

22468

1967-1968

Assembly Facility

January 1, 1967 - December 31, 1967

VIII.04

HISTORICAL REPORT

M I C H O U D A S S E M B L Y F A C I L I T Y

January 1, 1967 - December 31, 1967

NEW GLORY FOR OLD GLORY

To promote recognition of the space effort of the United States, American flags are now being placed on Saturn V first stages. Four flags are centered around the liquid oxygen tank, one to each quarter. The flags are produced by a silk-screen process on self-adhesive paper in four sheets, and measure 6'8" by 12 feet.

TABLE OF CONTENTS

<u>Chapter</u>		<u>Page</u>
I	Michoud Highlights	1
II	General	2
III	Project Management	4
IV	Support Activities	18
V	Facilities Management	23
VI	Contract and Financial Management	29
VII	Computer Operations	49

the Manned Spacecraft Center, Houston, Texas, effective November 11, 1967. The Assistant to the Manager for Quality Assurance and Reliability, Mr. A. G. Smith, temporarily assumed the additional duty of Chief, Reliability Office.

C. Public Affairs

The 15,900 NASA/Contractor Open House visitors, combined with the 18,000 persons who assembled for the Presidential visit, contributed to the total of 72,228 visitors to the Michoud Assembly Facility during 1967. Fifty-four VIP's and 1161 foreign visitors are also included in that total. A summary of major public affairs activities for 1967 is attached as Exhibit #1.

CHAPTER III

PROJECT MANAGEMENT

A. Saturn IB, S-IB Program

1. Stage Operations

a. S-IB-4: The AS-204 launch vehicle was to have been a manned launch early in 1967. During a simulated flight test there was a flash fire in the capsule which claimed the lives of the flight crew. Due to this catastrophic incident, a detailed investigation and redesign of certain launch components resulted and launch was delayed until January 22, 1968. The vehicle was moved from Pad 34 to Pad 37B for launching.

b. S-IB-5: Throughout the year this stage underwent normal operations to prepare it for shipment to KSC. At the close of the year it was in post-storage checkout.

c. S-IB-6: This stage arrived at MAF from KSC on April 8, 1967. The stage was returned from KSC because of the AS-204 accident and the indefinite schedule of TB stages. The S-IB-6 was placed in storage.

d. S-IB-7 and S-IB-8: These stages underwent normal operations throughout the year. At the close of the year, S-IB-7 was to be taken out of storage and readied for a mid-1968 need date at KSC, and S-IB-8 remained in storage.

e. S-IB-9: The stage departed on January 17, 1967 from MAF for static testing. Short duration testing was held on February 27, 1967, and long duration testing was conducted on March 7, 1967. At the close of the year, the stage was in storage, having been returned to MAF March 20, 1967.

f. S-IB-10: The stage arrived at the static test site on April 9, 1967. It was static fired on May 9, 1967 (short duration) and May 22, 1967 (long duration). S-IB-10 was returned to MAF on June 13, 1967, and at the close of the year was in storage.

g. S-IB-11: Off-loading of the stage at the static test site took place on October 30, 1967.

h. S-IB-12: Clustering of this stage began on January 17, 1967 and at the close of the year the stage was in post-manufacturing checkout.

i. S-IB-13 through S-IB-16: At the close of the year detail manufacture of parts and minor sub-assemblies of structural components was in progress. Long lead time items for most of the structural assemblies had been received.

j. General

(1) H-1 Engines: While at static test, the gas generator on engine H-7090 of S-IB-9 was removed because of unsatisfactory conditions. The engine was inspected and found to be contaminated. As a result of this finding, engines from all S-IB stages were removed, inspected, and cleaned. The LOX cavity seal area of the four outboard engines on S-IB-11 were found to be contaminated with a liquid. Steps were taken to determine the source of this contamination. After an investigation of all H-1 engines, it was determined that the four engines on S-IB-11 were the only ones to contain moisture. Throughout the year there were various incidents of contamination in the H-1 engines. All findings were thoroughly investigated and corrective action was taken.

(2) Long-Term Storage Plan of S-IB Stages: Agreement was reached with CCSD to provide a storage plan for long-term storage of the S-IB stages.

(3) Post-Storage Modification Operations: The S-IB Operations Office's concurrence was given to a CCSD request for establishing a post-storage modification operation, during which time engineering changes will be incorporated and other pre-shipment operations, which were deferred in

order to prepare the stage for storage, may be performed.

(4) Missing Flow Tube: A flow tube from the fuel fill and drain valve on S-IB-9 was missing when the valve was removed because of other deficiencies. At the close of the year, the flow tube had not been found.

(5) Antenna Range Facility: In the 1966 historical report, it was noted that CCSD was given project approval to establish an antenna range facility at MAF. In October 1967, however, CCSD was advised to submit a proposal to delete the contractual requirements for the facility. It was determined that the requirements no longer exist. At the close of the year, this item was pending negotiation.

2. Quality Assurance and Reliability

a. Quality Engineering

(1) The contractor's quality data systems were reviewed and quality and reliability data were consolidated and evaluated to maintain cognizance of the quality level maintained by the contractor and to detect and resolve problem areas. Significant activities during the period were:

(a) System audits were conducted in Quality operations and in the Reliability Data Center to evaluate controls exercised in management of failure and discrepancy documentation. Findings and recommendations were presented to the contractor for information and corrective action.

(b) Significant problems were noted in quality and reliability data systems as a result of the conversion to "third generation" computer equipment. There were serious delays in processing and numerous errors in output products for several months as a result of programming and operational problems. Assistance was given the contractor to resolve problems where possible.

(c) Maintained cognizance over and assisted with imple-

mentation of a system to provide a weekly magnetic tape of significant stage problems to MSFC-Huntsville.

