking sites. One hundred and twenty-one acres of public domain land and 3,339 acres under easement for access causeway purposes make up the balance of the total land area.

In addition to the operation and maintenance of all facilities at the John F. Kennedy Space Center, the center is responsible for certain facilities within the National Eastern Test Range launch area. The capital investment as of June 30, 1965, was $561,762,000.

ANALYSIS OF RESOURCES REQUIREMENTS BY OBJECT CLASSIFICATION:

		1965	1966	1967
11.	Personnel Compensation.....	$20,107,000	$28,546,000	$30,777,000
12.	Personnel Benefits.....	1,355,000	1,930,000	2,068,000
	Total, Personnel Costs...	$21,462,000	$30,476,000	$32,845,000
21.	Travel and Transportation of Persons.....	2,441,000	2,080,000	2,173,000
22.	Transportation of Things...	919,000	862,000	1,127,000
23.	Rents, Communications, and Utilities.....	3,964,000	5,565,000	7,066,000
24.	Printing and Reproduction..	216,000	339,000	461,000
25.	Other Services.....	14,970,000	28,315,000	36,756,000
	Services of other agencies.....	3,163,000	6,761,000	8,146,000
26.	Supplies and Materials.....	3,534,000	3,550,000	6,594,000
31.	Equipment.....	799,000	818,000	1,970,000
32.	Land and Structures.....	938,000	947,000	960,000
42.	Insurance Claims and Indemnities.....	10,000	10,000	10,000
	Total.....	$52,416,000	$79,723,000	$98,108,000

JUSTIFICATION BY OBJECT CLASSIFICATION:

Personnel Distribution

	1965	1966	1967
Direct Personnel by Program			
Manned Space Flight			
Gemini.....	208	219	---
Apollo.....	1,205	1,234	1,560
Space Science and Applications			
Launch vehicle procurement....	19	132	132
Sub-total, direct positions.	1,432	1,585	1,692

	1965	1966	1967
Support personnel			
Director and Staff.....	20	20	20
Administration.....	532	546	551
Research and development support.	444	469	487
Sub-total, support positions...	996	1,035	1,058
Total, permanent positions.....	2,428	2,620	2,750
Other positions:			
Positions under cooperative training agreements.....	38	38	38
Other temporary positions.....	25	8	8
Total, all positions.....	2,491	2,666	2,796

Personnel requirements

FY 1967 planned employment level will be required for the remaining Gemini missions in addition to the Apollo Saturn IB and Saturn V activity, and unmanned missions at the Eastern and Western Test Ranges. This employment level was established after an extensive study of the operational requirements. The increased number of launches scheduled, and the requirement for essentially concurrent preparation and checkout of several launch vehicles and spacecraft will add significantly to the workload. Launch operations engineers who are engaged in the technical direction and monitoring of numerous contractors responsible for the assembly, testing and checkout of launch vehicles and spacecraft will be augmented as the tempo of activity mounts.

Personnel Costs

	1965	1966	1967
Total Positions.....	2,491	2,666	2,796
Permanent.....	2,428	2,620	2,750
Other.....	63	46	46
Personnel Compensation:			
Annual cost of permanent positions.....	$24,069,000	$27,808,000	$29,897,000
Pay above the stated annual rate.....	92,000	107,000	108,000
Lapses (deduct).....	-5,849,000	-1,909,000	-1,703,000

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	1965	1966	1967
Net cost of permanent positions	$18,312,000	$26,006,000	$28,302,000
Other personnel compensation	1,795,000	2,540,000	2,475,000
Total compensation	20,107,000	28,546,000	30,777,000
NASA funded	20,107,000	28,546,000	30,777,000
Reimbursable	---	---	---
Personnel benefits	1,355,000	1,930,000	2,068,000
NASA funded	1,355,000	1,930,000	2,068,000
Reimbursable	---	---	---
Total personnel costs	21,462,000	30,476,000	32,845,000
NASA funded	21,462,000	30,476,000	32,845,000
Reimbursable	---	---	---
Average Number of All Employees (Man Years)	1,935	2,531	2,653

Personnel Costs - $32,845,000

The FY 1967 personnel costs increase $2,369,000 above FY 1966. Of this increase, $1,569,000 is due to 73 additional man years to be realized from the full year effect of FY 1966 additional positions, to the costs of within-grade advancements and other position adjustments, and to fund the cost of the Federal Employees Salary Act of 1965 for a full year. The balance of the increase, $800,000 is required to fund an additional 130 positions required for FY 1967.

Travel and Transportation of Persons - $2,173,000

The request for travel and transportation of persons for FY 1967 represents an increase of $93,000 from FY 1966. The bulk of this increase is attributable to the need for more frequent trips to contractor plants and test sites in connection with the development and delivery of ground support and launch equipment for the Apollo Saturn V program. A small increase is anticipated in the costs of local transportation to support the growth in stage and spacecraft contractor population.

Transportation of Things - $1,127,000

The increase of $265,000 for FY 1967 is required for freight costs associated with the movement of the increased supplies, materials, and equipment purchases in FY 1967, and for increased truck motor pool services to support the continued buildup of Apollo Saturn V Launch Complex 39 and the increased stage and support contractor activity.

Rents, Communications, and Utilities - $7,066,000

The increase of $1,501,000 for FY 1967 reflects a full-year operating cost for facilities activated during FY 1966, and also supports the continued buildup of requirements for electricity at Apollo-Saturn V Launch Complex 39.

Printing and Reproduction - $461,000

The increase of $122,000 for FY 1967 provides for additional contractual printing and reproduction necessary to support the increased level of activity to be provided as the number of stage and support contractors for the Apollo program operational levels buildup.

Other Services - $44,902,000

The increase of $9,826,000 for FY 1967 relates to the impact of the continued physical growth of the installation as facilities which have been under construction for approximately four years are completed, and as the buildup in launch activity increases.

The largest increment of the requirement, $5,655,000 provides for additional man years of effort for the base operations support. Base operations covers maintenance and operation of facilities, supply operations, fire protection, security, and industrial health.

Administrative support services make up the second largest increment of the increase - $2,605,000. This increase provides for additional man years of effort in computer operations, microfilming and documentation, technical writing, library services, and photographic services.

Reimbursement for Air Force support of NASA operations at the Eastern Test Range launch area will increase by $1,324,000 for FY 1967. This increase considers the full-year costs for maintenance of launch and related facilities such as, Launch Complex 13, Hangars E, J, and K transferred from the Air Force to NASA control in January 1966, and the first operational year of a new NASA-DOD agreement which provides that NASA will reimburse the Air Force for photographic and photo-laboratory services at the Eastern Test Range.

The balance of the "other services" increase provides for maintenance and repair costs for instruments and equipment, and maintenance and operation costs in support of unmanned operations at the Western Test Range.

Supplies and Materials - $6,594,000

The increase of $3,044,000 for FY 1967 provides for the issue of supplies and materials used in support of base operations. The supplies and materials consumption rates are consistent with the buildup in stage, spacecraft, and support contractor activity.

Equipment - $1,970,000

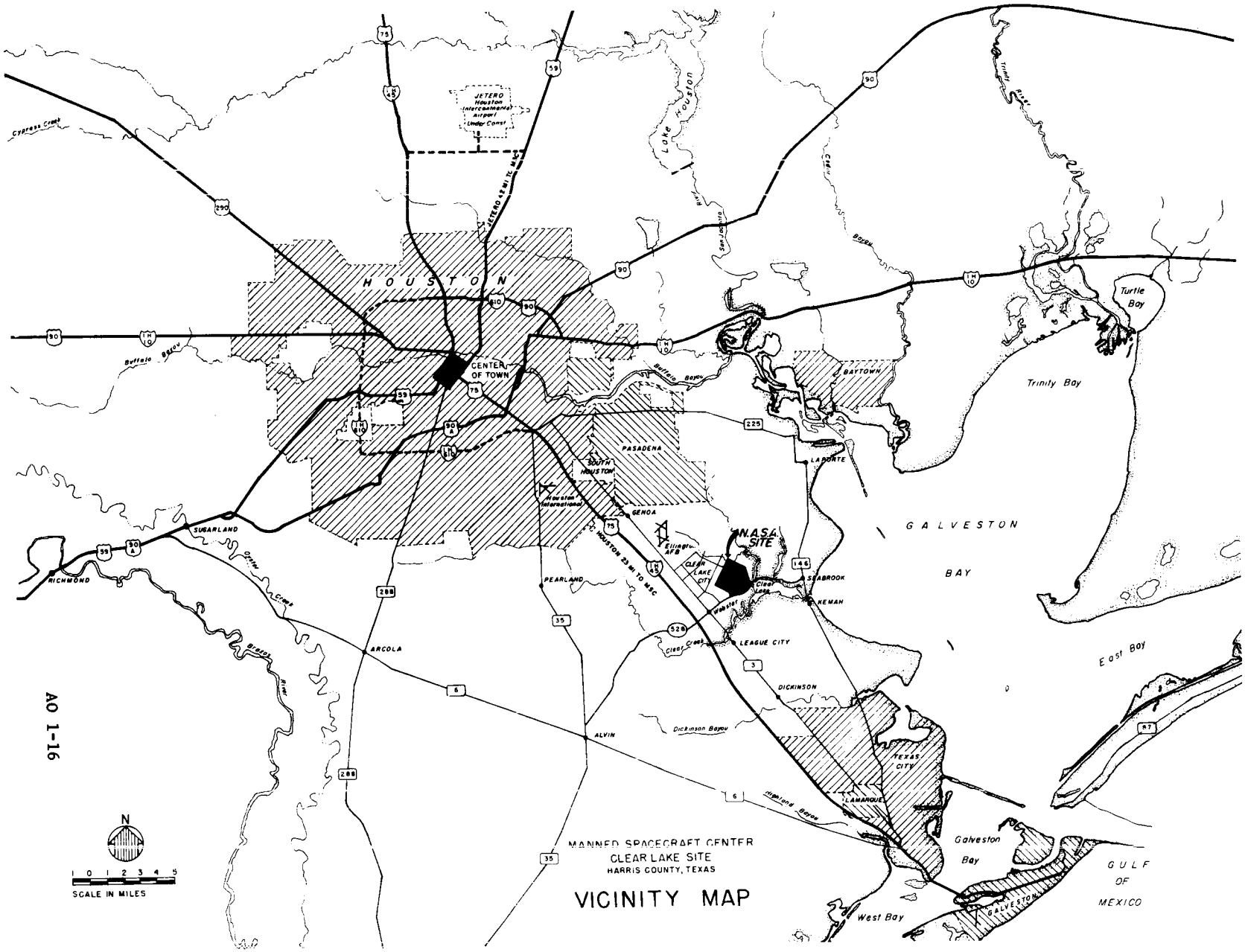
The increase of $1,152,000 for FY 1967 is attributable to equipment requirements in support of base operations such as, fire protection equipment, medical laboratories and emergency power equipment.

Land and Structures - $960,000

The estimate for FY 1967 supports requirements for minor construction projects and modifications at the Kennedy Space Center and at the Eastern and Western Test Ranges. There is a continuing requirement for modification and minor construction of technical and support facilities to permit their effective utilization under evolving improvements in checkout and launch techniques. Funds requested for this purpose will permit the center to react promptly to these requirements.

Insurance Claims and Indemnities - $10,000

These funds provide payment for the settlement of claims against the United States Government for bodily injury, death, and property damage or loss.


HOUSTON
CENTER OF TOWN
JETERO Houston Intercontinental Airport Under Const
Lake Houston
Cypress Creek
Buffalo Bayou
San Jacinto River
Trinity River
Cedar Bayou
Turtle Bay
Trinity Bay
BAYTOWN
LA PORTE
PASADENA
SOUTH HOUSTON
Houston International
GENOA
SUGARLAND
RICHMOND
Brazos River
Oyster Creek
ARCOLA
PEARLAND
ALVIN
HOUSTON 23 MI TO MSC
Ellington AFB
N.A.S.A. SITE
CLEAR LAKE CITY
Clear Lake
Webster
Clear Creek
SEABROOK
KEMAH
LEAGUE CITY
DICKINSON
Dickinson Bayou
Highland Bayou
TEXAS CITY
LAMARQUE
GALVESTON BAY
East Bay
Galveston Bay
West Bay
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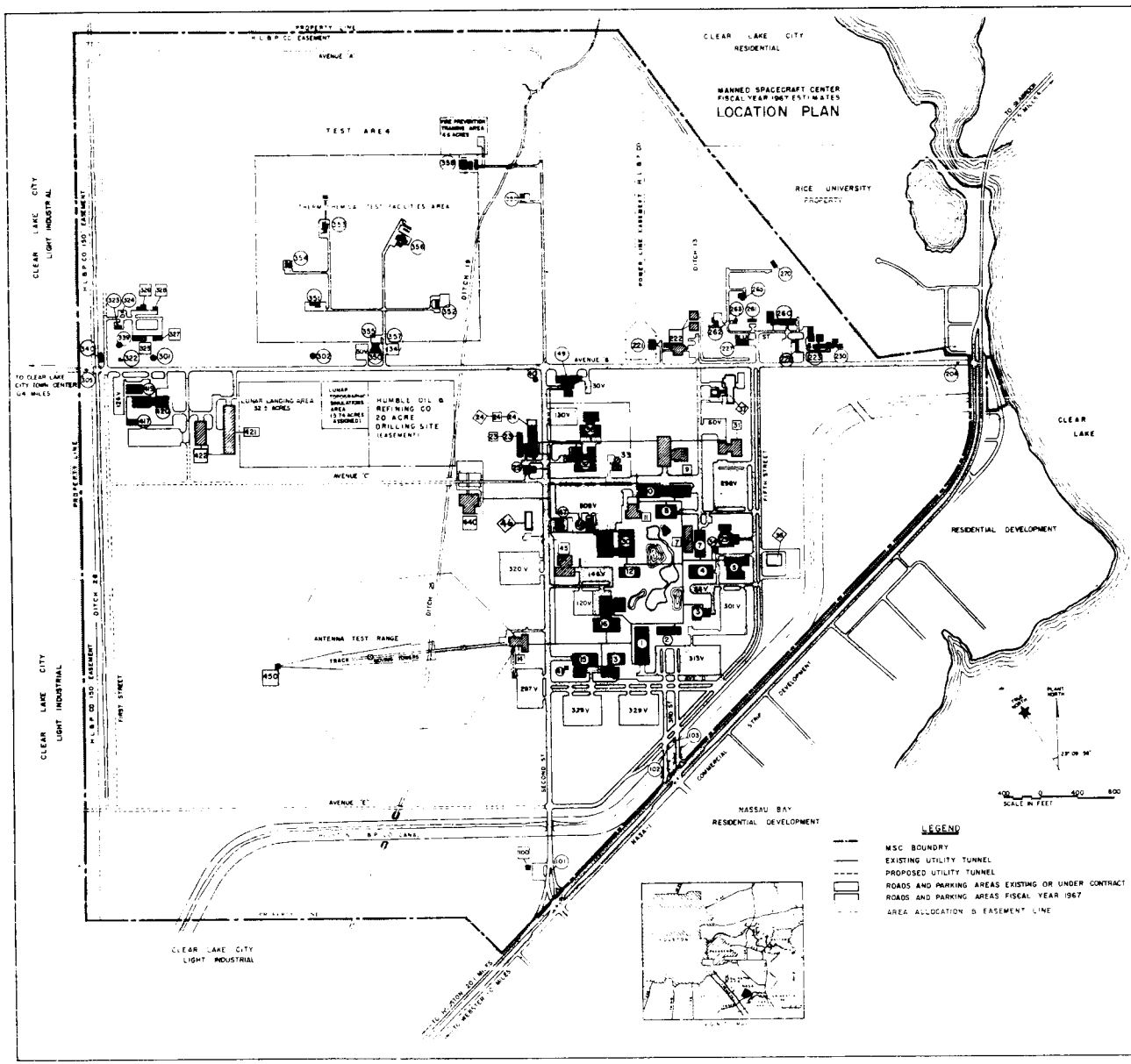
SCALE IN MILES
MANNED SPACECRAFT CENTER
CLEAR LAKE SITE
HARRIS COUNTY, TEXAS
VICINITY MAP



(1) EXISTING FACILITIES (FY-62,63,64)

1 AUDITORIUM FY 62
2 PROJECT MANAGEMENT FY 62
3 CENTRAL CAFETERIA FY 62
4 FLIGHT OPERATIONS OFFICE FY 62
5 MISSION SIMULATION AND TRAINING FACILITY FY 64
7 LIFE SYSTEMS LABORATORY FY 62
8 TECHNICAL & ENGINEERING SERVICES OFFICE FY 62

10 TECHNICAL SERVICES SHOP FY 62

12 CENTRAL DATA OFFICE FY 62
13 SYSTEMS EVALUATION LABORATORY FY 62

14 INSTRUMENTATION AND ELECTRONIC SYSTEMS LABORATORY FY 62
16 SPACECRAFT RESEARCH OFFICE AND LABORATORY FY 62,64
23 CENTRAL H&C COOLING TOWER FY 62,63,64
24 CENTRAL HEATING AND COOLING PLANT FY 62,63,64
25 FIRE STATION FY 62
29 FLIGHT ACCELERATION FACILITY FY 63
30 MISSION CONTROL CENTER FY 63

32 SPACE ENVIRONMENT SIMULATION LABORATORY FY 62,65
33 ULTRA HIGH VACUUM SPACE CHAMBER FACILITY FY 64
34 FLIGHT ACCELERATION MOTOR-GENERATOR BUILDING FY 63
36 F.S.C. CONTRACTOR SUPPORT FACILITY FY 62
40 ELEVATED WATER TANK FY 62
41 GAS STORAGE FY 62