(d) Arrangements were made with the contractor to present to NASA personnel a monthly Quality and Reliability Status Review. This review covers important accomplishments and problems during the month.

(2) Engineering planning, assistance and direction were provided to the contractor to assure that Quality Engineering requirements were fulfilled during fabrication, processing, assembly, testing, packaging, and shipment of Saturn boosters and equipment. The contractor's operating documentation and techniques were reviewed and evaluated and direction was given concerning development of new techniques and correction of deficiencies.

(3) The contractor's system for insuring that vendors maintain adequate quality control programs was reviewed and evaluated. Arrangements were made for Government inspection agency coverage at vendors' plants where necessary. Overall vendor activity slacked off somewhat during the year as the original S-IB contract neared completion.

(4) The contractor's quality program plan and operating procedure were reviewed and evaluated to assure that documentation coverage and implementation is adequate to accomplish the quality program objectives.

(5) Considerable activity occurred as a result of the Apollo 204 accident at KSC in January:

(a) A major electrical systems survey was conducted on stages S-IB-5 and S-IB-9.

(b) A comprehensive systems safety review was conducted to ensure operational procedures are adequate to avoid such a tragedy with the S-IB stage.

(6) The NASA Headquarters Apollo Quality Office conducted an audit in November. Results were generally quite satisfactory.

b. Reliability

(1) General

(a) Reliability requirements were funded for the follow-on contract (Vehicles S-IB-13 through S-IB-16), Schedule VI to the main contract, by a series of modifications.

(b) The Reliability Program Plan REL-10 was revised and revisions E and F published.

(c) Reliability Evaluation Reports, Critical Items Lists and Qualification Status Reports were published for S-IB-5 to support its launch status.

(d) The Supplier Survey Group surveyed several new suppliers due to the need for a second source on some components.

(e) A monthly reliability meeting was started with personnel from CCSD, I-MICH, I-1/1B-S1/1B, R-QUAL, and contractor representatives from G.E., Datona, representing HQ MAR participating in these reviews. The reviews were designed to keep everyone up-to-date on vehicle status for input into preflight readiness reviews and to present problems and accomplishments during the past month.

(f) A formal design review was held for the redesign of the high pressure pneumatic control system. This new system is for the follow-on contract vehicles.

(g) Support was furnished to R-QUAL in gathering failure documentation and information to help them in their close-out on significant failures.

(h) The MAF Reliability Office supported R-QUAL in a partial program audit. The audit was made to evaluate the contractor's performance and recommend changes to their program. No significant action items were generated.

(i) CCSD produced a Reliability Program Plan REL-20 for the follow-on program. This plan was reviewed; however, it was returned without action because no contract had been signed.

(2) Testing

All reports for the formal reliability test program under MOD 292 of the contract were published. All testing in the Emergency Detection System test program, Phase A and B, was completed and reports published. Testing of hardware from new vendors and hardware with configuration changes was in progress at the close of the reporting period.

c. Product Control Engineering

(1) Final assembly of S-IB-11 and S-IB-12 was completed. Post-manufacturing checkout was completed on S-IB-10, S-IB-11 and S-IB-12. S-IB-9, S-IB-10, and S-IB-11 were shipped to Huntsville where they were successfully static fired. Post-static checkout was completed on Stages S-IB-8 and S-IB-9.

(2) Stages S-IB-5 and S-IB-7 were in storage for part of the year. S-IB-5, following a post-storage checkout, was shipped to the Kennedy Space Center on December 29, 1967. S-IB-6 was returned from the Kennedy Space Center on April 10, 1967, and was placed in storage. It was removed from storage, and following a modification period, started post-storage checkout on November 21, 1967. S-IB-7 completed a post-storage checkout in midsummer 1967.

(3) Some of the hardware for S-IB-13 and subsequent stages

was received at Michoud during the past year. Work was in progress on receiving inspection and minor sub-assembly at the end of 1967.

B. Saturn V, S-IC Program

1. Stage Operations

No feeder report was received from the S-IC Operations Office, Michoud Assembly Facility, for the 1967 history. The following milestones are taken from the MAF Public Information Office's Chronology of Major Events

a. On February 3, 1967, NASA signed an incentive contract modification with The Boeing Company for five Saturn V first stages--511 through 515. The \$120 million supplemental agreement extends the Boeing contract through June, 1970. Also, NASA authorized Boeing to rehabilitate or replace some 360 tools or pieces of equipment used in assembly of the booster. The cost of this contract modification was \$1,895,195.

b. On May 16, 1967, the first flight version of the Saturn V first stage to be tested at NASA's Mississippi Test Facility (S-IC-4) was static fired for 125 seconds. The booster was the second S-IC flight stage built at Michoud. The first two S-IC flight boosters were built and static fired at MSFC and the third was assembled at Michoud and static fired at MSFC.

c. On November 9, 1968, the first Saturn V first stage, assembled at the Marshall Space Flight Center from major components built and milled at Michoud, launched the Saturn V vehicle on its historic initial mission.

2. Quality Assurance and Reliability

a. Quality Engineering

(1) The contractor's quality and reliability data systems were reviewed for adequacy to assure compliance with quality requirements of the S-IC stage contract. Significant activities during the period were:

(a) The contractor's Failure Reporting and Corrective Action System was evaluated for adequacy in accordance with contractual provisions. No major deficiencies or incompatibilities were noted. However, minor problems were noted in some areas including incomplete input of all nonconformance data and lack of centralized control over corrective action documentation. Adequate corrective action was taken by the contractor.

(b) The input of failure and defect data to MSFC was reviewed to assure adequate operation. No significant deficiencies were noted.

(c) The contractor's Quality Status Reporting requirements were refined and expanded to provide more detailed information and greater coverage of problems through formal presentations and supplementary documentation.

(d) Some problems were noted in conversion to "third generation" computer equipment. These were generally resolved without undue disruption of the operation.