47 SOUTHWESTERN BELL TELEPHONE BUILDING NA
48 EMERGENCY POWER BUILDING (MCC-H) FY 63
49 VIBRATION AND ACOUSTIC TEST FACILITY FY 64

101 GUARDHOUSE FY 64
102 GUARDHOUSE FY 64
103 GUARDHOUSE FY 64
204 GUARDHOUSE FY 64
221 ELECTRICAL SUBSTATION FY 62

223 SEWAGE TREATMENT PLANT FY 62,64
226 FIELD CONSTRUCTION OFFICE FY 62,64
227 PRINTING AND REPRODUCTIONS FACILITY FY 65
230 CREW SYSTEMS BIOLOGICAL FACILITY FY 64
260 TRANSLATION AND DOCKING FACILITY FY 63
261 RADIOLOGICAL CALIBRATION AND WASTE STORAGE FACILITY FY 63,64
262 ARC JET, RADIANT HEATING AND ACOUSTIC TEST FACILITY FY 63
263 HEALTH PHYSICS LABORATORY FY 64
265 RADIATION AND FIELDS ACCELERATOR LABORATORY FY 65
270 SOLAR TELESCOPE FACILITY FY 65
301 WATER WELL NO. 1 FY 62
302 WATER WELL NO. 2 FY 62
305 GUARDHOUSE FY 64
322 WATER TREATMENT FY 62
323 FILTER CLEANING AND STORAGE FACILITY FY 65
324 CLASSIFIED WASTE DISINTEGRATOR FACILITY FY 65
339 GROUND WATER STORAGE TANK FY 62
340 GAS METERING STATION FY 62
350 THERMOCHEMICAL TEST FACILITY FY 63
351 THERMOCHEMICAL SPACE CHAMBER FY 63
352 ELECTRO-EXPLOSIVE DEVICES FY 63
353 REACTION CONTROL TEST FACILITY FY 63
354 SPACE POWER SYSTEMS TEST FACILITY FY 63
355 CHEMICAL STORAGE BUILDING FY 63
356 COMPONENTS TEST FACILITY FY 63
357 THERMOCHEMICAL TEST AREA GATE HOUSE FY 63
358 THERMOCHEMICAL PROPELLANT WASTE TREATMENT FY 63
380 HAZARDOUS MATERIAL STORAGE FACILITY FY 64
416 INTERIM OFFICE SUPPORT FACILITY FY 65
417 GARAGE FY 62
419 SUPPORT OFFICE FY 62
420 SUPPORT SHOP AND WAREHOUSE FY 62

(2) FACILITIES AUTHORIZED OR UNDER CONTRACT

7 LIFE SYSTEMS LABORATORY FY 65
9 TECHNICAL SERVICE FACILITY FY 65
11 BRANCH CAFETERIA FY 65
14 ANECHOIC CHAMBER TEST FACILITY FY 65
23 CENTRAL H&C COOLING TOWER FY 65
24 CENTRAL HEATING & COOLING PLANT FY 65
31 LUNAR MISSION & SPACE EXPLORATION FACILITY FY 65
32 SPACE ENVIRONMENT SIMULATION LABORATORY FY 65,66
33 ULTRA HIGH VACUUM CHAMBER FACILITY FY 64
45 PROJECT ENGINEERING FACILITY FY 64
100 SECURITY CONTROL CENTER FY 65
222 ATMOS RE-ENTRY MAT & STRUCTURES EVAL FACILITY FY 64
325 MAINTENANCE SHOP FACILITY FY 66
326 ROADS AND GROUNDS EQUIPMENT MAINTENANCE FACILITY FY 66
327 M.S.F. WORK CONTROL CENTER FY 65
328 ROADS AND GROUNDS MATERIAL STORAGE FACILITY FY 65
422 LOGISTIC SUPPORT WAREHOUSE FY 65
440 ELECTRONIC SYSTEMS COMPATABILITY
450 ANTENNA SERVICE BUILDING & TOWER FY 64
[illegible] SUPPORT WAREHOUSE FY 66

(3) PROPOSED FISCAL YEAR 1967 PROJECTS

46 ENGINEERING BLDG
24 ADDITION TO CENTRAL HEATING & COOLING PLANT

35 FLIGHT CREW TRAINING FACILITY
37 LUNAR SAMPLE RECEIVING LABORATORY

MANNED SPACECRAFT CENTER

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING CHART
MANNED SPACECRAFT CENTER

STAFFING SUMMARY

	66	67
Excepted	36	36
GS-16	29	29
GS-15	211	219
GS-14	404	425
All other GS	3,911	3,822
Wage Board	218	216
Total Permanent	4,809	4,747
Temporary	119	119
Total Position	4,928	4,866

OFFICE OF THE DIRECTOR

	66	67
Excepted	4	4
GS-16	-	-
GS-15	-	-
GS-14	-	2
All other GS	12	10
Wage Board	-	-
Total Permanent	16	16

CHIEF OF CENTER MEDICAL PROGRAMS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	1	1
GS-14	-	-
All other GS	3	3
Wage Board	-	-
Total Permanent	5	5

AUDIT OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	1	1
All other GS	15	15
Wage Board	-	-
Total Permanent	17	17

PUBLIC AFFAIRS OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	4	4
All other GS	52	52
Wage Board	-	-
Total Permanent	57	57

FLIGHT SAFETY OFFICE

	66	67
Excepted	1	1
GS-16	-	-
GS-15	10	10
GS-14	6	9
All other GS	43	40
Wage Board	-	-
Total Permanent	60	60

CENTER MEDICAL OFFICE

	66	67
Excepted	-	-
GS-16	1	1
GS-15	5	6
GS-14	2	6
All other GS	41	36
Wage Board	-	-
Total Permanent	49	49

LEGAL OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	3	3
GS-14	2	3
All other GS	14	13
Wage Board	-	-
Total Permanent	19	19

GEMINI PROGRAM OFFICE

	66	67
Excepted	4	4
GS-16	3	-
GS-15	25	1
GS-14	36	1
All other GS	122	44
Wage Board	-	-
Total Permanent	190	50

APOLLO SPACECRAFT PROGRAM OFFICE

	66	67
Excepted	4	4
GS-16	4	7
GS-15	42	50
GS-14	76	88
All other GS	227	204
Wage Board	-	-
Total Permanent	353	353

ASSISTANT DIRECTOR FOR FLIGHT OPERATIONS

	66	67
Excepted	1	1
GS-16	1	1
GS-15	1	1
GS-14	-	-
All other GS	20	25
Wage Board	-	-
Total Permanent	23	28

FLIGHT SUPPORT DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	3
GS-14	8	11
All other GS	98	93
Wage Board	-	-
Total Permanent	107	107

MISSION PLANNING AND ANALYSIS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	6	7
GS-14	15	17
All other GS	290	283
Wage Board	-	-
Total Permanent	313	309

FLIGHT CONTROL DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	2	4
GS-14	11	3
All other GS	273	276
Wage Board	-	-
Total Permanent	288	285

LANDING AND RECOVERY DIVISION

	66	67
Excepted	-	-
GS-16	1	1
GS-15	2	3
GS-14	5	6
All other GS	98	96
Wage Board	2	2
Total Permanent	108	108

ASSISTANT DIRECTOR FOR ADMINISTRATION

	66	67
Excepted	2	2
GS-16	1	1
GS-15	2	2
GS-14	1	2
All other GS	9	8
Wage Board	-	-
Total Permanent	15	15

RESOURCES MANAGEMENT DIVISION

	66	67
Excepted	1	1
GS-16	-	-
GS-15	2	2
GS-14	10	10
All other GS	158	153
Wage Board	-	-
Total Permanent	171	166

PROCUREMENT AND CONTRACTS DIVISION

	66	67
Excepted	1	1
GS-16	-	-
GS-15	5	6
GS-14	17	18
All other GS	224	216
Wage Board	1	1
Total Permanent	248	242

PERSONNEL DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	3	4
All other GS	91	85
Wage Board	-	-
Total Permanent	95	90

MANAGEMENT SERVICES DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	6	6
All other GS	89	83
Wage Board	-	-
Total Permanent	96	90

ADMINISTRATIVE SERVICES DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	2	2
All other GS	179	174
Wage Board	62	60
Total Permanent	244	237

TECHNICAL SERVICES DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	2	2
GS-14	1	2
All other GS	66	55
Wage Board	139	139
Total Permanent	208	198

ENGINEERING DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	6	6
GS-14	7	7
All other GS	95	89
Wage Board	-	-
Total Permanent	108	102

PHOTOGRAPHIC TECHNOLOGY LABORATORY

	66	67
Excepted	-	-
GS-16	-	-
GS-15	-	-
GS-14	1	1
All other GS	56	49
Wage Board	-	-
Total Permanent	57	50

ASSISTANT DIRECTOR FOR ENGINEERING AND DEVELOPMENT

	66	67
Excepted	2	2
GS-16	1	1
GS-15	5	5
GS-14	2	2
All other GS	11	11
Wage Board	-	-
Total Permanent	21	21

EXPERIMENTS PROGRAM OFFICE

	66	67
Excepted	1	1
GS-16	-	-
GS-15	4	9
GS-14	10	17
All other GS	96	154
Wage Board	-	-
Total Permanent	111	181

OFFICE OF LONG RANGE PLANNING

	66	67
Excepted	1	1
GS-16	-	-
GS-15	1	1
GS-14	1	1
All other GS	3	3
Wage Board	-	-
Total Permanent	6	6

ASSISTANT DIRECTOR FOR FLIGHT CREW OPERATIONS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	1	1
GS-14	1	1
All other GS	1	1
Wage Board	-	-
Total Permanent	4	4

ASTRONAUT OFFICE

	66	67
Excepted	-	-
GS-16	2	2
GS-15	2	3
GS-14	5	9
All other GS	43	38
Wage Board	-	-
Total Permanent	52	52

AIRCRAFT OPERATIONS

	66	67
Excepted		
GS-16		
GS-15		
GS-14		
All other GS		
Wage Board		
Total Permanent		

ADVANCED SPACECRAFT TECHNOLOGY DIVISION

	66	67
Excepted	1	1
GS-16	2	2
GS-15	6	8
GS-14	26	24
All other GS	151	221
Wage Board	-	-
Total Permanent	186	256

INFORMATION SYSTEMS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	5	5
GS-14	8	10
All other GS	77	75
Wage Board	-	-
Total Permanent	92	92

FLIGHT CREW SUPPORT DIVISION

	66	67
Excepted	1	1
GS-16	2	2
GS-15	7	8
GS-14	17	19
All other GS	280	274
Wage Board	3	3
Total Permanent	310	307

CREW SYSTEMS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	11	11
GS-14	20	21
All other GS	167	166
Wage Board	2	2
Total Permanent	202	202

COMPUTATION AND ANALYSIS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	5	5
GS-14	14	14
All other GS	128	128
Wage Board	-	-
Total Permanent	149	149

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION

	66	67
Excepted	1	1
GS-16	3	3
GS-15	6	8
GS-14	20	23
All other GS	148	143
Wage Board	1	1
Total Permanent	179	179

GUIDANCE AND CONTROL DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	18	18
GS-14	22	23
All other GS	104	103
Wage Board	-	-
Total Permanent	146	146

PROPULSION AND POWER DIVISION

	66	67
Excepted	1	1
GS-16	-	-
GS-15	4	5
GS-14	10	13
All other GS	125	121
Wage Board	-	-
Total Permanent	140	140

STRUCTURES AND MECHANICS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	9	10
GS-14	24	24
All other GS	158	157
Wage Board	-	-
Total Permanent	193	193

MSC - WSTF OPERATIONS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	3	4
GS-14	7	7
All other GS	124	123
Wage Board	-	-
Total Permanent	135	135

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ORGANIZATION AND STAFFING CHART
MANNED SPACECRAFT CENTER

STAFFING SUMMARY

	66	67
Excepted	36	36
GS-16	29	29
GS-15	211	219
GS-14	404	425
All other GS	3,911	3,822
Wage Board	218	216
Total Permanent	4,809	4,747
Temporary	114	119
Total Positions	4,928	4,866

OFFICE OF THE DIRECTOR

	66	67
Excepted	4	4
GS-16	-	-
GS-15	-	-
GS-14	-	2
All other GS	12	10
Wage Board	-	-
Total Permanent	16	16

CHIEF OF CENTER MEDICAL PROGRAMS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	1	1
GS-14	-	-
All other GS	3	3
Wage Board	-	-
Total Permanent	5	5

AUDIT OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	1	1
All other GS	15	15
Wage Board	-	-
Total Permanent	17	17

PUBLIC AFFAIRS OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	4	4
All other GS	52	52
Wage Board	-	-
Total Permanent	57	57

FLIGHT SAFETY OFFICE

	66	67
Excepted	1	1
GS-16	-	-
GS-15	10	10
GS-14	6	9
All other GS	43	40
Wage Board	-	-
Total Permanent	60	60

CENTER MEDICAL OFFICE

	66	67
Excepted	-	-
GS-16	1	1
GS-15	5	6
GS-14	2	6
All other GS	41	36
Wage Board	-	-
Total Permanent	49	49

LEGAL OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	3	3
GS-14	2	3
All other GS	14	13
Wage Board	-	-
Total Permanent	19	19

GENERAL PROGRAM OFFICE

	66	67
Excepted	4	4
GS-16	3	-
GS-15	25	1
GS-14	36	1
All other GS	122	44
Wage Board	-	-
Total Permanent	190	50

APOLLO SPACECRAFT PROGRAM OFFICE

	66	67
Excepted	4	4
GS-16	4	7
GS-15	22	50
GS-14	6	88
All other GS	277	204
Wage Board	-	-
Total Permanent	313	353

ASSISTANT DIRECTOR FOR FLIGHT OPERATIONS

	66	67
Excepted	1	1
GS-16	1	1
GS-15	4	4
GS-14	2	2
All other GS	20	19
Wage Board	-	-
Total Permanent	28	28

FLIGHT SUPPORT DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	3
GS-14	8	11
All other GS	98	93
Wage Board	-	-
Total Permanent	107	107

MISSION PLANNING AND ANALYSIS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	6	7
GS-14	15	17
All other GS	290	283
Wage Board	-	-
Total Permanent	313	309

FLIGHT CONTROL DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	2	4
GS-14	11	13
All other GS	273	266
Wage Board	-	-
Total Permanent	288	285

LANDING AND RECOVERY DIVISION

	66	67
Excepted	-	-
GS-16	1	1
GS-15	2	3
GS-14	5	6
All other GS	98	96
Wage Board	2	2
Total Permanent	108	108

ASSISTANT DIRECTOR FOR ADMINISTRATION

	66	67
Excepted	2	2
GS-16	1	1
GS-15	2	2
GS-14	1	1
All other GS	9	9
Wage Board	-	-
Total Permanent	15	15

RESOURCES MANAGEMENT DIVISION

	66	67
Excepted	1	1
GS-16	-	-
GS-15	2	2
GS-14	10	10
All other GS	158	153
Wage Board	-	-
Total Permanent	171	166

PROCUREMENT AND CONTRACTS DIVISION

	66	67
Excepted	1	1
GS-16	-	-
GS-15	5	6
GS-14	17	18
All other GS	224	216
Wage Board	1	1
Total Permanent	248	242

PERSONNEL DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	3	4
All other GS	91	85
Wage Board	-	-
Total Permanent	95	90

MANAGEMENT SERVICES DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	6	6
All other GS	89	83
Wage Board	-	-
Total Permanent	96	90

ADMINISTRATIVE SERVICES DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	2	2
All other GS	179	174
Wage Board	62	60
Total Permanent	244	237

TECHNICAL SERVICES DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	2	2
GS-14	1	2
All other GS	66	55
Wage Board	139	139
Total Permanent	208	198

ENGINEERING DIVISION

	66	67
Excepted	-	-
GS-16	-	-
GS-15	6	6
GS-14	7	7
All other GS	95	89
Wage Board	-	-
Total Permanent	108	102

PHOTOGRAPHIC TECHNOLOGY LABORATORY

	66	67
Excepted	-	-
GS-16	-	-
GS-15	-	-
GS-14	1	1
All other GS	56	49
Wage Board	-	-
Total Permanent	57	50

ASSISTANT DIRECTOR FOR ENGINEERING AND DEVELOPMENT

	66	67
Excepted	2	2
GS-16	1	1
GS-15	5	5
GS-14	2	2
All other GS	11	11
Wage Board	-	-
Total Permanent	21	21

EXPERIMENTS PROGRAM OFFICE

	66	67
Excepted	1	1
GS-16	-	-
GS-15	4	9
GS-14	10	17
All other GS	96	154
Wage Board	-	-
Total Permanent	111	181

OFFICE OF LONG RANGE PLANNING

	66	67
Excepted	1	1
GS-16	-	-
GS-15	1	1
GS-14	1	1
All other GS	3	3
Wage Board	-	-
Total Permanent	6	6

ADVANCED SPACECRAFT TECHNOLOGY DIVISION

	66	67
Excepted	1	1
GS-16	2	2
GS-15	6	8
GS-14	26	24
All other GS	151	221
Wage Board	-	-
Total Permanent	186	256

INFORMATION SYSTEMS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	5	5
GS-14	8	10
All other GS	77	75
Wage Board	-	-
Total Permanent	92	92

CREW SYSTEMS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	11	11
GS-14	20	21
All other GS	167	166
Wage Board	2	2
Total Permanent	202	202

COMPUTATION AND ANALYSIS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	5	5
GS-14	14	14
All other GS	128	128
Wage Board	-	-
Total Permanent	149	149

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION

	66	67
Excepted	1	1
GS-16	3	3
GS-15	6	8
GS-14	20	23
All other GS	148	143
Wage Board	1	1
Total Permanent	179	179

GUIDANCE AND CONTROL DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	18	18
GS-14	22	23
All other GS	104	103
Wage Board	-	-
Total Permanent	146	146

PROPULSION AND POWER DIVISION

	66	67
Excepted	1	1
GS-16	-	-
GS-15	4	5
GS-14	10	13
All other GS	125	121
Wage Board	-	-
Total Permanent	140	140

STRUCTURES AND MECHANICS DIVISION

	66	67
Excepted	1	1
GS-16	1	1
GS-15	9	10
GS-14	24	24
All other GS	158	157
Wage Board	-	-
Total Permanent	193	193

ASSISTANT DIRECTOR FOR FLIGHT CREW OPERATIONS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	1	1
GS-14	1	1
All other GS	1	1
Wage Board	-	-
Total Permanent	4	4

ASTRONAUT OFFICE

	66	67
Excepted	-	-
GS-16	2	2
GS-15	2	3
GS-14	5	9
All other GS	43	38
Wage Board	-	-
Total Permanent	52	52

AIRCRAFT OPERATIONS OFFICE

	66	67
Excepted	-	-
GS-16	1	1
GS-15	1	2
GS-14	1	2
All other GS	20	18
Wage Board	8	8
Total Permanent	31	31

FLIGHT CREW SUPPORT DIVISION

	66	67
Excepted	1	1
GS-16	2	2
GS-15	7	8
GS-14	17	19
All other GS	280	274
Wage Board	3	3
Total Permanent	310	307

MSC - WSTF OPERATIONS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	3	4
GS-14	7	7
All other GS	124	123
Wage Board	-	-
Total Permanent	135	135

ADMINISTRATIVE OPERATIONS

FISCAL YEAR 1967 ESTIMATES

MANNED SPACECRAFT CENTER

MISSION AND CAPABILITIES:

The Manned Spacecraft Center was established in November 1961. The primary mission of the Center is the development of spacecraft, ground control and operational support systems, the development of operational techniques, in-flight life support systems, the selection and training of astronauts, and the preparation for, and conduct of, manned space flight missions. The Center is currently engaged in the following major space research and development programs:

Gemini - The objectives of the Gemini program are to develop an operational capability in manned space flight and, through this capability, to conduct specific experiments and tests which support Apollo, Department of Defense programs, and scientific investigations. In the Gemini program, the United States is developing and demonstrating the capability for long-duration flights of at least 14 days, rendezvous and docking, post-docking maneuvers, extra-vehicular activity, and controlled re-entry.

During FY 1967, effort will be devoted primarily to final hardware deliveries and operational activities required for manned rendezvous missions.

Apollo Spacecraft - The Apollo spacecraft activity relates to the design, development, fabrication and test of the man-rated Apollo spacecraft. The spacecraft is comprised of three modules: Command Module, Service Module, and the Lunar Excursion Module. This spacecraft is designed to transport three men into a lunar orbit, land two men on the lunar surface and return the crew to earth. The actual lunar orbital and lunar landing flights will be preceded by extended earth-orbital flights to:

1. Qualify the spacecraft,

2. Integrate the flight crews with the spacecraft and systems and enable them to checkout the systems and obtain in-flight training, experience, and proficiency,

3. Develop lunar rendezvous and docking procedures,

4. Practice the techniques of navigation and re-entry,

5. Further develop and implement mission ground control procedures and equipment, and

6. Conduct scientific experiments.

The objective of the overall Apollo activity is the development of a space vehicle system and an operational capability that will result in a broad program of space exploration, including landing a flight crew on the moon and returning them to earth. The overall Apollo program consists of the following flight phases:

1. Unmanned sub-orbital and earth orbital flights,

2. Manned earth orbital, long-duration, and rendezvous flights, and

3. Manned lunar flights.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Authorized Positions, end of year..	4,431	4,928	4,866
Average Number of All Employees....	4,344	4,411	4,798
Administrative Operations.....	$91,036,000	$87,550,000	$98,212,000

INSTALLATION DESCRIPTION:

The Manned Spacecraft Center is located two miles east of the town of Webster, Texas. The site is approximately 20 miles southeast of downtown Houston, and 25 miles northwest of Galveston, Texas. A portion of the site borders on Clear Lake.

Total NASA-owned land consists of 1,600 acres. The capital investment of the Manned Spacecraft Center at the Clear Lake site as of June 30, 1965, was $241,093,481. The Center holds an additional 55,952 acres under use agreement at the White Sands Test Facility with a capital investment of $14,536,800. Combined capital investment of the Manned Spacecraft Center as of June 30, 1965, was $255,630,281.

ANALYSIS OF RESOUCRES REQUIREMENTS BY OBJECT CLASSIFICATION:

		1965	1966	1967
11.	Personnel Compensation....	$46,076,000	$49,917,000	$54,866,000
12.	Personnel Benefits.....	3,154,000	3,368,000	3,824,000
	Total, personnel costs..	$49,230,000	$53,285,000	$58,690,000
21.	Travel and Transportation of Persons.....	4,630,000	4,874,000	5,261,000
22.	Transportation of Things..	864,000	893,000	884,000
23.	Rent, Communications, and Utilities.....	7,316,000	9,068,000	9,460,000
24.	Printing and Reproduction.	614,000	700,000	700,000

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	1965	1966	1967
25. Other Services.....	11,427,000	13,199,000	16,804,000
Services of other agencies.....	743,000	612,000	615,000
26. Supplies and Materials.....	4,282,000	2,918,000	3,350,000
31. Equipment.....	10,694,000	800,000	1,147,000
32. Lands and Structures.....	1,235,000	1,200,000	1,300,000
42. Insurance Claims and Indemnities.....	1,000	1,000	1,000
Total.....	$91,036,000	$87,550,000	$98,212,000

JUSTIFICATION BY OBJECT CLASSIFICATION:

Personnel Distribution

	1965	1966	1967
Direct Personnel by Program			
Manned Space Flight			
Gemini.....	735	872	154
Apollo.....	2,179	2,552	3,229
Advanced missions.....	68	68	68
Space Science and Applications			
Physics and astronomy.....	6	6	3
Lunar and planetary.....	2	2	1
Launch vehicle development.....	2	2	0
Bioscience.....	1	0	1
Meteorological satellites.....	0	1	1
Advanced Research and Technology			
Space vehicle systems.....	0	0	1
Electronics systems.....	2	2	2
Human factor systems.....	0	0	1
Technology Utilization	5	5	5
Sub-total, direct positions....	3,000	3,510	3,466
Support Personnel			
Director and Staff.....	113	113	113
Administration.....	668	713	695
Research and Development support.	456	473	473

	1965	1966	1967
Sub-total, support positions...	1,237	1,299	1,281
Total, permanent positions.....	4,237	4,809	4,747
Other Positions:			
Positions under cooperative training agreements.....	119	119	119
Other temporary positions.....	75	-	-
Total, all positions.....	4,431	4,928	4,866

Personnel requirements

The Manned Spacecraft Center personnel requirements are in direct support of its primary mission to develop spacecraft and conduct operational missions for manned space flight programs. The activation of the mission control center, the support of Gemini manned flights and Apollo development and manned flights, and flight controller manning for the global tracking stations required an increase in personnel for fiscal year 1966.

As the Gemini program nears completion, personnel will be phased into the Apollo program effort.

Apollo activities managed by the Manned Spacecraft Center will reach their peak during fiscal years 1967 and 1968. Major emphasis will be placed on spacecraft ground and flight qualification testing, culminating in the first manned Apollo mission and the first flight of a lunar-mission-configured spacecraft in calendar year 1967.

Personnel Costs

	1965	1966	1967
Total Positions.....	4,431	4,928	4,866
Permanent.....	4,237	4,809	4,747
Other.....	194	119	119
Personnel Compensation:			
Annual cost of permanent positions.....	$41,391,000	$50,226,000	$50,790,000
Pay above the stated annual rate	159,000	193,000	196,000
Lapses (deduct).....	-187,000	-5,793,000	-453,000
Net cost of permanent postions..	$41,363,000	$44,626,000	$50,533,000
Other personnel compensation....	4,713,000	5,291,000	4,333,000
Total compensation.....	$46,076,000	$49,917,000	$54,866,000
NASA funded.....	46,076,000	49,917,000	54,866,000
Reimbursable.....	---	---	---

	1965	1966	1967
Personnel benefits.....	$3,154,000	$3,368,000	$3,824,000
NASA funded.....	3,154,000	3,368,000	3,824,000
Reimbursable.....	---	---	---
Total Personnel costs.....	$49,230,000	$53,285,000	$58,690,000
NASA funded.....	49,230,000	53,285,000	58,690,000
Reimbursable.....	---	---	---
Average Number of All Employees (Manyears).....	4,344	4,411	4,798

Personnel Costs - $58,690,000

Fiscal year 1967 personnel costs increase $5,405,000 above FY 1966. Because a large number of employees will be recruited in late FY 1966, 387 additional manyears must be financed in FY 1967. The increase also includes a full year's funding of the Federal Employees Salary Act of 1965 which was effective October, 1965.

Travel and Transportation of Persons - $5,261,000

The FY 1967 requirement is $387,000 above FY 1966. Additional funds are needed to support the increased flight activity in FY 1967. During that fiscal year, a combination of Gemini and Apollo flights will place a heavy demand on the staff that support launch, flight, and recovery activities. The tempo of Apollo tests will be stepped up as the Apollo launch activity becomes fully operational. This increased activity requires additional travel to contractor plants, to the Kennedy Space Center, the White Sands Test Facility, and tracking sites.

Transportation of Things - $884,000

The FY 1967 request is $9,000 lower than the FY 1966 requirements. Since the personnel augmentation for the Center will be accomplished during FY 1966, the recruitment plan for the budget year reflects only replacements. Accordingly, there will be fewer movements of household goods at government expense during FY 1967. This reduction is partially offset by an increase in the requirement for freight movements resulting from planned increased purchases of supplies and materials to support testing activities.

Rent, Communications, and Utilities - $9,460,000

The FY 1967 estimate is $392,000 higher than the FY 1966 requirements. This net increase results from increases in communications and utilities that are partially offset by a decrease in ADP equipment rentals.

The increase in communications is attributed to the increase in personnel during FY 1966, and the increased tempo of Apollo activity during FY 1967. The increase in utilities results from additional buildings to be completed late in FY 1966 and during FY 1967.

Printing and Reproduction - $700,000

The amount required in FY 1967 for contractual printing, duplicating, binding, and microfilming remains at the FY 1966 level. There will be an increase in the volume of printing requirements due to increased flight mission activity. It is anticipated that this increased volume can be handled in-house.

Other Services - $17,419,000

This estimate provides for services on a contract basis, by other government agencies and private contractors, on a continuing, as well as a non-recurring or seasonal basis as required for the operation of this Center. The amount required for this purpose in FY 1967 is $3,608,000 higher than the requirement for FY 1966. The significant areas for this increase are as follows:

$867,000 is required for engineering services, and technical documentation. Increases for engineering and drafting services, and safety engineering and inspection services are generated by an additional need for operational modification studies as program phases progress. Specialized contractor engineering support is required to develop drawings, specifications, cost estimates, and other technical data for both building and equipment modifications. Technical documentation and ADP programming support will increase as the program effort moves into the qualification testing phase.

$1,374,000 is required for maintenance and repair as additional buildings and facilities are added to the inventory, as expiration of warranties on installed equipment occur, and as use of laboratories and test facilities increases in support of both Gemini and Apollo activity.

$1,004,000 is required for expansion of requirements for increased scope of the film documentation support services for laboratory and test activities, and contract support of the Center medical operations which provide professional radiation protection and health physics services, occupational medicine and environmental health services.

$350,000 is required to provide janitorial services for additional office building space, for computer facilities and the environmental areas. In addition, security services and fire protection services will expand in FY 1967 because both Gemini and Apollo programs will be involved in operations which will generate increased test activity that must be supported.

Supplies and Materials - $3,350,000

The FY 1967 request is $432,000 above the FY 1966 requirements. This increase is, to a great extent, attributable to supplies and materials for maintenance of additional buildings to be occupied late in FY 1966 and during FY 1967. Also, additional funds are required to provide supplies and materials to be used by the staff recruited late in FY 1966.

Equipment - $1,147,000

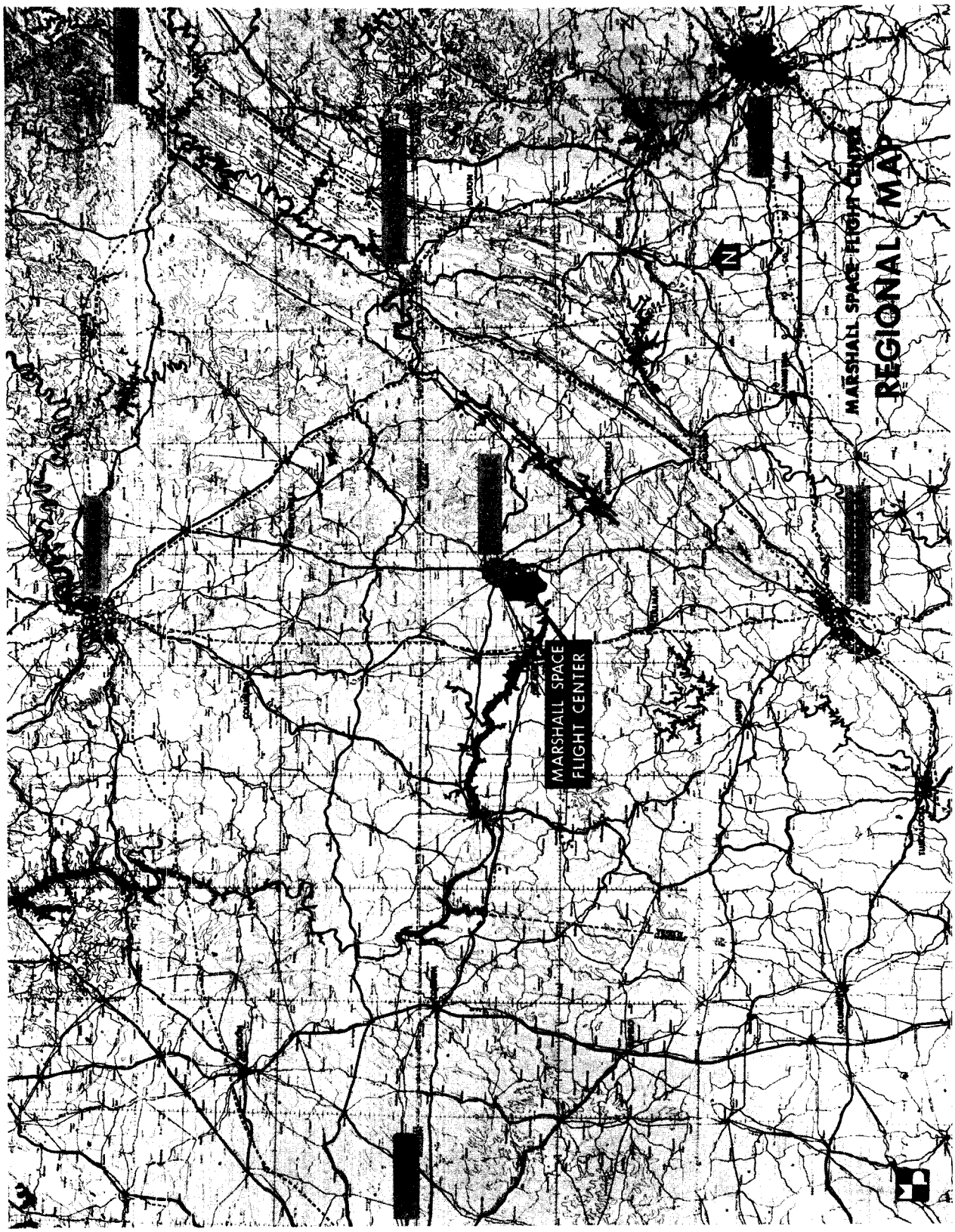
The FY 1967 equipment requirement increases by $347,000. The largest single item to be procured is an automated milling machine. This machine is to be used to support Apollo flight and test hardware that require extremely close tolerances.

Lands and Structures - $1,300,000

This object classification provides for alterations, modifications, and minor construction of facilities within statutory limitations. The amount requested for FY 1967 exceeds the FY 1966 level by $100,000, and is due to increased activities at the Center. The start of major engineering programs in such areas as environmental and flight acceleration testing will generate the need for modifications. Operational scope increases in mission control, and an increasing Center population will also require alterations in the support facilities area.

Insurance Claims and Indemnities - $1,000

Funds requested are for the settlement of claims and indemnities and are expected to remain at the FY 1966 level.