(2) Engineering planning, assistance, and direction were provided to the contractor to assure that Quality Engineering requirements were fulfilled during fabrication, processing, assembly, testing, packaging, and shipment of Saturn boosters and equipment. The contractor's operating documentation and techniques were reviewed and evaluated and direction was given concerning development of new techniques and correction of deficiencies.

(3) The contractor's system for insuring that vendors maintain adequate quality control programs was reviewed and evaluated.

Arrangements were made for Government inspection agency coverage at vendors' plants where necessary.

(4) The contractor's quality program plan and operating procedures were reviewed and evaluated to assure that documentation coverage and implementation is adequate to accomplish the quality program objectives.

(5) A substantial amount of activity occurred as a result of the Apollo 204 fire at KSC in January:

(a) A major electrical systems survey was conducted on stage S-IC-3.

(b) A comprehensive systems safety review was conducted to ensure operational procedures are adequate to avoid such a tragedy with the S-IC stage.

(c) Assistance was rendered and data was provided in numerous instances.

(6) The NASA Headquarters Apollo Quality Office conducted an audit in November. Results were generally quite satisfactory.

b. Reliability

(1) Reliability Management

There were no major contractor reliability organization changes during the year; however, the various organization reliability responsibilities were more specifically defined by the Reliability Program Plan. The annual up-date of the "Reliability Program Plan" D5-11013 was approved by NASA and released on December 15, 1967. The revised plan included four supplemental documents which more specifically delineates the reliability responsibilities of the contractor's Operations,

Systems Test, Quality and Reliability Assurance, and Operations organizations.

Boeing's Reliability Engineering staff increased from 13 personnel at the beginning of the year to 23 personnel at the end of the year. The increase in personnel was brought about in part due to the added emphasis placed on reliability activities by both Boeing's and NASA's Management. Part of the increase was also attributable to the increased workload brought on by MICH 648, Reliability Analysis Model (RAM).

(2) Program Reviews

There were three significant meetings held between NASA and Boeing Management during the year. The meetings were prompted by NASA's notification to Boeing of the lack of an effective Reliability Program and the pinpointing of certain known deficiencies. Two meetings, one of August 31 and one of September 5, 1967, presented Boeing's position and planning regarding the implementation of an effective S-IC Reliability Program. A meeting was held on December 7, 1967, in which the status of the S-IC Reliability Program was presented. By the end of the year, all major deficiencies pointed out to Boeing had been worked off. A significant result of these meetings was the reactivation by Boeing of their Reliability Coordination Committee meetings. The committee represents all contractor reliability related organizations. The committee objective is to follow-up on all action assignments to eliminate reliability program deficiencies and to seek areas of potential reliability improvement.

Monthly Reliability Status Presentations by Boeing were requested by MSFC and negotiations for this effort were underway at the

end of the year.

(3) Elimination of Human Induced Failures

There was a revival of the Human Factors effort by Boeing during the year after continuous pressure by NASA for improvement of this effort which had subsided to virtually no effort. One engineer was assigned from Boeing Reliability to track this effort. Positive results were being manifested by the year's end. The principal area of activity involved efforts to reduce stage damage during and after the manufacturing process.

(4) Test Program

The Reliability Test Program was almost completely curtailed in March because of an accident in the High Pressure Test Facility. The rupture of a high-pressure facility line plus higher priority tests made this facility unavailable for reliability testing from March through almost the balance of the year. There were only four reliability tests remaining at the end of the year.

c. Product Control Engineering

modifications originally scheduled to be accomplished at KSC was begun.

Post-manufacturing checkout was completed on S-IC-5, S-IC-6 and S-IC-7 during 1967. S-IC-5 was shipped to MTF where it was successfully static fired on August 25, 1967. The stage was transferred back to MAF and placed in storage prior to running the post-static checkout. Stages S-IC-6 and S-IC-7 were placed in storage prior to static firing.

The assembly of S-IC-8 and on progressed smoothly with no major problems encountered.

C. Reliability Effort

Reliability activities not reported under the applicable program headings were as follows:

1. Of significance was the publication of the Michoud "Reliability Program Management Plan", and involvement in the Systems aspects of Safety and Contractor Awareness Programs.

2. Special emphasis in meetings, reviews, audits, and visits was apparent in the following areas: Titanium Hazards, Relay Contamination, Electromagnetic Interference, Use of Failure Mode and Effects Analysis, Math Modeling, Distributor Problems and Foam Expansion, Control of Test Hardware, Cutoff Sensors, Parts Program, Reliability Assessment Methods, Critical Parts Handling and Marking, and Safety Precautions to be taken when attempting first stage water recovery.

3. Coordination studies and basic research in the area of systems safety were conducted during the year in support of the Michoud Safety Office, the Reliability Office having assumed some functions commonly grouped under Systems Safety on a part-time basis.

D. Engine Program Management

During 1967, thirty H-1 engines and nineteen F-1 engines were delivered by Rocketdyne to MAF for use on the S-IB and S-IC stages, respectively.

Major tasks performed during this period by the Engine Office were as follows:

1. An official working agreement was developed for use by CCSD and Rocketdyne. Prior to that time this interface relationship had been governed by verbal agreements and were often confused.
2. A procedure requiring Rocketdyne to officially review and concur with CCSD checkout procedures involving the H-1 engine was initiated. This should preclude damaging procedural errors experienced previously.
3. Contractual changes were made so that H-1 engines at MAF could be maintained by Rocketdyne rather than CCSD, resulting in considerable savings to the Government.
4. A LOX seal contamination check resulted in an investigation of all installed seals at MAF. The results of this investigation pointed out CCSD procedural errors that had adversely affected nearly every H-1 engine in the S-IB program.
5. A transition in F-1 engine delivery to MAF from plane, to truck, to barge delivery was coordinated during this period resulting in a \$7000-per engine cost savings to the Government.
6. A major task at MAF resulted in the approval of two changes to F-1 engine thermal insulation. Facilities were designed and equipped and the two year task started during this period.
7. Problems with component cleanliness during shipment were discovered and corrected during 1967. Many man-hours recleaning these components were eliminated.
8. The close out of Boeing UER's written against the F-1 engine became quite a problem during this period. I-MICH-E directed the investigation and recommended the solution to this major problem.