MARSHALL SPACE FLIGHT CENTER
REGIONAL MAP
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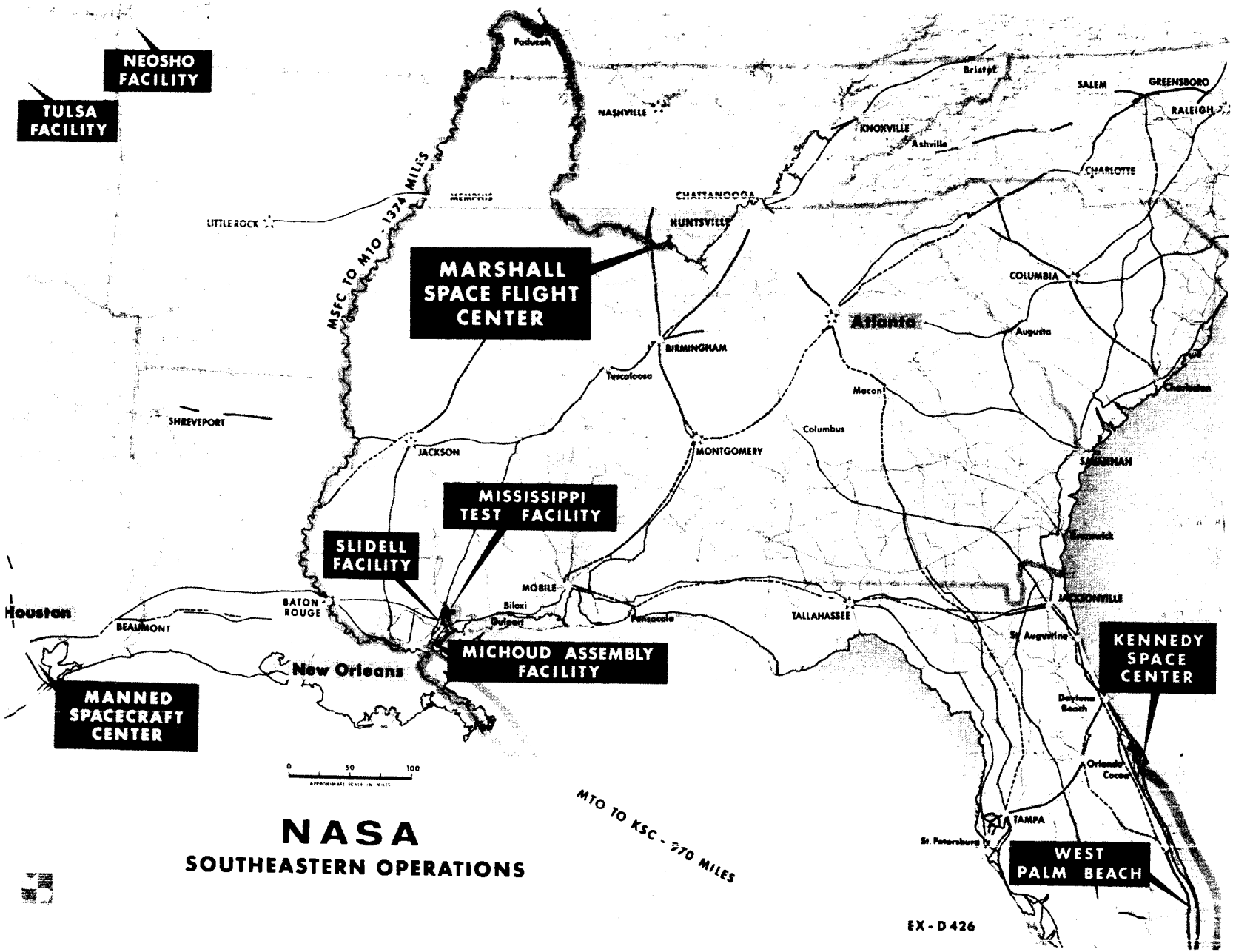
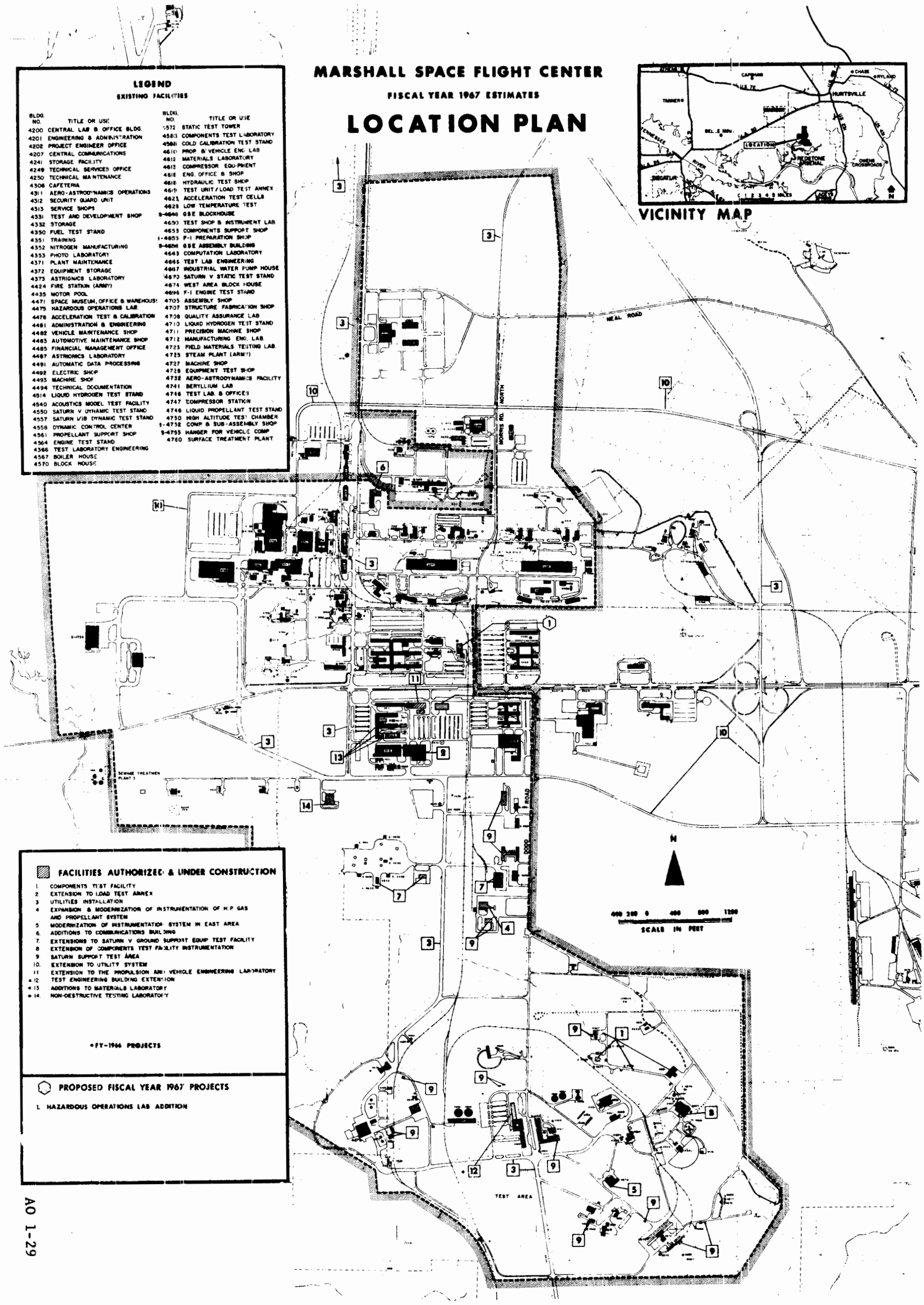


NASA
SOUTHEASTERN OPERATIONS

MARSHALL SPACE FLIGHT CENTER

FISCAL YEAR 1967 ESTIMATES

LOCATION PLAN



LEGEND

EXISTING FACILITIES

BLDG. NO.	TITLE OR USE
4200	CENTRAL LAB & OFFICE BLDG.
4201	ENGINEERING & ADMINISTRATION
4202	PROJECT ENGINEER OFFICE
4207	CENTRAL COMMUNICATIONS
4241	STORAGE FACILITY
4249	TECHNICAL SERVICES OFFICE
4250	TECHNICAL MAINTENANCE
4306	CAFETERIA
4311	AERO-ASTRODYNAMICS OPERATIONS
4312	SECURITY GUARD UNIT
4313	SERVICE SHOPS
4331	TEST AND DEVELOPMENT SHOP
4332	STORAGE
4350	FUEL TEST STAND
4351	TRAINING
4352	NITROGEN MANUFACTURING
4353	PHOTO LABORATORY
4371	PLANT MAINTENANCE
4372	EQUIPMENT STORAGE
4373	ASTRIONICS LABORATORY
4424	FIRE STATION (ARMY)
4435	MOTOR POOL
4471	SPACE MUSEUM, OFFICE & WAREHOUSE
4475	HAZARDOUS OPERATIONS LAB.
4476	ACCELERATION TEST & CALIBRATION
4481	ADMINISTRATION & ENGINEERING
4482	VEHICLE MAINTENANCE SHOP
4483	AUTOMOTIVE MAINTENANCE SHOP
4485	FINANCIAL MANAGEMENT OFFICE
4487	ASTRIONICS LABORATORY
4491	AUTOMATIC DATA PROCESSING
4492	ELECTRIC SHOP
4493	MACHINE SHOP
4494	TECHNICAL DOCUMENTATION
4514	LIQUID HYDROGEN TEST STAND
4540	ACOUSTICS MODEL TEST FACILITY
4550	SATURN V DYNAMIC TEST STAND
4557	SATURN V/B DYNAMIC TEST STAND
4558	DYNAMIC CONTROL CENTER
4561	PROPELLANT SUPPORT SHOP
4564	ENGINE TEST STAND
4566	TEST LABORATORY ENGINEERING
4567	BOILER HOUSE
4570	BLOCK HOUSE
4572	STATIC TEST TOWER
4583	COMPONENTS TEST LABORATORY
4588	COLD CALIBRATION TEST STAND
4610	PROP & VEHICLE ENG. LAB
4612	MATERIALS LABORATORY
4613	COMPRESSOR EQUIPMENT
4616	ENG. OFFICE & SHOP
4618	HYDRAULIC TEST SHOP
4619	TEST UNIT/LOAD TEST ANNEX
4623	ACCELERATION TEST CELLS
4628	LOW TEMPERATURE TEST
S-4646	GSE BLOCKHOUSE
4650	TEST SHOP & INSTRUMENT LAB.
4653	COMPONENTS SUPPORT SHOP
S-4655	F-1 PREPARATION SHOP
S-4656	GSE ASSEMBLY BUILDING
4663	COMPUTATION LABORATORY
4666	TEST LAB ENGINEERING
4667	INDUSTRIAL WATER PUMP HOUSE
4670	SATURN V STATIC TEST STAND
4674	WEST AREA BLOCK HOUSE
4696	F-1 ENGINE TEST STAND
4705	ASSEMBLY SHOP
4707	STRUCTURE FABRICATION SHOP
4708	QUALITY ASSURANCE LAB
4710	LIQUID HYDROGEN TEST STAND
4711	PRECISION MACHINE SHOP
4712	MANUFACTURING ENG. LAB
4725	FIELD MATERIALS TESTING LAB.
4725	STEAM PLANT (ARMY)
4727	MACHINE SHOP
4728	EQUIPMENT TEST SHOP
4732	AERO-ASTRODYNAMICS FACILITY
4741	BERYLLIUM LAB
4746	TEST LAB. & OFFICES
4747	COMPRESSOR STATION
4748	LIQUID PROPELLANT TEST STAND
4750	HIGH ALTITUDE TEST CHAMBER
S-4752	COMP & SUB-ASSEMBLY SHOP
S-4755	HANGER FOR VEHICLE COMP
4760	SURFACE TREATMENT PLANT

FACILITIES AUTHORIZED & UNDER CONSTRUCTION

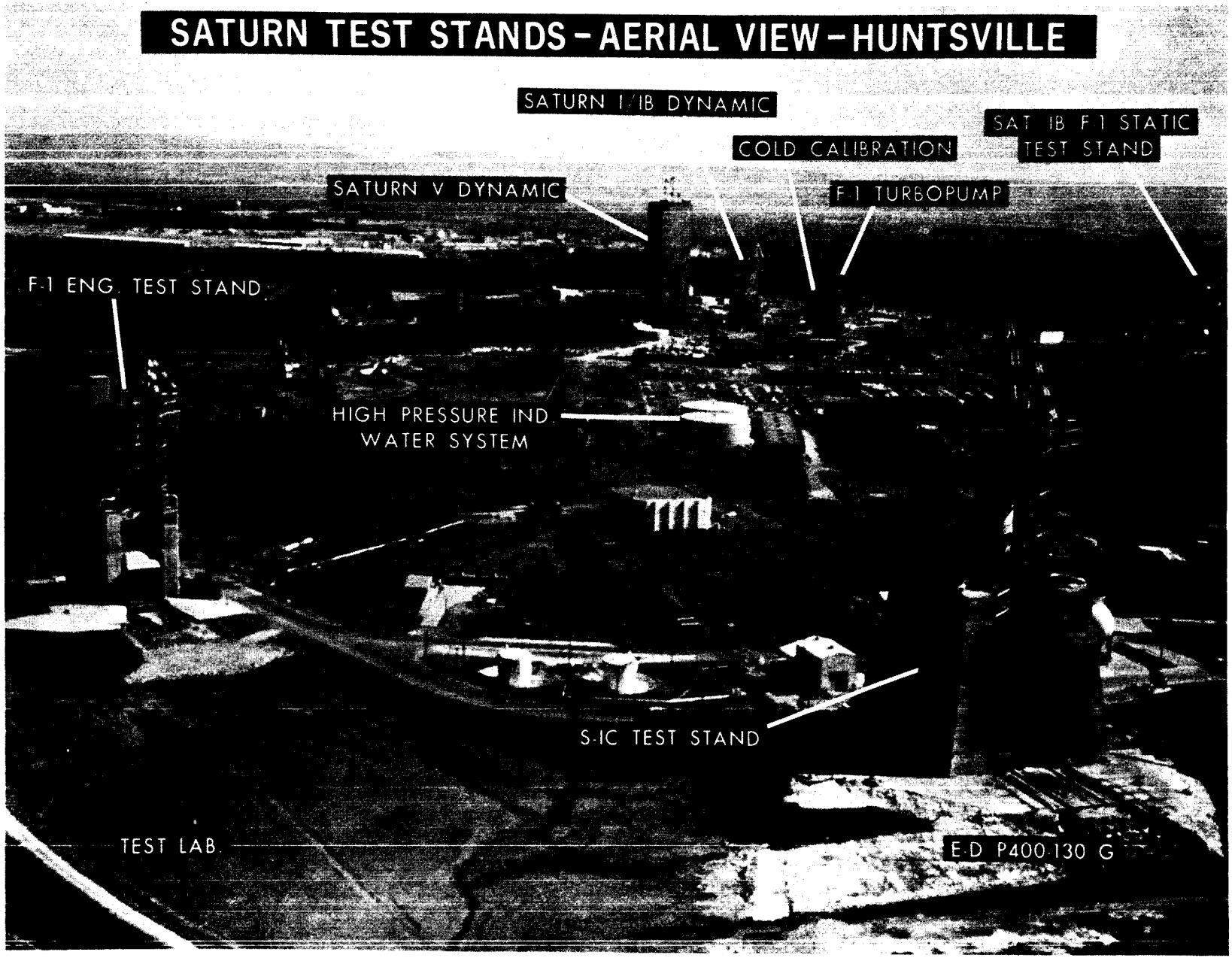
1. COMPONENTS TEST FACILITY
2. EXTENSION TO LOAD TEST ANNEX
3. UTILITIES INSTALLATION
4. EXPANSION & MODERNIZATION OF INSTRUMENTATION OF H.P. GAS AND PROPELLANT SYSTEM
5. MODERNIZATION OF INSTRUMENTATION SYSTEM IN EAST AREA
6. ADDITIONS TO COMMUNICATIONS BUILDING
7. EXTENSIONS TO SATURN V GROUND SUPPORT EQUIP TEST FACILITY
8. EXTENSION OF COMPONENTS TEST FACILITY INSTRUMENTATION
9. SATURN SUPPORT TEST AREA
10. EXTENSION TO UTILITY SYSTEM
11. EXTENSION TO THE PROPULSION AND VEHICLE ENGINEERING LABORATORY
- 12. TEST ENGINEERING BUILDING EXTENSION
- 13. ADDITIONS TO MATERIALS LABORATORY
- 14. NON-DESTRUCTIVE TESTING LABORATORY

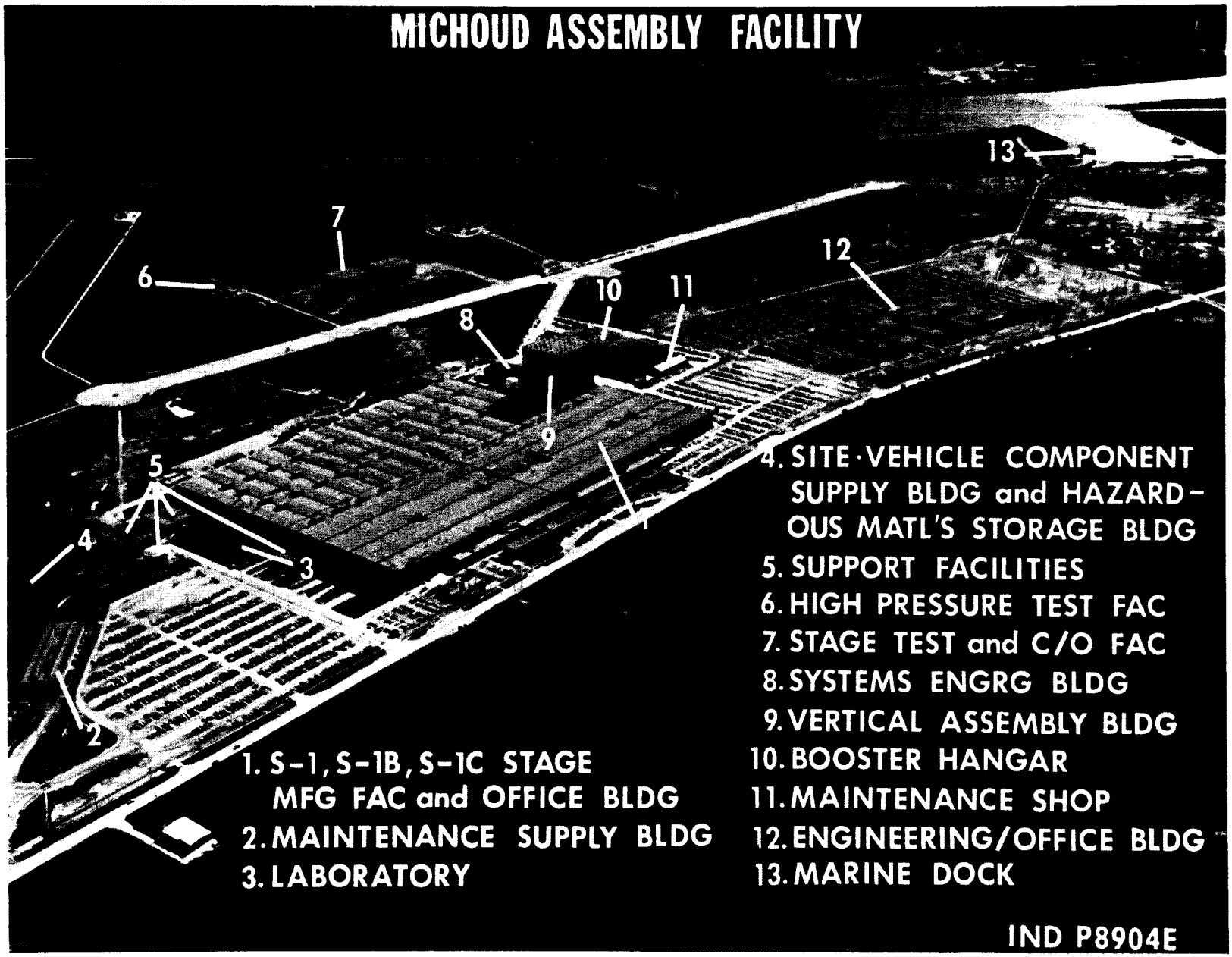
- FY-1966 PROJECTS

PROPOSED FISCAL YEAR 1967 PROJECTS

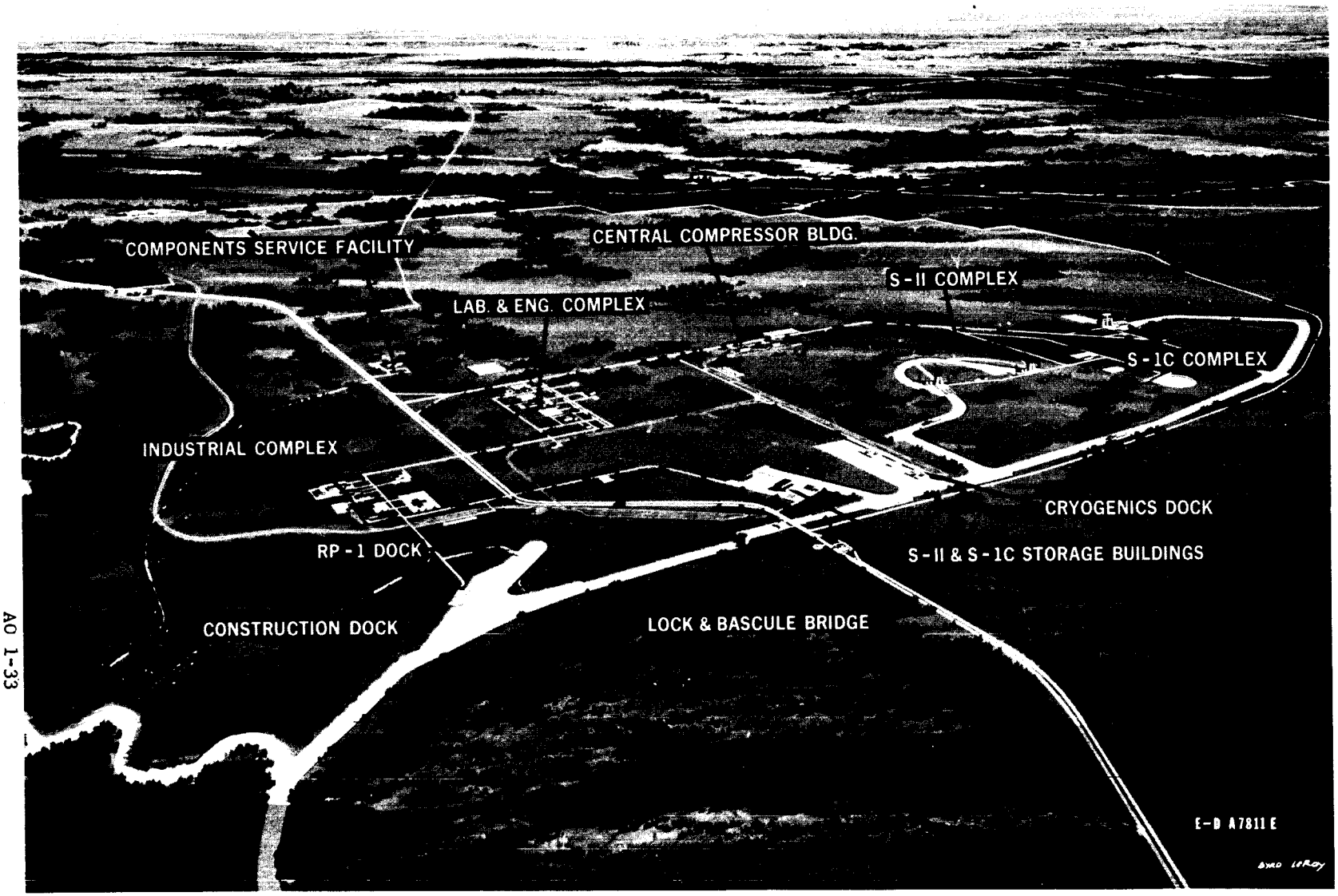
1. HAZARDOUS OPERATIONS LAB ADDITION

205-833 O - 66 - 21


SATURN TEST STANDS - AERIAL VIEW - HUNTSVILLE
SATURN I/IB DYNAMIC
SAT IB F-1 STATIC TEST STAND
COLD CALIBRATION
SATURN V DYNAMIC
F-1 TURBOPUMP
F-1 ENG. TEST STAND
HIGH PRESSURE IND. WATER SYSTEM
S-IC TEST STAND
TEST LAB.
E-D P400-130 G


MICHOUD ASSEMBLY FACILITY
1. S-1, S-1B, S-1C STAGE MFG FAC and OFFICE BLDG
2. MAINTENANCE SUPPLY BLDG
3. LABORATORY
4. SITE·VEHICLE COMPONENT SUPPLY BLDG and HAZARDOUS MATL'S STORAGE BLDG
5. SUPPORT FACILITIES
6. HIGH PRESSURE TEST FAC
7. STAGE TEST and C/O FAC
8. SYSTEMS ENGRG BLDG
9. VERTICAL ASSEMBLY BLDG
10. BOOSTER HANGAR
11. MAINTENANCE SHOP
12. ENGINEERING/OFFICE BLDG
13. MARINE DOCK
IND P8904E

MISSISSIPPI TEST FACILITY - AERIAL VIEW



S-II TEST STAND A-2-MTF

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

STAFFING SUMMARY

	66	67
Excepted	49	49
GS-16	61	61
GS-15	360	373
GS-14	761	801
All other GS	4,727	4,591
Wage Board	1,359	1,346
Total Permanent	7,317	7,221
Temporary	169	169
Total Positions	7,486	7,390

OFFICE OF DIRECTOR

	66	67
Excepted	13	13
GS-16	1	1
GS-15	3	3
GS-14	2	2
All other GS	6	6
Wage Board	-	-
Total Permanent	25	25

PUBLIC AFFAIRS OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	1	2
All other GS	28	27
Wage Board	-	-
Total Permanent	30	30

CHIEF COUNSEL

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	2
GS-14	5	5
All other GS 14	14	13
Wage Board	-	-
Total Permanent	20	20

LABOR RELATIONS OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	1
GS-14	1	2
All other GS	3	2
Wage Board	-	-
Total Permanent	5	5

EXECUTIVE STAFF

	66	67
Excepted	5	5
GS-16	-	-
GS-15	7	9
GS-14	11	12
All other GS	60	57
Wage Board	-	-
Total Permanent	83	83

MANAGEMENT SERVICES OFFICE

	66	67
Excepted	1	1
GS-16	-	-
GS-15	3	4
GS-14	9	9
All other GS	168	167
Wage Board	29	29
Total Permanent	210	210

PURCHASING OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	2	2
GS-14	9	13
All other GS	212	208
Wage Board	-	-
Total Permanent	223	223

TECHNICAL SERVICES OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	2	3
GS-14	8	12
All other GS	278	273
Wage Board	301	301
Total Permanent	589	589

FINANCIAL MANAGEMENT OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	7	7
GS-14	9	14
All other GS	180	175
Wage Board	-	-
Total Permanent	196	196

MANPOWER UTILIZATION AND ADMINISTRATION OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	3	3
GS-14	11	12
All other GS	94	93
Wage Board	-	-
Total Permanent	108	108

FACILITIES AND DESIGN OFFICE

	66	67
Excepted	-	-
GS-16	1	1
GS-15	4	5
GS-14	19	19
All other GS	82	81
Wage Board	-	-
Total Permanent	106	106

NASA AUDIT OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	2	2
GS-14	1	1
All other GS	16	16
Wage Board	-	-
Total Permanent	19	19

RESEARCH AND DEVELOPMENT OPERATIONS

	66	67
Excepted	3	3
GS-16	-	-
GS-15	1	1
GS-14	2	2
All other GS	-	-
Wage Board	-	-
Total Permanent	6	6

ADVANCED SYSTEMS OFFICE

	66	67
Excepted	-	-
GS-16	3	3
GS-15	18	18
GS-14	26	27
All other GS	62	61
Wage Board	-	-
Total Permanent	109	109

TECHNICAL SYSTEMS OFFICE

	66	67
Excepted	-	-
GS-16	1	1
GS-15	3	3
GS-14	8	8
All other GS	3	3
Wage Board	-	-
Total Permanent	15	15

TECHNICAL STAFF OFFICE

	66	67
Excepted	1	1
GS-16	1	1
GS-15	2	3
GS-14	6	7
All other GS	10	8
Wage Board	-	-
Total Permanent	20	20

OPERATIONS MANAGEMENT OFFICE

	66	67
Excepted	1	1
GS-16	1	1
GS-15	6	6
GS-14	15	17
All other GS	43	41
Wage Board	-	-
Total Permanent	66	66

AERO-ASTRODYNAMICS LABORATORY

	66	67
Excepted	1	1
GS-16	6	6
GS-15	33	33
GS-14	43	43
All other GS	251	243
Wage Board	7	7
Total Permanent	341	333

ASTRIONICS LABORATORY

	66	67
Excepted	6	6
GS-16	5	5
GS-15	53	54
GS-14	105	106
All other GS	555	555
Wage Board	150	150
Total Permanent	874	876

COMPUTATION LABORATORY

	66	67
Excepted	2	2
GS-16	3	3
GS-15	7	7
GS-14	22	26
All other GS	135	128
Wage Board	-	-
Total Permanent	169	166

MANUFACTURING ENGINEERING LABORATORY

	66	67
Excepted	3	3
GS-16	1	1
GS-15	12	12
GS-14	38	38
All other GS	336	300
Wage Board	365	336
Total Permanent	755	690

PROPULSION AND VEHICLE ENGINEERING LABORATORY

	66	67
Excepted	2	2
GS-16	6	6
GS-15	53	54
GS-14	105	109
All other GS	503	497
Wage Board	64	64
Total Permanent	733	732

QUALITY AND RELIABILITY ASSURANCE LABORATORY

	66	67
Excepted	1	1
GS-16	3	3
GS-15	27	27
GS-14	45	45
All other GS	484	464
Wage Board	20	20
Total Permanent	580	560

RESEARCH PROJECTS LABORATORY

	66	67
Excepted	1	1
GS-16	3	3
GS-15	12	12
GS-14	25	26
All other GS	67	66
Wage Board	-	-
Total Permanent	108	108

TEST LABORATORY

	66	67
Excepted	1	1
GS-16	4	4
GS-15	22	23
GS-14	39	39
All other GS	263	262
Wage Board	356	356
Total Permanent	685	685

INDUSTRIAL OPERATIONS

	66	67
Excepted	2	2
GS-16	-	-
GS-15	5	5
GS-14	2	2
All other GS	5	3
Wage Board	-	-
Total Permanent	14	12

CONTRACTS OFFICE

	66	67
Excepted	1	1
GS-16	-	-
GS-15	2	3
GS-14	14	14
All other GS	129	128
Wage Board	-	-
Total Permanent	146	146

FACILITIES PROJECTS OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	1	2
GS-14	14	14
All other GS	26	26
Wage Board	-	-
Total Permanent	41	42

PROJECT LOGISTICS OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	2	3
GS-14	7	7
All other GS	7	8
Wage Board	-	-
Total Permanent	16	18

RESOURCES MANAGEMENT OFFICE

	66	67
Excepted	-	-
GS-16	1	1
GS-15	2	2
GS-14	7	8
All other GS	26	25
Wage Board	-	-
Total Permanent	36	36

SATURN I/IB PROGRAM OFFICE

	66	67
Excepted	2	2
GS-16	5	5
GS-15	13	13
GS-14	25	25
All other GS	109	107
Wage Board	-	-
Total Permanent	154	152

SATURN IB/CENTAUR PROGRAM OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	4	4
GS-14	9	9
All other GS	15	15
Wage Board	-	-
Total Permanent	28	28

SATURN V PROGRAM OFFICE

	66	67
Excepted	1	1
GS-16	6	6
GS-15	19	19
GS-14	53	57
All other GS	170	167
Wage Board	-	-
Total Permanent	249	250

ENGINE PROGRAM OFFICE

	66	67
Excepted	1	1
GS-16	6	6
GS-15	11	11
GS-14	21	21
All other GS	79	77
Wage Board	-	-
Total Permanent	118	116

MICHOUD ASSEMBLY FACILITY

	66	67
Excepted	1	1
GS-16	2	2
GS-15	9	9
GS-14	24	24
All other GS	229	224
Wage Board	30	35
Total Permanent	295	295

MISSION OPERATIONS OFFICE

	66	67
Excepted	-	-
GS-16	-	-
GS-15	3	3
GS-14	6	7
All other GS	16	16
Wage Board	-	-
Total Permanent	25	26

MISSISSIPPI TEST FACILITY

	66	67
Excepted	-	-
GS-16	2	2
GS-15	4	4
GS-14	14	17
All other GS	63	49
Wage Board	37	48
Total Permanent	120	120

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ADMINISTRATIVE OPERATIONS

FISCAL YEAR 1967 ESTIMATES

GEORGE C. MARSHALL SPACE FLIGHT CENTER

MISSION AND CAPABILITIES:

The George C. Marshall Space Flight Center, which became a part of NASA on July 1, 1960, has a long and distinguished history in the field of rocketry which underlies its technical capabilities in the performance of its basic mission. Extensive technical experience has been accumulated as a result of the research and development work conducted on Redstone, Jupiter, Pershing, and Saturn. The success of the Saturn launches stems directly from the practical know-how gained through the years and has been instrumental in the building of the technology for the Saturn IB and Saturn V vehicles for the Apollo program.

The primary mission of this Center is to develop and provide launch vehicle and space transportation systems to meet National space program requirements. This responsibility extends through all phases of design, fabrication, testing, and production, to integration and coordination of launching of the vehicle. Major emphasis is on program management, technical guidance, supervision of industrial contractors and overall systems engineering, and systems integration for launch vehicle or space transportation systems project.

Other activities include basic research, product engineering, product improvement, engine development, post flight evaluation and analysis, advancement of launch vehicle technology, particularly in the areas of multi-engine vehicles, and nuclear and electrical propulsion.

Major functions currently assigned include:

1. Program management for developing and producing the following family of large launch vehicles:

   (a) The Saturn IB which provides the Nation with a carrier for large scientific satellite payloads (approximately 18 tons in low-earth orbit), assists in Apollo spacecraft development and qualification, and advances large booster technology in support of Saturn V.

   (b) The Saturn V, which will accomplish manned lunar landing missions, lunar logistics missions, planetary escape missions, and will provide the Nation with a carrier for large scientific satellite payloads of approximately 140 tons in low-earth orbit, and 47 tons in escape trajectories.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Authorized Positions, end of year.....	7,754	7,486	7,390
Average Number of All Employees.....	7,623	7,469	7,278
Administrative Operations....	$137,787,000	$128,260,000	$131,934,000

INSTALLATION DESCRIPTION:

Operations of the Marshall Space Flight Center are conducted at four primary locations.