9. A system requiring that Rocketdyne review and concur in all engine test procedures affecting the F-1 engine prior to use by Boeing was coordinated and put into effect.

10. An investigation conducted by this office revealed that temporary bellows covers being installed by The Boeing Company were causing corrosion problems. The use of these covers was stopped by this office.

11. A revised Boeing/NASA/Rocketdyne working agreement was coordinated for MAF.

12. A certification program for welders, solderers, and other special skills was instigated for Rocketdyne personnel.

13. Many hardware discrepancies were investigated and dispositioned along with the coordination of engine changes and special inspections. To date, changes to the engines have resulted in negligible or no impact to the stage schedules.

14. Changes to the allowable leakage rates at certain connections on the F-1 engine were coordinated and implemented, resulting in considerably less seal replacement at MAF.

CHAPTER IV
SUPPORT ACTIVITIES

A. Safety

1. Accident Experience, January - December 1967

	<u>Minor Injuries</u>	<u>Lost Time Injuries</u>	<u>Property Damage</u>
NASA/MSFC/MAF	14	0	1*
Boeing Company	1594	13	4
CCSD	435	0	1
LTV--STC	49	0	0
Mason-Rust	279	1	7

*Damage was caused by an accident involving NASA sub-contractor.
Estimated cost to repair or replace property damaged was \$71,924.

Frequency Rate Comparison, 1967

MAF	0.84
MSFC	1.38
NASA	1.66
All-Industry	6.91
Aircraft Manufacturing	2.26

2. Safety Surveillance

Safety surveys were conducted in all areas of operation at MAF by assigned safety personnel. Safety reviews and spot checks were made by the NASA/MSFC/MAF Safety Officer to assure compliance with contract and NASA standards. Environmental health survey was conducted by representatives from MSFC during this reporting period. This survey group rated the environmental health program at Michoud Assembly Facility as excellent.

3. Education and Promotion

a. Safety education and promotion is a continuous program at

the Michoud Assembly Facility. During this reporting period, a medical self-help training course was conducted at Michoud Assembly Facility for NASA personnel, and was attended by approximately 95 employees. The course was designed to prepare people to meet their own health needs if disaster should strike and there should be no doctor available.

b. The Michoud Assembly Facility participated in the "Project LIFE" program presented by WWL-TV, New Orleans, La. The major emphasis of this program was traffic safety. The film, "Treacherous Ten", pointing out the ten most dangerous traffic areas in the city area was shown to a majority of MAF employees.

c. Pamphlets, posters, and the MAF Weekly Bulletin were used to promote safety consciousness among NASA/MSFC/MAF employees at least monthly during the calendar year.

d. The NASA/MSFC/MAF Safety Officer participated in and coordinated efforts to produce a motion picture on rescue operations for MSFC. The movie demonstrated the use of a vertical lift stretcher. MAF personnel participating in the film were W. W. Moore, Rosemarie B. Moree, Paul R. Spitzfaden, Frances G. Prendergast, Josephine R. Bradley. Many favorable comments were received in the NASA/MSFC/MAF Safety Office on the value of the completed film.

4. Safety Awards

a. NASA/MSFC/MAF received the Award of Merit from the National Safety Council. The award was in recognition of NASA/MSFC/MAF employees working 1,023,215 manhours without a disabling injury.

b. Employees of NASA/MSFC/MAF were awarded a plaque by the Metropolitan New Orleans Safety Council for maintaining a 0.00 accident frequency rate. This is the third consecutive year for NASA/MSFC/MAF employees to

earn this award.

B. Transportation

1. The Michoud Harbor handled 109 ship or barge movements during this period:

a. Seven stage movements inbound and three weight simulator movements inbound by barge.

b. Eleven stage movements and two weight simulator movements outbound by barge.

c. Thirteen LSD Point Barrow movements:

- (1) Three stage movements inbound.
- (2) One weight simulator inbound.
- (3) Two movements miscellaneous cargo inbound.
- (4) One SII stage movement outbound.
- (5) Two miscellaneous cargo movements outbound.
- (6) One weight simulator movement outbound.
- (7) One transporter movement outbound.
- (8) One movement empty to shipyard.
- (9) One movement empty from shipyard repairs.

d. Twenty-three general cargo or transporter movements inbound by barge.

e. Twenty-two general cargo or transporter movements outbound by barge.

f. Twenty-three empty barge movements, inbound or outbound, including preparation for hurricane protection.

g. Six F-1 engines were unloaded from the Super Guppy at the Naval Air Station, Belle Chasse, La., and two F-1 engines were unloaded from the Super Guppy at the Gulfport Municipal Airport, Gulfport, Miss.

Unloading location was changed to Gulfport in June due to highway conditions between Belle Chasse and Michoud. Ten F-1 engines were received from Canoga Park, Calif. by truck.