The first location, the main Marshall Space Flight Center site is near Huntsville, Alabama, on Army property at the Redstone Arsenal. The Center occupies 1,797 acres under a non-revocable use permit from the Army and 64 leased acres. The capital investment as of June 30, 1965, was $319,555,000. Certain facilities such as the Redstone Arsenal Army Air Field and some utilities are used jointly by NASA and the Army. Within the Center complex, the total area of specialized and support buildings amount to 4,325,806 square feet. Another 680,780 square feet of warehouse facilities belonging to the Army at Redstone Arsenal are used by the Center. The Huntsville location has deep-water access via the Tennessee River, Ohio River, and Mississippi River.

The second location, the Michoud Assembly Facility is located 15 miles east of New Orleans, Louisiana. The facility occupies 897 acres. The capital investment as of June 30, 1965, was $114,010,000. Facilities comprise a total of 3,282,777 square feet, including the main assembly plant, which covers an area of 43 acres under one roof. A new engineering building and the vertical assembly building are complete and occupied. The Michoud Assembly Facility is on the Gulf Intra-Coastal Waterway and has deep-water access via the Mississippi River.

The third location, the Mississippi Test Facility is located in southwest Mississippi, approximately 50 miles northeast of New Orleans, Louisiana. The total land area will be 138,870 acres, of which 13,428 acres will make up the actual test area and will be owned by NASA. The remaining 125,442 acres will be held as a buffer zone. In the buffer area, 7,568 acres will be owned in fee, and 117,874 acres will be under restrictive easement. The capital investment for the Mississippi Test Facility as of June 30, 1965, was $164,854,000. Test stands will include a dual-position stand for testing the 7,500,000 pound thrust S-IC booster stage and two stands for testing the 1,000,000 pound thrust S-II stages. The site has deep-water access for transporting large boosters via the Pearl River and the Intra-Coastal Waterway.

The fourth location, the Slidell Central Computer Facility supporting the Michoud Assembly Facility and the Mississippi Test Facility is located on a

14-acre site at Slidell, Louisiana, 20 miles northeast of the Michoud Assembly Facility. The capital investment as of June 30, 1965, was $3,607,000.

ANALYSIS OF RESOURCES REQUIREMENTS BY OBJECT CLASSIFICATION:

	1965	1966	1967
11. Personnel Compensation...	$79,345,000	$80,206,000	$80,271,000
12. Personnel Benefits.....	5,528,000	5,558,000	5,660,000
Total, personnel costs.	$84,873,000	$85,764,000	$85,931,000
21. Travel and Transportation of Persons.....	3,722,000	3,769,000	3,724,000
22. Transportation of Things.	379,000	366,000	366,000
23. Rent, Communications, and Utilities.....	10,854,000	9,255,000	10,213,000
24. Printing and Reproduction	1,025,000	1,038,000	1,038,000
25. Other Services.....	18,610,000	19,106,000	20,429,000
Services of other agencies.....	2,542,000	2,632,000	2,628,000
26. Supplies and materials...	5,820,000	4,322,000	5,397,000
31. Equipment.....	8,744,000	1,000,000	1,000,000
32. Lands and Structures.....	1,212,000	1,000,000	1,200,000
42. Insurance Claims and Indemnities.....	6,000	8,000	8,000
Total.....	$137,787,000	$128,260,000	$131,934,000

JUSTIFICATION BY OBJECT CLASSIFICATION:

Personnel Distribution

	1965	1966	1967
Direct Personnel by Program			
Manned Space Flight			
Apollo.....	5,485	5,238	5,063
Advanced missions.....	59	94	128
Space Science and Applications			
Physics and astronomy.....	8	8	12
Lunar and planetary exploration.....	3	9	13
Launch vehicle development.....	4	-	-
Meteorological satellites.....	-	1	3

	1965	1966	1967
Advanced Research and Technology			
Basic research	80	85	92
Space vehicle systems	104	130	141
Electronics systems	71	71	62
Human factor systems	5	5	7
Space power and electric propulsion systems	8	8	22
Nuclear rockets	12	12	12
Chemical propulsion	7	7	17
Tracking and Data Acquisition	5	6	6
Technology Utilization	15	13	13
Sub-total, direct positions	5,866	5,687	5,591
Support personnel			
Director and Staff	186	181	181
Administration	768	750	750
Research and development support	690	699	699
Sub-total, support positions	1,644	1,630	1,630
Total, permanent positions	7,510	7,317	7,221
Other positions:			
Positions under cooperative training agreements	169	169	169
Other temporary positions	75	---	---
Total, all positions	7,754	7,486	7,390

Personnel requirements

The Marshall Space Flight Center personnel ceiling for end FY 1967 has been established at 7,390. This represents a planned reduction of 96 positions from the FY 1966 ceiling. Although the early Saturn launches are complete, both the Saturn IB and V projects have entered critical phases requiring more active participation in systems engineering and development ground testing as initial flight dates approach. The first Saturn IB launches are planned for calendar year 1966. In calendar year 1967, four additional Saturn IB flights, including long-duration manned missions, are planned. Saturn V hardware is undergoing intensive development and qualification ground testing during FY 1966. Heavy emphasis is also being placed on the activation of Saturn V facilities at the Mississippi Test Facility and

Launch Complex 39, Kennedy Space Center. During calendar year 1967, critical ground testing, both development and qualification, will continue in the Saturn V project and Saturn V flights from Launch Complex 39 will begin. The initial unmanned missions will qualify the space vehicle systems in preparation for later manned flights. Throughout these critical periods, increasing contractor activity will require intensified monitoring and quality and reliability assurance inspections.

Personnel Costs

	1965	1966	1967
Total Positions	7,754	7,486	7,390
Permanent	7,510	7,317	7,221
Other	244	169	169
Personnel Compensation:			
Annual cost of permanent positions	$73,635,000	$76,173,000	$76,720,000
Pay above the stated annual rate	280,000	293,000	296,000
Lapses (deduct)	-1,283,000	-2,129,000	-1,747,000
Net cost of permanent positions	72,632,000	74,337,000	75,269,000
Other personnel compensation	6,714,000	5,869,000	5,002,000
Total compensation	79,346,000	80,206,000	80,271,000
NASA funded	79,345,000	80,206,000	80,271,000
Reimbursable	1,000	---	---
Personnel benefits	5,528,000	5,558,000	5,660,000
NASA funded	5,528,000	5,558,000	5,660,000
Reimbursable	---	---	---
Total personnel costs	84,874,000	85,764,000	85,931,000
NASA funded	84,873,000	85,764,000	85,931,000
Reimbursable	1,000	---	---
Average Number of All Employees (Man Years)	7,623	7,469	7,278

Personnel Costs - $85,931,000

An additional $167,000 is required in FY 1967 for personnel compensation and benefits. This is a net increase, and is due primarily to costs related to the Federal Employee Salary Act, effective October 1965, for a full fiscal year, plus a small increase in average salary resulting from within-grade advancements and promotions. These additional costs are partially offset by a planned reduction in personnel during FY 1967.

Travel and Transportation of Persons - $3,724,000

The amount requested in FY 1967 for travel and transportation of persons is $45,000 less than the amount available for FY 1966. This planned decrease is based upon a planned reduction in personnel at the Center and the completion of test stand activation at the Mississippi Test Facility.

Transportation of Things - $366,000

The amount required for FY 1967 is estimated at the same level as for FY 1966, and provides for transportation of freight, express, drayage, and parcel post.

Rent, Communications, and Utilities - $10,213,000

Requirements for rent, communications, and utilities exceed the FY 1966 estimate by $958,000. This net increase results from an increase in EDP equipment, long distance toll costs, and utilities; partially offset by decreased requirements in rental of office space.

The increase in EDP equipment rental is directly related to the support of requirements for testing leading up to intensified Saturn IB flight activity and continuation of critical ground testing for Saturn V. Long distance tolls will also increase slightly because of additional contractor monitoring associated with this increased activity. A decrease in rental of space is possible as construction of Government facilities at Marshall Space Flight Center is completed. Utilities will increase in FY 1967 as facilities completed in FY 1966 become operational for a full year. These utilities include gas, electricity, water, and sewage disposal; all of which are provided through the Redstone Arsenal. The FY 1967 estimates are based on rates provided by the Department of the Army.

Printing and Reproduction - $1,038,000

The amount required for FY 1967 is estimated to remain at the FY 1966 level and provides for the cost of printing, duplicating, photostating, blueprinting, microfilming, photographing, and reproduction services purchased from Government and commercial sources. These services are required for publication or reproduction of such items as technical manuals, technical reports, computer masters for spare parts lists, and technical documentation.

Other Services - $23,057,000

Contractor and other Government agency services to supplement the in-house capabilities are furnished on a continuing, as well as on a seasonal, intermittent or non-recurring basis. An increase of $1,319,000 will be required in FY 1967 to provide these services. The significant areas for this increase are as follows:

$413,000 is required for such items as technical documentation and drawings. The principal increase is in technical documentation

which results from the Saturn IB coming into the operational test phase, and qualification of the Saturn V space vehicle systems in preparation for later manned flights.

$463,000 is required for maintenance and repair of buildings, grounds, and equipment. This increase is related to additional floor space requiring maintenance, and planned rehabilitation of warehouse areas. Warehouse maintenance has been curtailed due to limited fund availability in the current fiscal year.

The remaining net increase of $443,000 is required primarily for chemical cleaning of research and development equipment and components, and janitorial services. The increase in chemical cleaning is due to continued support of the Mississippi Test Facility, and more component cleaning as a result of additional tests during FY 1967. Janitorial services requirements are related to additional floor space to be maintained as construction projects are completed.

Supplies and Materials - $5,397,000

Requirements for supplies and materials will increase in FY 1967 over FY 1966 by $1,075,000. The increase is the result of a forced reduction during FY 1966 due to limited fund availability. The additional funds requested will restore the normal flow of materials to meet current operating demands.

Equipment - $1,000,000

Requirements for equipment are anticipated to remain at the FY 1966 level.

Lands and Structures - $1,200,000

The amount requested for land and structures in FY 1967 exceeds the FY 1966 level by $200,000. This object class provides for alterations, modifications, and minor construction of facilities within statutory limitations. Requirements under this object class are of a continuing nature which are generated by changes in the research and development program, as well as development of new technological approaches.

Insurance Claims and Indemnities - $8,000

Funds requested are for the settlement of claims and indemnities, and are expected to remain at the FY 1966 level.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ORGANIZATION AND STAFFING CHART

NASA HEADQUARTERS

STAFFING SUMMARY

	66	67
Excepted	191	191
GS-16	65	65
GS-15	377	399
GS-14	300	321
All other GS	1,211	1,141
Wage Board	18	18
Total Permanent	2,162	2,135
Temporary	65	65
Total Positions	2,227	2,200

ADMINISTRATOR

	66	67
Excepted	11	11
GS-16	-	-
GS-15	1	1
GS-14	2	2
All other GS	5	5
Wage Board	-	-
Total Permanent	19	19

EXECUTIVE SECRETARY

	66	67
Excepted	1	1
GS-16	-	-
GS-15	3	3
GS-14	3	3
All other GS	55	55
Wage Board	2	2
Total Permanent	64	64

ADMINISTRATION NASA-Wide

	66	67
Excepted	16	16
GS-16	1	1
GS-15	42	42
GS-14	47	48
All other GS	142	137
Wage Board	-	-
Total Permanent	248	244

HEADQUARTERS OPERATIONS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	4	4
GS-14	6	6
All other GS	227	225
Wage Board	15	15
Total Permanent	253	251

DEFENSE AFFAIRS

	66	67
Excepted	3	3
GS-16	-	-
GS-15	1	2
GS-14	1	-
All other GS	5	5
Wage Board	-	-
Total Permanent	10	10

GENERAL COUNSEL

	66	67
Excepted	6	6
GS-16	-	-
GS-15	11	11
GS-14	6	6
All other GS	29	28
Wage Board	-	-
Total Permanent	52	51

INDUSTRY AFFAIRS

	66	67
Excepted	10	10
GS-16	1	1
GS-15	17	18
GS-14	36	37
All other GS	84	80
Wage Board	-	-
Total Permanent	148	146

INTERNATIONAL AFFAIRS

	66	67
Excepted	2	2
GS-16	1	1
GS-15	3	3
GS-14	-	-
All other GS	21	21
Wage Board	-	-
Total Permanent	27	27

LEGISLATIVE AFFAIRS

	66	67
Excepted	2	2
GS-16	-	-
GS-15	4	4
GS-14	2	2
All other GS	20	20
Wage Board	1	1
Total Permanent	29	29

POLICY ANALYSIS

	66	67
Excepted	3	3
GS-16	-	-
GS-15	2	2
GS-14	2	2
All other GS	10	10
Wage Board	-	-
Total Permanent	17	17

PROGRAMMING

	66	67
Excepted	7	7
GS-16	-	-
GS-15	13	14
GS-14	12	12
All other GS	39	37
Wage Board	-	-
Total Permanent	71	70

PUBLIC AFFAIRS

	66	67
Excepted	4	4
GS-16	-	-
GS-15	14	14
GS-14	20	20
All other GS	80	78
Wage Board	-	-
Total Permanent	118	116

TECHNOLOGY UTILIZATION

	66	67
Excepted	6	6
GS-16	-	-
GS-15	8	8
GS-14	13	13
All other GS	51	50
Wage Board	-	-
Total Permanent	78	77

MANNED SPACE FLIGHT

	66	67
Excepted	39	39
GS-16	12	12
GS-15	116	124
GS-14	88	97
All other GS	198	175
Wage Board	-	-
Total Permanent	453	447

SPACE SCIENCE AND APPLICATIONS

	66	67
Excepted	38	38
GS-16	23	23
GS-15	60	68
GS-14	28	38
All other GS	147	125
Wage Board	-	-
Total Permanent	296	292

TRACKING AND DATA ACQUISITION

	66	67
Excepted	6	6
GS-16	5	5
GS-15	19	20
GS-14	10	10
All other GS	22	20
Wage Board	-	-
Total Permanent	62	61

ADVANCED RESEARCH AND TECHNOLOGY

	66	67
Excepted	36	36
GS-16	22	22
GS-15	59	61
GS-14	24	25
All other GS	76	70
Wage Board	-	-
Total Permanent	217	214

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ORGANIZATION AND STAFFING CHART

NASA HEADQUARTERS

STAFFING SUMMARY

	66	67
Excepted	191	191
GS-16	65	65
GS-15	377	399
GS-14	300	321
All other GS	1,211	1,141
Wage Board	18	18
Total Permanent	2,162	2,135
Temporary	65	65
Total Positions	2,227	2,200

ADMINISTRATOR

	66	67
Excepted	11	11
GS-16	-	-
GS-15	1	1
GS-14	2	2
All other GS	5	5
Wage Board	-	-
Total Permanent	19	19

EXECUTIVE SECRETARY

	66	67
Excepted	1	1
GS-16	-	-
GS-15	3	3
GS-14	3	3
All other GS	55	55
Wage Board	2	2
Total Permanent	64	64

ADMINISTRATION NASA-Wide

	66	67
Excepted	16	16
GS-16	1	1
GS-15	42	42
GS-14	47	48
All other GS	142	137
Wage Board	-	-
Total Permanent	248	244

HEADQUARTERS OPERATIONS

	66	67
Excepted	1	1
GS-16	-	-
GS-15	4	4
GS-14	6	6
All other GS	227	225
Wage Board	15	15
Total Permanent	253	251

DEFENSE AFFAIRS

	66	67
Excepted	3	3
GS-16	-	-
GS-15	1	2
GS-14	1	-
All other GS	5	5
Wage Board	-	-
Total Permanent	10	10

GENERAL COUNSEL

	66	67
Excepted	6	6
GS-16	-	-
GS-15	11	11
GS-14	6	6
All other GS	29	28
Wage Board	-	-
Total Permanent	52	51

INDUSTRY AFFAIRS

	66	67
Excepted	10	10
GS-16	1	1
GS-15	17	18
GS-14	36	37
All other GS	84	80
Wage Board	-	-
Total Permanent	148	146

INTERNATIONAL AFFAIRS

	66	67
Excepted	2	2
GS-16	1	1
GS-15	3	3
GS-14	-	-
All other GS	21	21
Wage Board	-	-
Total Permanent	27	27

LEGISLATIVE AFFAIRS

	66	67
Excepted	2	2
GS-16	-	-
GS-15	4	4
GS-14	2	2
All other GS	20	20
Wage Board	1	1
Total Permanent	29	29

POLICY ANALYSIS

	66	67
Excepted	3	3
GS-16	-	-
GS-15	2	2
GS-14	2	2
All other GS	10	10
Wage Board	-	-
Total Permanent	17	17

PROGRAMMING

	66	67
Excepted	7	7
GS-16	-	-
GS-15	13	14
GS-14	12	12
All other GS	39	37
Wage Board	-	-
Total Permanent	71	70

PUBLIC AFFAIRS

	66	67
Excepted	4	4
GS-16	-	-
GS-15	14	14
GS-14	20	20
All other GS	80	78
Wage Board	-	-
Total Permanent	118	116

TECHNOLOGY UTILIZATION

	66	67
Excepted	6	6
GS-16	-	-
GS-15	8	8
GS-14	13	13
All other GS	51	50
Wage Board	-	-
Total Permanent	78	77

MANNED SPACE FLIGHT

	66	67
Excepted	39	39
GS-16	12	12
GS-15	116	124
GS-14	88	97
All other GS	198	175
Wage Board	-	-
Total Permanent	453	447

SPACE SCIENCE AND APPLICATIONS

	66	67
Excepted	38	38
GS-16	23	23
GS-15	60	68
GS-14	28	38
All other GS	147	125
Wage Board	-	-
Total Permanent	296	292

TRACKING AND DATA ACQUISITION

	66	67
Excepted	6	6
GS-16	5	5
GS-15	19	20
GS-14	10	10
All other GS	22	20
Wage Board	-	-
Total Permanent	62	61

ADVANCED RESEARCH AND TECHNOLOGY

	66	67
Excepted	36	36
GS-16	22	22
GS-15	59	61
GS-14	24	25
All other GS	76	70
Wage Board	-	-
Total Permanent	217	214

ADMINISTRATIVE OPERATIONS

FISCAL YEAR 1967 ESTIMATES

NASA HEADQUARTERS

MISSION AND CAPABILITIES:

The mission of the Headquarters of the National Aeronautics and Space Administration is to plan and provide executive direction for the programs authorized by the Congress, and to implement the national objectives stated in the National Aeronautics and Space Act of 1958, as amended. The principal statutory functions are:

1. To conduct research into, and for the solution of, problems of flight within and outside the earth's atmosphere and to develop, construct, test, and operate aeronautical and space vehicles for research purposes.