C. Administrative Services

Total personnel on board at Michoud as of the close of the year was as follows:

Boeing Launch Systems Branch	4,303
Chrysler Space Division	2,455
Mason-Rust	753
NASA	231
LTV	<u>283</u>
TOTAL STRENGTH	8,025

Total personnel on board in each organizational element of NASA/MSFC/MAF as of the end of 1967 was as follows:

Office of the Manager	5
Counsel	1
Engine Office	3
Facilities Office	8
Financial Office	16
Contracts Office	25
Public Relations Office	4
Computer Operations Office	6
S-IB Operations Office	9
S-IC Operations Office	9
Support Services Office	24
Assistant to the Manager for	
Quality Assurance & Reliability	7
Quality Engineering Office	32
Reliability Office	3
Product Control Engr. Office	<u>79</u>
TOTAL	231

Two major manpower assessments were made in April and June, 1967, and manpower activities and organizational evaluations throughout the latter part of the year were concentrated on the goal of accomplishing the mission

effectively despite anticipated reductions in personnel strength.

On November 29, 1967, the Director, MSFC, announced that as a reduction in the appropriation for administrative operations, MSFC had been directed to reduce personnel by 700, to be effective January 13, 1968.

On December 6, 1967, letters of notification were sent to individuals affected by reduction-in-force.

CHAPTER V

FACILITIES MANAGEMENT

CONSTRUCTION

A. The following NASA let contracts were completed during calendar year 1967:

1. Contract NAS8-17142 - Johnson Service Company, Plant Utilities Monitoring System.
2. Contract NAS8-17881 - South Central Plumbing and Heating Company, Modifications to Potable Water and Plant Utility Systems.
3. Contract NAS8-17905 - Gurtler-Hebert, Emergency Generator for Contractor Services Building.
4. Contract NAS8-17922 - Mathieu Well Service, Modifications to Chemical Waste Disposal System
5. Purchase Order 11199 - Motorola Corporation, Installation of 200 ft. Radio Antenna Tower, Building 320.

B. The following NASA contract was let during calendar year 1967:

Contract NAS8-22933 - Pratt Farnsworth, Modification to Chemical Waste Manholes - estimated completion date, January 4, 1968.

C. The Boeing Company completed the following projects during calendar year 1967:

1. High Pressure Test-Helium Line.
2. Stage Test Facility - Floor Leveling Cell #3.
3. Manufacturing Expansion Plan - Rework and Modifications.
4. High Pressure Test - Water Flow Facility

5. Rehabilitation of Chemical Cleaning and Finish Process Facility.
 6. Component Test Area - Modifications and Additions.
 7. General Plant Data Collection System, Power and Cable Installation.
 8. Warehouse and Stores - Component Supply Building - Double Deck Shelving.
 9. Tube and Valve Cleaning Facility - Installation of Tube Cleaning Console.
 10. Rework and Modification Facility - Manufacturing Expansion Plan.
 11. Stage Test Facility - Floor Leveling Cell #4.
 12. Heat Treat Furnace - Foundation and Utilities.
 13. Paving around High Pressure Test Facility.
 14. High Pressure Test Facility - Fire Protection and Emergency Lighting.
 15. Vertical Assembly Building - Modification to the Cleaning System and Installation of Safety Platforms.
 16. Manufacturing Expansion Plan - Foundations and Utilities.
 17. Renovation of Boeing Executive Office area.
 18. Stage Storage and Modifications to Horizontal Installation Facility.
- D. The Boeing Company let the following contracts in calendar year 1967:
1. High Pressure Test - Special Gas Facilities
 2. Warehouse and Stores Building 103 - Double Deck Shelving.
 3. Engine Build-Up Facility - Modifications to Rocketdyne area.

E. Chrysler Corporation completed the following contract in calendar year 1967:

Test Cell Building - Modification to Air Conditioning.

F. Chrysler Corporation let the following contract in calendar year 1967 which is still in effect:

Modification to Rocketdyne area.

G. Mason-Rust completed the following R&A projects in calendar year 1967:

1. Replace Hot and Cold Water Piping in Buildings 101 and 102.
2. Construct miscellaneous Walkways.
3. Rehabilitation of South Lean-to, Building 303.
4. Cleaning, Fill and Drainage South of Saturn Boulevard.
5. Paving of Industrial area.
6. Installation of Diesel Engine for Pump House No. 4.
7. Installation of emergency Battery Lighting Units.
8. Painting and Erection of Scale Model Booster.
9. Emergency Diesel Generator for Pump House No. 3.
10. Emergency Stairways for Buildings 101, 102, and 220.
11. Modifications to Emergency Power Distribution Systems Buildings 103, 110, 207, and 330.
12. Improvements to Boiler Plant Tank Farm area.
13. Installation of Emergency Power for Plant Maintenance Offices.
14. Emergency Repairs to Paved Area, Marine Dock Facility.

15. Rehabilitation of Building 130.
16. Improvements to Marine Dock Facility.
17. Repairs to Saturn Dock Access Road.
18. Repairs to Building 111.
19. Repairs to Process Piping, Building 207.
20. Lighting of Walkways, Building 420.

H. Mason-Rust let the following contracts in calendar year 1967 which are still in effect:

1. Installation of Air Curtains, Building 220.
2. Rework of Announcing System, Computer Operations Office.
3. Replace Potable Water Line to Building 481.
4. Repair Roof of Building 301.
5. Raise Electrical and Storm Drainage Manholes to Grade

I. Design on the following FY 1968 Rehabilitation projects was completed:

1. Rehabilitation of Cooling Tower, Building 202.
2. Rehabilitation of Elevated Water Tank, Building 302.
3. Electrical System Rehabilitation, Building 103.
4. Repairs to Roadway and Parking Lot Paving.

J. A PER for the following FY 1969 Rehabilitation projects was completed by the A-E firm of Waldemar S. Nelson and Associates:

1. Environmental Control for Building 420.
2. Electrical Companion Feeders for Buildings 404, 421, and 350.
3. Trash and Refuse Disposal Incinerator.
4. Saturn Dock Improvements.