2. To conduct activities required for the exploration of space with manned and unmanned vehicles.

3. To arrange for participation by the scientific community in planning scientific measurements and observations to be made through use of aeronautical and space vehicles, and conduct or arrange for the conduct of such measurements and observations.

4. To provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof.

The following offices at Headquarters assist management in carrying out the technical aspects of this mission:

The Office of Manned Space Flight - Responsible for all NASA activities directly involving manned space flight missions. Programs include Gemini - to develop an operational capability to fly a two-man spacecraft in near-earth orbit for periods up to fourteen days and to learn new techniques, including rendezvous, docking and extravehicular activity; Apollo - to provide a broad national capability for manned space exploration, including earth-orbital, lunar orbital, and lunar surface operations and to achieve the specific objective of manned lunar landing and return within this decade; and Advanced Missions - to plan a broad program of exploration which will achieve and maintain a position of space leadership for the United States. The Office of Manned Space Flight has launch responsibility for all major manned and unmanned missions utilizing NASA launch vehicles. This Office also has over-all institutional responsibility for the three

installations primarily concerned with the manned space flight programs. These installations are: the George C. Marshall Space Flight Center, including Mississippi Test Facility, Michoud Assembly Facility, and Slidell where a computer facility is located; the Manned Spacecraft Center, including NASA activities at the White Sands Test Facility; and the John F. Kennedy Space Center, NASA, including NASA activities at the Eastern and Western Test Ranges.

The Office of Space Science and Applications - Responsible for NASA programs involving the unmanned scientific investigation of the space environment including the moon, planets, and interplanetary space utilizing ground-based, airborne, and space techniques such as sounding rockets, earth satellites, and deep space probes (e.g., Voyager); for scientific experiments to be conducted by man in space and selection and training of astronaut-scientists; for the research and development of space flight applications in such areas as meteorology, communications, navigation, geodesy, and economic geographic surveys, and for the support of operational systems using these developments; for the development, procurement, and use of light and medium class launch vehicles, such as Centaur; and for the sustaining university program.

The Office of Space Science and Applications has an over-all institutional responsibility for those NASA installations primarily involved in space science and applications programs. These are the Goddard Space Flight Center, Wallops Station, and the Jet Propulsion Laboratory, including the NASA Resident Office which administers the contract with the California Institute of Technology for the operation of the Jet Propulsion Laboratory.

The Office of Advanced Research and Technology - Responsible for the planning, direction, execution, evaluation, documentation, and dissemination of the results of all NASA research and technology programs which are conducted primarily to demonstrate the feasibility of a concept, structure, component, or system which may have specific general application to the nation's aeronautical and space objectives. This Office is also responsible for coordinating NASA's total program of supporting research and technology, which is related to carrying out the specific flight missions in order to avoid unnecessary duplication and to insure that the agency has an integrated and balanced research program.

In addition, this office has over-all institutional responsibility for the research centers primarily involved in carrying out NASA's advanced research programs. These installations are: the Ames Research Center, the Electronics Research Center, the Flight Research Center, the Langley Research Center, the Lewis Research Center, and the Space Nuclear Propulsion Office.

The Office of Tracking and Data Acquisition - Responsible for the development, implementation, and operation of tracking, data acquisition, communications, and data processing facilities, systems, and services required for NASA flight programs. In addition, the Office is responsible for agency-wide coordination of the management of automatic data processing systems and services.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Authorized Positions, end of year.	2,263	2,227	2,200
Average Number of All Employees...	1,989	2,063	2,043
Administrative Operations.....	$51,516,000	$56,286,000	$58,667,000

INSTALLATION DESCRIPTION:

The NASA Headquarters is located at 400 Maryland Avenue, S. W., Washington, D. C., and also occupies two other buildings in the southwest area of the District of Columbia, as well as storage facilities in nearby Arlington, Virginia. With the exception of the space leased in the Reporter's Building and the warehousing space, personnel occupy government-owned buildings.

ANALYSIS OF RESOURCES REQUIREMENTS BY OBJECT CLASSIFICATION:

		1965	1966	1967
11.	Personnel Compensation.....	$25,311,000	$27,281,000	$27,946,000
12.	Personnel Benefits.....	1,959,000	2,167,000	2,373,000
	Total, personnel costs....	$27,270,000	$29,448,000	$30,319,000
21.	Travel and Transportation of Persons.....	2,550,000	2,642,000	2,642,000
22.	Transportation of Things....	341,000	295,000	295,000
23.	Rent, Communications, and Utilities.....	1,899,000	2,341,000	2,390,000
24.	Printing and Reproduction...	1,580,000	1,925,000	2,075,000
25.	Other Services.....	12,654,000	15,048,000	16,024,000
	Services of other agencies	2,778,000	2,472,000	2,807,000
26.	Supplies and Materials.....	500,000	555,000	555,000
31.	Equipment.....	1,936,000	1,550,000	1,550,000
32.	Lands and Structures.....	---	---	---
42.	Insurance Claims and Indemnities.....	8,000	10,000	10,000
	Total.....	$51,516,000	$56,286,000	$58,667,000

The above estimates for FY 1966 and FY 1967 are distributed between NASA-wide support functions, conducted or administered centrally, which provide service to all centers; and for Headquarters operations which are for the support of the day-to-day operations of all Headquarters offices. The following table shows this comparison by object classification:

Analysis of Funding for NASA-wide Support and Headquarters Operations

Object Classification	FY 1966 Total	FY 1966 NASA-wide Support	FY 1966 Hdqtrs. Operat.	FY 1967 Total	FY 1967 NASA-wide Support	FY 1967 Hdqtrs. Operat.
	(In thousands of dollars)					
11. Personnel Comp...	$27,281	$25,004	$2,277	$27,946	$25,563	$2,383
12. Personnel Benef..	2,167	2,012	155	2,373	2,209	164
21. Travel and Trans of Persons.....	2,642	2,588	54	2,642	2,588	54
22. Trans. of Things.....	295	234	61	295	234	61
23. Rent, Communic. & Utilities....	2,341	1,261	1,080	2,390	1,319	1,071
24. Printing & Repro	1,925	1,772	153	2,075	1,922	153
25. Other Services...	17,520	15,638	1,882	18,831	16,818	2,013
26. Supplies & Mat...	555	15	540	555	15	540
31. Equipment.....	1,550	1,345	205	1,550	1,345	205
32. Land & Structures	---	---	---	---	---	---
42. Ins. Claims and Indemnities....	10	---	10	10	---	10
Total.....	$56,286	$49,869	$6,417	$58,667	$52,013	$6,654

JUSTIFICATION BY OBJECT CLASSIFICATION:

Personnel Distribution

	1965	1966	1967
Direct Personnel by Program			
Manned Space Flight			
Gemini.....	103	75	43
Apollo.....	249	291	321
Advanced missions.....	101	87	83

	1965	1966	1967
Space Science and Applications			
Physics and astronomy	57	57	56
Lunar and planetary exploration	76	76	74
Sustaining university program	71	71	71
Launch vehicle development	10	6	4
Launch vehicle procurement	15	19	20
Bioscience	26	26	26
Meteorological satellites	20	20	20
Communication and applications technology satellites	21	21	21
Advanced Research and Technology			
Basic research	31	31	31
Space vehicle systems	44	44	43
Electronics systems	37	37	37
Human factor systems	22	22	22
Space power and electric propulsion systems	31	31	30
Nuclear rockets	3	3	3
Chemical propulsion	22	22	22
Aeronautics	27	27	26
Tracking and Data Acquisition	60	62	61
Technology Utilization	14	14	14
Sub-total, direct positions	1,040	1,042	1,028
Support personnel			
*Director and Staff	617	618	611
Administration (Headquarters)	258	253	251
*Research and development support	248	249	245
Sub-total, support positions	1,123	1,120	1,107
Total, permanent positions	2,163	2,162	2,135
Other positions:			
Positions under cooperative training agreements	---	---	---
Other temporary positions	100	65	65
Total, all positions	2,263	2,227	2,200
*NASA-wide support.	(865)	(867)	(856)

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Personnel requirements

The FY 1967 budget request includes a total of 2,200 civilian positions for NASA Headquarters, a reduction of 27 positions below the current fiscal year.

Of the 2,135 permanent positions shown in the above table, 1,028 are directly related to the staffing of the scientific and technical program areas in the Office of Manned Space Flight, the Office of Space Science and Applications, the Office of Advanced Research and Technology, the Office of Tracking and Data Acquisition, and the Office of Technology Utilization. Of the remaining 1,107 permanent positions, 856 are for NASA-wide support functions relating to the review, coordination, direction and planning of activities such as procurement, financial management, audit, acquisition and dissemination of scientific and technical information, and the balance of 251 are for Headquarters operations concerned with administrative services, personnel, security, accounts and reports, and contracts.

Personnel Costs

	1965	1966	1967
Total Positions	2,263	2,227	2,200
Permanent	2,163	2,162	2,135
Other	100	65	65
Personnel Compensation:			
Annual cost of permanent positions	$26,308,000	$27,849,000	$27,945,000
Pay above the stated annual rate	101,000	107,000	107,000
Lapses (deduct)	-2,464,000	-2,165,000	-1,538,000
Net cost of permanent positions	23,945,000	25,791,000	26,514,000
Other personnel compensation	1,366,000	1,490,000	1,432,000
Total compensation	25,311,000	27,281,000	27,946,000
NASA funded	25,311,000	27,281,000	27,946,000
Reimbursable	---	---	---
Personnel benefits	1,959,000	2,167,000	2,373,000
NASA funded	1,959,000	2,167,000	2,373,000
Reimbursable	---	---	---
Total personnel costs	27,270,000	29,448,000	30,319,000
NASA funded	27,270,000	29,448,000	30,319,000
Reimbursable	---	---	---
Average Number of All Employees (Man Years)	1,989	2,063	2,043

Personnel Costs - $30,319,000

The personnel costs for FY 1967 are estimated to be $30,319,000 covering 2,043 manyears of employment. Of this amount, $27,946,000 is requested for personnel compensation and $2,373,000 for personnel benefits. The FY 1967 estimate is $871,000 over the amount for the current fiscal year. This increase is required to cover the cost of the Federal Employees Salary Act of 1965 on a full year basis, for within-grade step increases and career development, for retirement contributions and other benefits, and for increased costs payable to the Department of Labor for benefits and other payments made from the Employees' Compensation Fund during FY 1965.

The following table shows the major items which are included in the estimate for personnel costs:

	FY 1967 Estimate	Increase or Decrease from FY 1966
Personnel compensation:		
Net cost of permanent positions.....	$26,514,000	$+723,000
Other personnel compensation.....	1,432,000	-58,000
Sub-total.....	$27,946,000	$+665,000
Personnel benefits:		
Retirement contributions.....	1,749,000	+56,000
Other benefits.....	365,000	+61,000
Employees' Compensation Fund.....	259,000	+89,000
Sub-total.....	2,373,000	+206,000
Total personnel costs.....	$30,319,000	$+871,000

Of the $30,319,000 requested for personnel costs, $27,772,000 is estimated for salaries and benefits of employees engaged in NASA-wide programs and activities which are conducted or administered centrally for the benefit of all centers, and $2,547,000 for personnel engaged in Headquarters operations.

Travel and Transportation of Persons - $2,642,000

The FY 1967 estimate of $2,642,000 for travel and transportation of persons is the same level as FY 1966 requirements. Of this amount, $2,425,000 is for NASA employee travel and transportation and $217,000 for non-NASA employee travel costs of technical and research advisory committees, and for costs of local transportation.

The amount requested includes $2,588,000 in support of NASA-wide programs and activities; and the remainder of $54,000 is related to Headquarters operations.

Transportation of Things - $295,000

The FY 1967 amount of $295,000 requested for transportation of things is the same level required for the current fiscal year. The costs under this object classification include $195,000 for domestic and overseas shipments of exhibits and spacemobiles; $56,000 for transportation of household goods and personal effects; and $44,000 for freight, express, drayage and parcel post costs of shipments to NASA installations, and rental of trucks from the General Services Administration.

Of the $295,000 requested in FY 1967, $234,000 is for support of NASA-wide activities and $61,000 for Headquarters operations.

Rent, Communications, and Utilities - $2,390,000

The FY 1967 estimate of $2,390,000 under this object classification includes: $590,000 for rents, a net increase of $49,000 over FY 1966, which provides for an increase of $58,000 required for rental of space to house the NASA Scientific and Technical Information Facility on a full year basis in FY 1967 and a decrease of $9,000 for rental of ADP equipment; and $1,800,000 for communications costs which are projected at the same level as the current fiscal year requirements.

The following table reflects the items included in the FY 1967 estimates for rents and communications:

	FY 1967 Estimate	Increase or Decrease from FY 1966
Rents:		
Space	$367,000	$+58,000
ADP and EAM equipment	89,000	-9,000
Office duplicating equipment	134,000	---
Total, rents	$590,000	$+49,000
Communications:		
Leased lines	366,000	---
Local telephone & exchange service	451,000	---
Long distance tolls	295,000	---
Postage and TWX	688,000	---
Total, communications	$1,800,000	---
Total, rents and communications	$2,390,000	$+49,000

Of the $2,390,000 requested for FY 1967 for rents and communications, $1,319,000 is estimated for NASA-wide support and $1,071,000 for Headquarters operations.

Printing and Reproduction - $2,075,000

The FY 1967 estimate for these services is $2,075,000, an increase of $150,000 above the FY 1966 level. Over 90 per cent, or $1,915,000 of the FY 1967 estimate is for printing and related services which will be performed through government sources. The remaining $160,000 is for printing and photostating to be done by commercial sources. The major activities funded under this object classification are as follows:

	FY 1967 Estimate	Increase over FY 1966
Scientific and technical information publications.....	$1,100,000	$+150,000
Educational and information publications.....	350,000	---
Printing and reproduction of administrative issuances, forms, etc.....	625,000	---
Total, printing and reproduction.....	$2,075,000	$+150,000

The increase of $150,000 requested in FY 1967 in the scientific and technical information activity includes $50,000 for NASA's abstracting and indexing journal "Scientific and Technical Aerospace Reports," $60,000 for printing of technical reviews, monographs, handbooks and data compliations, and $40,000 for special publications on selected aerospace topics.

Of the $2,075,000 requested in FY 1967, $1,922,000 is for printing and reproduction services for NASA-wide support activities and $153,000 for Headquarters operations.

Other Services - $18,831,000

The FY 1967 request for other services is $18,831,000, a net increase of $1,311,000 above the FY 1966 level. Listed in the following table are the major items which are funded under this object classification:

	FY 1967 Estimate	Increase or Decrease over FY 1966
Scientific and technical information facility.....	$5,308,000	$+341,000
Documentation journal literature.....	1,810,000	+300,000
Translation services.....	350,000	+75,000

	FY 1967 Estimate	Increase or Decrease over FY 1966
Scientific information systems development	$355,000	---
Technical publications preparation	885,000	$+238,000
Dissemination of information through educational institutions and other channels	1,305,000	---
Educational and information media services	1,725,000	---
Educational exhibit services	745,000	---
Security investigations	1,300,000	---
Reliability and quality assurance studies	500,000	+60,000
Incentive contracting study	197,000	+197,000
Training programs	400,000	+50,000
Miscellaneous studies and services	1,938,000	-131,000
Headquarters operations	2,013,000	+131,000
Total, other services	$18,831,000	$+1,311,000

Of the net increase of $1,311,000 for other services, over 75%, or $1,004,000, is requested for the NASA-wide scientific and technical information program. This includes:

1. $341,000 to provide increased support for operation of NASA's contractor operated Scientific and Technical Information Facility. The workload of the facility has been increasing between 20 and 30% each year over the past several years. It is anticipated that this trend will continue in FY 1967. The increased workload is caused by the additional number of scientific and technical reports which are becoming available from NASA supported research and development programs, and from interagency agreements and exchange arrangements with domestic and foreign organizations.

2. $300,000 for documentation of world-wide journal literature to process the increased volume of significant foreign aerospace literature for immediate use in the U. S. aerospace programs.

3. $75,000 for additional translation services required to handle the rise in world-wide journal activity in the aerospace sciences and the availability of a continually increasing volume of material originally published in foreign languages.

4. $288,000 for preparation of manuscript material for specialized scientific and technical publications. This includes $163,000 for handbook and data compilations on selected aerospace subjects, and $125,000 increased support of the Langley Research Center printing plant operations for specialized services such as editing, verification of references, and preparation of graphs and tables.