MAINTENANCE - REPAIRS AND OPERATION

1. The increased emphasis on plant maintenance and operation that started in calendar year 1966 was continued in calendar year 1967. In fact, the Michoud MROF report for the second quarter of FY-68 showed that 70 percent of the Michoud Facilities Office effort was devoted to plant maintenance and operation. This is a natural change as the Michoud plant, for all practical purposes, is operational and the stress now is on better techniques, better methods, and better communication among the several contractors for better cost control.
2. One of the examples of how Michoud is effecting economies in operation is the newly installed Plant Utilities Monitoring System. When this system became operational, all the roving operators of the Support Services Contractor were released. Equating the annual salaries of the operators against the capital cost of the Monitoring System results in a direct dividend of 6-1/4 percent per annum. The real benefit of the system, however, is that with instantaneous monitoring of the plant's utilities and systems much higher dividends will be realized through more efficient operation. More of this type of project is reflected in our FY-69 and FY-70 budgets.
3. The cost of purchased utilities for calendar year 1967 was \$1,341,987 as compared with \$1,332,983 for calendar year 1966, or an increase of \$9,004.

However, the cost for the Michoud plant itself, excluding Slidell, was \$1,424 below the cost of calendar year 1966, despite a full years cost impact of the new Contractors Services Building and the additional tooling and equipment in the Boeing area. The Slidell Computer Facility showed an increase of \$10,428 over calendar year 1966 because of a full years cost impact of the new computer wing, office extension and cafeteria which expanded the Facility about 65 percent over the previous area. Every effort will be made in 1968 to keep utilities costs in line despite more demands that will be generated by further additions to tooling and equipment in the Boeing area, and the introduction of the Third Generation computer equipment in Slidell.

4. The new deep well for the chemical waste disposal system has been in operation since August of 1967. The operation of the well to date has been most successful. Pressures are within tolerances and there has been no evidence of the intrusion of sand into the screened area. By including the total cost of the new well, plus all previous costs, the chemical waste disposal cost now stands at \$6.00 per 1000 gallons. As the well continues to operate, this cost per gallon will diminish.

CHAPTER VI
CONTRACT AND FINANCIAL MANAGEMENT

A. Contract Management

1. S-IC Stage Contracts

a. Supplemental Agreement MICH-310 to Contract NAS8-5608 for stages 11 through 15, with a target cost of \$112,000,000.00 and target fee of \$8,137,500.00, was approved by NASA Headquarters on February 1, 1967.

b. Supplemental Agreement No. 23 to Contract NAS8-5606(F), in the amount of \$1,896,000.00, for facilities was approved February 2, 1967.

c. An RFP for long-lead-time materials, parts and components, including engineering services for stages S-IC-16 and S-IC-17 was issued to The Boeing Company on March 9, 1967, and was proposed on April 10, 1967. After changes to requirements and submittals of proposals, negotiations, etc., the negotiated contract cost was \$2,275,000.00 and award made on July 21, 1967.

d. An RFP for necessary supplies and services for fabrication and delivery of 10 stages, S-IC-16 through S-IC-25, with options, was forwarded to The Boeing Company on April 4, 1967. Proposal was submitted on July 3, 1967, at an estimated cost and fee of \$353,085,943.00. On September 20, 1967, program adjustments required a resubmittal of proposal by Boeing, but on October 4, 1967, it was decided that no further action would be taken on stages 16 through 25.

e. Considerable effort was expended in trying to initiate a Supplemental Agreement to adjust delivery schedules for the S-IC stages 3 through 15 and to restructure incentive arrangements. An agreement was not

reached in calendar year 1967, and will continue into 1968.

2. S-IB Stage Contracts

a. On March 1, 1967, NASA Headquarters issued a message authorizing initiating action for the issuance of an RFP for additional S-IB stages 13 through 28. A target date for issuance of the RFP was established as March 27, 1967. The RFP was presented to Chrysler Corporation on March 24, 1967, with a quotation due-date of April 24, 1967. Proposal was received on May 1, 1967, having three options - a firm estimate of \$50,256,941.00 for completion of stages 13 through 16; Option 1, long-lead-time procurement for stages 17 through 19, \$12,469,620.00; Option 2, stages 17 through 28, \$103,288,242.00; Option 3, stages 17 through 28, including long-lead-time hardware in option 1, \$115,763,464.

b. On June 27, 1967, Chrysler was requested to furnish a revised quotation for delivery of stages 13 through 28 to conform to a new KSC need-date. Proposal was received August 16, 1967, and forwarded for evaluation.

c. Extensions of time on long-lead-time items, Supplemental Agreement MICH-147, extended Schedule VI through December 31, 1967. Negotiation was conducted on Supplemental Agreement MICH-154 for extension through March 31, 1968.

d. A letter dated September 6, 1967, from Chrysler made an appeal to the Administrative Board of Contract Appeals regarding the Contracting Officer's finding-of-fact for a reduced mission. The Contracting Officer issued a finding-of-fact that Chrysler was not entitled to any reward since the end-condition of flight exceeded the tolerances prescribed in the contract. The Contracting Officer forwarded a Notice of Appeal to the Board

Chairman the same date as received. The Board assigned NASA-BCA-967-29 to the case.

3. Support Services Contract

Mason-Rust contract NAS8-14017 has a current value of \$41,700,130 for the period March 1, 1965 through December 31, 1968. During the calendar year 1967, the contract was extended for the period January 1, 1968 through December 31, 1968, for the sum of \$9,582,397.00. This amount is considerably less than calendar year 1967 and is contributed to a substantial drop in S-IB and S-IC stage contract activities and a concentrated effort in the approach to cost savings and cost avoidances. Through the efforts of the monitoring system, under a CPAF contract, award fees were determined and awarded for each 6-month period.

4. Computer Services Contract

LTV, Range Systems Division, Aerospace Corporation, contract NAS8-17203, has a current value of \$8,207,279.00 for the period January 8, 1966 through January 7, 1969. During calendar year 1967, the option was exercised for the period January 8, 1968 through January 7, 1969, in the amount of \$2,903,215.00. Installation of Third Generation equipment was started but at the close of 1967 complete installation was not made. Interim pieces of equipment were being utilized pending complete installation. Equipment rental manufacturers were notified, effective July 1, 1967, that all GSA rental contracts would be re-exercised by Michoud Assembly Facility instead of MSFC.

5. Construction and A-E Contracts

There were a total of 8 construction and A-E contracts under administration during the calendar year 1967, with an approximate value of \$1,900,000.00. There were numerous changes requiring negotiations and

issuance of modifications. Considerable effort was expended on the Chemical Waste Disposal Well which required settlement of a number of claims.

6. Defense Material System

Through the Defense Material System, numerous requests for special priority assistance have been made to the stage contractors which later developed in obtaining directions. The procurement of equipment for controlled materials on a priority basis for MAF was requested and obtained.

7. Interdepartmental Liaison

The delegated functions of liaison with the Government agencies for obtaining controlled management service by redelegating responsibility of Quality Assurance, Audit, Property Administration, etc., to the agencies, in accordance with interdepartmental agreements, have resulted in approximately 1175 delegations during the calendar year of 1967.

8. Small Business Administration

The Small Business Administration representing the region has periodically reviewed the procurement offices of the stage and support services contractors and has been favorably impressed with the percentage of procurement given to small business, particularly the awards given by Mason-Rust.

9. Utility Services

a. A contract was awarded July 1, 1967, to the Sewerage & Water Board of the City of New Orleans, for consumption of potable water at MAF. It is a contract for 1-year with options to renew, not to exceed five years, and having an estimated cost of \$79,000.00 per year.

b. An option was exercised with the New Orleans Public Service, Inc., for electric power and gas for the period July 1, 1967 through

June 30, 1968. The contract was awarded July 1, 1965, for approval of one year with options to renew not to exceed five years and having an estimated annual cost of \$1,100,000.00 for both electricity and gas.

B. Business Management

The Business Management Office was established in September 1967 as a result of a reorganization that combined the Financial Office with the Programs Office.

1. Summary of Business Management Office activities during calendar year 1967:

a. Manpower Utilization

Three significant management actions for improving efficiency, decreasing costs, and obtaining more effective use of manpower were implemented during the year and were reported in the semi-annual Manpower Utilization Reports.

b. Cost Reduction Program

Seventeen cost reduction actions with estimated savings of \$1,290,866 were processed and approved during the year.

c. Funding Activity

Fund certifications in the amount of \$155,907,805 and vouchers totalling \$173,068,190 were processed during 1967.

d. Surveillance of Construction Contracts

Approximately 1,200 payrolls for an average of 30 construction contracts were examined for compliance with the Davis-Bacon Act, Copeland Act, and the Fair Labor Standards Act of 1962.

e. Audit Reports

There were fourteen audit reports in process of settlement at the beginning of the year. Twenty-nine additional NASA and DCAA reports

were received during the year. Thirty-seven reports were satisfactorily closed and the balance are in process of settlement pending evaluations, comments, assessments of impacts and decisions.

f. Price Analyses of Contractors' Proposals

S-IB Program. Schedule VI of contract NAS8-4016 was established to provide for long lead procurement and the maintenance of capability to produce follow-on S-IB stages. The contractor's proposals relative to Schedule VI were evaluated, and recommended pricing objectives were furnished for the basic modification and each subsequent supplemental agreement which extended the period of performance. The price analyst participated in the negotiations with the contractor. The negotiated value of Schedule VI at December 31, 1967, was \$12,581,607.00, consisting of \$11,795,344.00 in estimated cost and \$786,263.00 in fixed fee.

Price analysis for modification of Schedule I and Schedule V of contract NAS8-4016 was furnished with the necessary participation provided in actual negotiations. The net increase in the negotiated target cost of Schedule I for the period was \$156,803. The estimated cost of Schedule V was established in the amount of \$476,104.

Price analysis support was furnished the Contract Cost Management Office, I-CO-AC, in the negotiation of supplemental agreements which adjusted Schedule II of contract NAS8-4016 during the period.

S-IC Program - Price analysis of The Boeing Company proposals for the adjustment of the contract value of contract NAS8-5608 was furnished in conjunction with the cost factor analysis performed by the Contract Cost Management Office, I-CO-AC, and the NASA Audit Office. Negotiated supplemental agreements relative to Schedule I of the contract

produced a net increase of \$4,915,653.00 in the established target cost for the calendar year. Supplemental agreements relative to Schedule IA resulted in a net decrease of \$1,320,543.00 for the period.

Computer and Support Services - Cost and price analysis of the contracts for Michoud support services and operation of the Slidell Computer Operations Office were evaluated as requested.

g. Review of Subcontracts and Purchase Orders

S-IB Program - Twenty-seven subcontracts and purchase orders, for a total net value of \$6,687,777.00, were reviewed.

S-IC Program - Ninety-eight subcontracts and purchase orders, for a total net value of \$10,112,441.00, were reviewed.

2. Programs Office activities for the period January 1, 1967 - June 30, 1967, were as follows:

a. Saturn I/IB, S-I/IB Program

1. The Chrysler Corporation Space Division contract NAS8-4016 administered by MAF was modified and increased in value during this reporting period in the amount of \$287,932.00 through Modification S/A MICH-108 (excludes Modification S/A 104 in the amount of \$2,400,000). This increased the contract value from \$329,183,075 to \$329,471,007 (includes \$6,366,551 of C of F). The increase in contract value was brought about by increasing Schedule I in the amount of \$222,660 and extending the effort of Schedule V in the amount of \$65,272 as follows:

- a. \$178,353 - Rework work orders and revision of delivery schedules.
- b. \$4,190 - Safety and arming device modification.
- c. \$23,010 - Design certification review.
- d. \$26,255 - Revisions to GFP and special directives.
- e. \$458 - Change to reliability program, amend DRL and amend Schedule VI - Logistics Support Program plan.