The remaining increase of $307,000 is required for the other NASA-wide support functions and for Headquarters operations, as follows:

For other NASA-wide requirements, a net increase of $176,000 consisting of increases of: (1) $60,000 for reliability and quality assurance studies relating to subjects such as systems design trade-off studies, quality assurance methodology and development of publications on special topics; (2) $197,000 for initiation of an incentive contracting effectiveness study; and (3) $50,000 for agency-wide training of personnel in technical management, supervisory and administrative areas common to several NASA centers with emphasis on training programs relating to supervisory management, incentive contracting, financial management, and contract administration. The foregoing increases are partially offset by decreases amounting to $131,000 in a variety of miscellaneous studies and services.

For Headquarters operations, an increase of $131,000 consisting of: (1) $110,000 for computer operation, programming and systems design services; and (2) $21,000 for contract administration and security guard services.

Supplies and Materials - $555,000

The FY 1967 estimate of $555,000 for supplies and materials is the same level required for FY 1966. The items under this object classification primarily include the purchase of pamphlets and documents for the scientific and technical information program, office and photographic supplies and materials, and subscriptions and technical books for the law and technical libraries.

Of the amount estimated for FY 1967, $15,000 is for NASA-wide support and $540,000 for Headquarters operations.

Equipment - $1,550,000

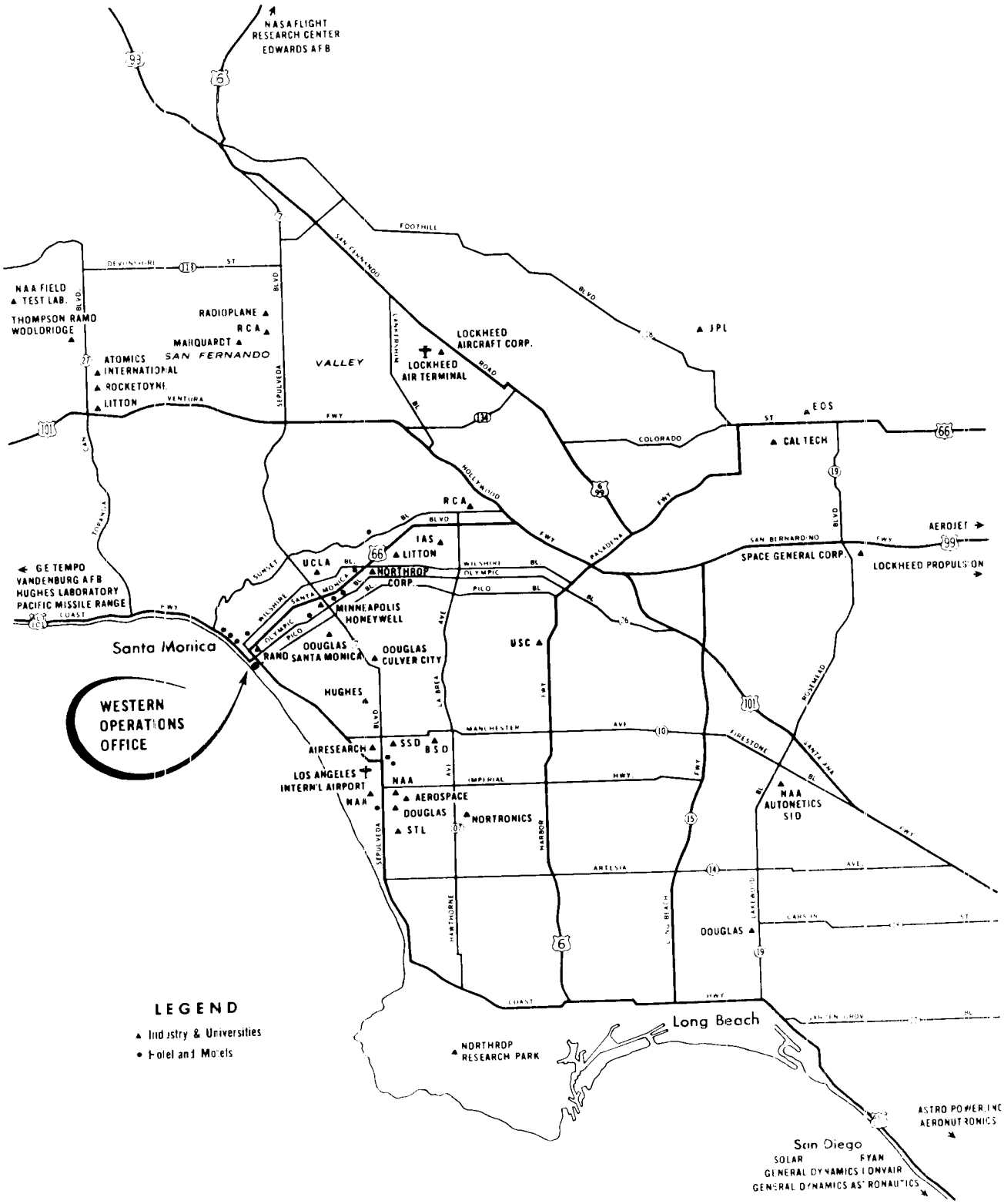
The FY 1967 estimate for equipment is the same level required for the current fiscal year. The items for FY 1966 and FY 1967 under this object classification include $205,000 for purchase of mechanical, photographic and miscellaneous office equipment; $155,000 for procurement of replacement vehicles for the existing spacemobile fleet which will exceed the 80,000 mile mark in FY 1966 and will become uneconomical to maintain and repair, and for updating of model inventory and equipment to be placed in these spacemobiles;

$80,000 for purchase of miscellaneous equipment for the Scientific and Technical Information Facility; and $1,110,000 for procurement of educational exhibits and materials which will provide up-to-date coverage of NASA programs in the manned and unmanned exploration of space, and to up-date the exhibit inventory to keep abreast of technical programs. These exhibits are designed for use in educational institutions, teachers and students fairs and workshops, professional and technical organizations and display before the general public, both domestic and foreign.

Of the $1,550,000 required in FY 1967 for equipment described above $1,345,000 is for support of NASA-wide activities and $205,000 for Headquarters operations.

Insurance Claims and Indemnities - $10,000

The FY 1967 requirement is estimated at the same level as for the current fiscal year. These funds cover payment of claims of $2,500 or less under the provisions of 28 U.S.C. 2672 for injury, death, or loss of property caused by the negligent or wrongful act or omission of any employee of NASA while acting within the scope of the responsibility of his office or employment.



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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ORGANIZATION AND STAFFING CHART

WESTERN OPERATIONS OFFICE

STAFFING SUMMARY

	66	67
Excepted	4	4
GS-16	1	1
GS-15	12	12
GS-14	47	47
All other GS	322	317
Total Permanent	386	381
Temporary	5	5
Total Positions	391	386

DIRECTOR

	66	67
Excepted	2	2
All other GS	3	3
Total Permanent	5	5

NASA RESIDENCY OFFICE - JPL

	66	67
GS-15	2	2
GS-14	6	6
All other GS	13	13
Total Permanent	21	21

LEGAL DIVISION

	66	67
GS-15	2	2
GS-14	3	3
All other GS	6	5
Total Permanent	11	10

ADMINISTRATIVE SERVICES DIVISION

	66	67
All other GS	36	35
Total Permanent	36	35

PUBLIC AFFAIRS DIVISION

	66	67
All other GS	8	8
Total Permanent	8	8

PERSONNEL DIVISION

	66	67
All other GS	9	9
Total Permanent	9	9

NASA-O DOWNEY

	66	67
Excepted	1	1
GS-15	1	1
GS-14	6	6
All other GS	125	124
Total Permanent	133	132

TECHNICAL DIVISION

	66	67
GS-16	1	1
GS-15	6	6
GS-14	25	25
All other GS	50	49
Total Permanent	82	81

CONTRACTS DIVISION

	66	67
Excepted	1	1
GS-15	1	1
GS-14	6	6
All other GS	47	46
Total Permanent	55	54

FINANCE DIVISION

	66	67
GS-14	1	1
All other GS	25	25
Total Permanent	26	26

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ORGANIZATION AND STAFFING CHART

WESTERN OPERATIONS OFFICE

STAFFING SUMMARY

	66	67
Excepted	4	4
GS-16	1	1
GS-15	12	12
GS-14	47	47
All other GS	322	317
Total Permanent	386	381
Temporary	5	5
Total Positions	391	386

DIRECTOR

	66	67
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NASA RESIDENCY OFFICE - JPL

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All other GS	13	13
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FINANCE DIVISION

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GS-14	1	1
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Total Permanent	26	26

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ADMINISTRATIVE OPERATIONS

FISCAL YEAR 1967 ESTIMATES

WESTERN OPERATIONS OFFICE

MISSION AND CAPABILITIES:

The primary mission of the Western Operations Office is to represent NASA in the southwestern area and to provide technical, contractual, and administrative support to NASA field centers and NASA Headquarters for programs and projects located in southern California and other areas west of Denver, Colorado. The Western Operations Office functions as a field support activity in such areas as procurement, technical management, public affairs and educational programs, legal and patent reviews, financial management activities, and other administrative support.

Technical management support, as assigned by NASA Headquarters and field centers, encompasses advanced technology contracts and many research and development hardware contracts. Contract activity includes negotiations for advanced technology, hardware, basic agreements with major contractors, and procurement of pressurants and propellants for NASA and contractors requirements. The Western Operations Office mission also includes operation of an in-plant staff at the North American Aviation plant at Downey, California, to handle over-all contract administration and quality assurance for the Apollo and Saturn projects.

The mission of the Western Operations Office also includes administrative support and services for the NASA Resident Office at the Jet Propulsion Laboratory. The Resident Office, physically located at the Jet Propulsion Laboratory in Pasadena, California, has principal contract administration responsibilities for the NASA contract with the California Institute of Technology which operates the Jet Propulsion Laboratory.

SUMMARY OF RESOURCES REQUIREMENTS:

	1965	1966	1967
Authorized Positions, end of year	405	391	386
Average Number of All Employees..	377	382	378
Administrative Operations.....	$22,693,000*	$5,987,000	$6,149,000

*Includes $17,034,000 for purchase of computers for JPL.

INSTALLATION DESCRIPTION:

The main Western Operations Office is located at 150 Pico Boulevard, Santa Monica, California. The Office occupies a group of buildings under commercial lease and no government investment in buildings or acreage is involved at this location.

Over one-third of the Western Operations Office staff is located in government owned facilities at Downey, California, which are currently being utilized by the Space Information Systems Division of North American Aviation, Inc., mainly for Apollo and Saturn work. The government owned portion of the North American Aviation Downey complex is located on 166 acres and the land and plant acquisition value is approximately $45 million as of June 30, 1965. The responsibility for management of property and facilities valued at $39.5 million was transferred from the Air Force to NASA on July 1, 1964. A few additional Western Operations Office personnel are assigned to other contractor locations within the Los Angeles area where full time project support is required.

ANALYSIS OF RESOURCES REQUIREMENTS BY OBJECT CLASSIFICATION:

		1965	1966	1967
11.	Personnel Compensation...	$4,115,000	$4,289,000	$4,426,000
12.	Personnel Benefits.....	289,000	309,000	317,000
	Total, personnel costs.	$4,404,000	$4,598,000	$4,743,000
21.	Travel and Transportation of persons.....	247,000	282,000	282,000
22.	Transportation of Things.	8,000	45,000	50,000
23.	Rent, Communications, and Utilities.....	349,000	402,000	402,000
24.	Printing and Reproduction	15,000	15,000	15,000
25.	Other Services.....	522,000	514,000	517,000
	Services of other agencies.....	12,000	14,000	58,000
26.	Supplies and Materials...	51,000	53,000	53,000
31.	Equipment.....	17,085,000	64,000	29,000
32.	Lands and Structures.....	---	---	---
42.	Insurance Claims and Indemnities.....	---	---	---
	Total.....	$22,693,000	$5,987,000	$6,149,000

JUSTIFICATION BY OBJECT CLASSIFICATION:

Personnel Distribution

	1965	1966	1967
Direct Personnel by Program			
Manned Space Flight			
Gemini	4	2	-
Apollo	161	162	163
Advanced missions	8	10	10
Space Science and Applications			
Physics and astronomy	15	15	14
Lunar and planetary exploration	15	14	14
Launch vehicle procurement	5	4	5
Bioscience	-	2	2
Communication and applications technology satellites	7	7	6
Advanced Research and Technology			
Space vehicle systems	3	3	3
Electronics systems	23	21	20
Space power and electric propulsion systems	2	2	2
Chemical propulsion	4	4	4
Technology Utilization	3	3	3
Sub-total, direct positions	250	249	246
Support personnel			
Director and Staff	9	9	9
Administration	63	63	62
Research and Development support	64	65	64
Sub-total, support positions	136	137	135
Total, permanent positions	386	386	381

	1965	1966	1967
Other positions			
Positions under cooperative training agreements.....	-	-	-
Other temporary positions.....	19	5	5
Total, all positions.....	405	391	386

Personnel Costs

	1965	1966	1967
Total Positions.....	405	391	386
Permanent.....	386	386	381
Other.....	19	5	5
Personnel Compensation:			
Annual cost of permanent positions.....	$3,985,000	$4,193,000	$4,221,000
Pay above the stated annual rate.....	15,000	16,000	16,000
Lapses (deduct).....	- 170,000	- 228,000	- 111,000
Net cost of permanent positions	3,830,000	3,981,000	4,126,000
Other personnel compensation...	285,000	308,000	300,000
Total Compensation.....	4,115,000	4,289,000	4,426,000
NASA funded.....	4,115,000	4,289,000	4,426,000
Reimbursable.....	---	---	---
Personnel benefits			
NASA funded.....	289,000	309,000	317,000
Reimbursable.....	289,000	309,000	317,000
Total personnel costs.....	4,404,000	4,598,000	4,743,000
NASA funded.....	4,404,000	4,598,000	4,743,000
Reimbursable.....	---	---	---
Average Number of All Employees (Man Years).....	377	382	378

Personnel Compensation and Benefits - $4,743,000

Personnel costs in FY 1967 are estimated to be $145,000 higher than in FY 1966, of which $137,000 is for personnel compensation and $8,000 is for personnel benefits. The estimate reflects the additional cost resulting from higher pay scales in effect for a full year, and for within-grade step increases, retirement contributions and other benefits.

Travel and Transportation of Persons - $282,000

Travel and transportation requirements in FY 1967 are expected to remain at the FY 1966 level. The total estimate includes $230,000 needed for employee travel to direct and coordinate technical program and administrative activities; to attend NASA technical meetings and working panels; and for the cost of temporary assignments and transfers. The balance of $52,000 will be used for the expense of local transportation and toll charges, and the rental of passenger motor vehicles from the General Services Administration.

Transportation of Things - $50,000

Transportation of things is estimated to increase $5,000 in FY 1967. This increase is related to the movement of household goods to accommodate the personnel turnover anticipated in FY 1967. The estimate also includes $38,000 for transportation of NASA exhibits in the western area of the United States.

Rent, Communications, and Utilities - $402,000

Fiscal year 1967 requirements in this area are estimated to remain unchanged from FY 1966.

The estimate includes $192,000 required for the commercial lease of real property and the rental of equipment, of which $168,000 is to continue the lease of 46,800 square feet of office space at an average annual cost of $3.60 per square foot. The remaining amount of $24,000 covers the rental of office and other equipment on a term basis.

The FY 1967 requirement of $205,000 for communications services is composed of the following items:

Leased lines.....	$4,000
Long distance tolls.....	39,000
Local telephone and exchange.....	71,000
All other communications.....	91,000

The balance of the FY 1967 estimate, amounting to $5,000, is required for utilities, primarily electric power.

Printing and Reproduction - $15,000

The FY 1967 cost of printing and reproducing technical and administrative reports, publications and forms is estimated to continue at the FY 1966 level. The estimate includes $3,000 to cover the printing of administrative materials by other government agencies, and $12,000 for the commercial printing of technical documents and related publications.

Other Services - $575,000

Requirements for other services in FY 1967 indicate a net increase of $47,000 over FY 1966. This results from planned expansion of the Reliable Electrical Connections School facilities at an additional cost of $12,000, in order to accelerate quality assurance certification of contractor personnel in time to assure adherence to space hardware production schedules; the augmentation of the technical reference library staff at an increased amount of $8,000 to serve the progressively larger use of these services by industry in the western area; and the assistance of Defense Contracts Administration Services Regions (DCASR) in providing contract administration services, which will require $44,000 of additional funding. These estimated increases are partially offset by the expected reduction of $17,000 in the cost of leasing, maintenance and operation of administrative aircraft at the Jet Propulsion Laboratory because of the disposal of a NASA-owned aircraft.

The following table indicates estimated FY 1967 funding for this area by the major requirements:

ADP equipment operation	$30,000
Custodial services	18,000
JPL administrative aircraft lease, maintenance and operation	245,000
Technical reference library	80,000
Reliable electrical connections school	120,000
Contract administration services	50,000
Miscellaneous minor services	32,000
Total	$575,000

Supplies and Materials - $53,000

The cost of supplies and materials for FY 1967 is expected to remain at the FY 1966 level. The estimate includes $48,000 for replacement of office supplies and $5,000 for purchase of expendable photographic, maintenance and operating supplies.

Equipment - $29,000

The FY 1967 estimate of $29,000 is $35,000 below FY 1966. The estimate includes $16,000 for the procurement of two replacement engines for leased administrative aircraft supporting the Jet Propulsion Laboratory; $4,000 to purchase two passenger motor vehicles (for replacement); and $9,000 for acquisition of photographic and non-capitalized equipment, and replacement of office furniture and equipment.

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