- f. \$2,200 - Shipment of S-IB-D/F and updating of Schedule I - S-IB Technical Work Statement.
 - g. \$7,492 - Verification of systems test and checkout matrices.
 - h. \$(32,640) - Decrease in estimated cost of plant modification (C of F).
 - i. \$22,500 - Increase plant modification - Alterations to Rocketdyne area.
 - j. \$(9,158) - Changes to the Document Requirements List (DRL) and reporting accident procedure.
 - k. \$65,272 - Extension of effort under Schedule V.
2. The Chrysler Corporation Space Division contract NAS8-5602(F) for facilities equipment reflected no change in contract value during this reporting period.
3. Fiscal year funding of the above contracts is as follows:
- a. Contract NAS8-4016:
 - (1) Incremental R&D funding during this reporting period was \$4,021,785 against FY 67 requirements (CPIF portion) for a FY 67 total of \$35,510,679. Included in this report figure was \$3,970,000 of Saturn IB AAP funding for a FY 67 total of \$7,470,000.
 - (2) C of F funding for plant modification was reduced in the amount of \$32,640.
 - b. Contract NAS8-5602(F). No change was made in the incremental funding of the contract during this reporting period.

b. Saturn V, S-IC Program

1. The Boeing Company Contract NAS 8-5608 administered by MAF was modified and increased in contract value during this report period in the amount of \$1,308,195 for Schedule I and \$120,050,417 for Schedule IA through Modification S/A MICH-533 (excludes Modifications S/A MICH-519, 520, and 523 in the amount of \$228,425.) This increased the contract value for Schedule I from \$858,362,707 to \$859,670,902 (includes \$13,740,152 of C of F) and Schedule IA from \$0 to \$120,050,417. The increase in contract value of \$121,358,612 provided, by Schedule, for the following:

a. Schedule I - \$1,308,195:

(1) \$273,912 - Replacement of transducers for S-IC pneumatic checkout racks; insulation protection of exposed ordnance in the S-IC forward skirt; and reduced fuel tank relief pressure setting.

(2) \$128,500 - Deletes S-IC Stage control sensors and modifies S-IC pneumatic console and adds GN₂ pressure drain capability.

(3) \$111,445 - Interconnecting cables to GSE at MTF, install GFE, rework propellant loading interface cable assembly and rework MTF support equipment for the 17th and 18th floor platforms.

(4) \$20,972 - Temporary storage of the S-IC-F.

(5) \$(780,053) - Credit for GFP S-IC Stage transporter spare parts, additions and deletions of GSE and converting S-IC common ordnance items from CRE to GFP, and miscellaneous GFP spare parts.

(6) \$42,949 - Compile F-1 engine documentation, modify SA-500-F at S-IC/S-II interface to accommodate increased wind load requirements.

(7) \$36,434 - Minor repair and alteration projects "Measurements Control Facility Improvements" and "Stage Test Facility (Building #420 Rehabilitation)."

(8) \$847,500 - Extends requirement for contractor modification and installation support S-IC-T, 1 and 2.

(9) \$(106,600) - Excludes Schedule I spares storekeeping function at KSC.

(10) \$271,358 - S-IC-T minimum changes list and adds U. S. Flag to S-IC paint pattern.

(11) \$32,240 - Deletion of fuel bubbling system and revise the S-IC pneumatic console fuel bubbling module.

(12) \$98,625 - Replace fastners on flow tubes for fuel prevalues and fuel emergency drain valves and protects instrumentation during separation.

(13) \$108,690 - Additional S-IC Program Deliverable Data.

(14) \$90,541 - F-1 Engine Thermal Conditioning System and replace Stage Fuel and Pressurization Check Valve in the MAB.

(15) \$40,666 - Rework Barge Poseidon; prepare Saturn V Test Reduction Report; and modify cable insulation for measurement C-9 and

C-10 on the F-1 Engine.

(16) \$250,685 - Accommodates Rocketdyne Servoactuator outrigger insulation; revises fuel density temperature measurement range; and revises slant release mechanism.

(17) \$(157,792) - Terminated Air-Research LOX Prevalves and deletes the Flight Combustion Monitor System on S-IC-6 and subsequent vehicles.

(18) \$328,161 - Change of S-IC-4 acceptance and delivery dates; activation acceleration of S-IC Test Complex at MTF; late availability of Government furnished S-IC Test Complex at MTF; and changes static firing requirement.

(19) \$(719,400) - Transfers the R-QUAL Test and Checkout Station to the Government.

(20) \$232,300 - Prevent shutdown of engine by prevalves, and improve Emergency Detection System Reliability.

(21) \$43,122 - Unplanned Event Records; inoperative thermocouple; Exterior Painting of Servo-Actuators; Incorporate Range of Temperature and Vibration Measurements; and revise Accelerometer Measurements for S-IC-1.

(22) \$113,940 - Shield S-IC Intertank Umbilical Carrier Assembly; hardware and Technical Assistance for the F-1 Engine Mock-up; and revise static firing viewing configuration of S-IC Stage TV System.

b. Schedule IA - \$120,050,417:

(1) \$120,137,500 - Fabricate, assembly, inspection and testing of S-IC Stages S-IC-11 through S-IC-15.

(2) \$(87,083) - GFP and miscellaneous spare parts.

2. Negotiations were completed during the report period for the procurement and fabrication of long lead time materials, parts and components, including engineering services for Stages S-IC-16 and S-IC-17 at a cost of \$2,275,000 under Contract NAS 8-19544. Contract approval is contingent upon receipt of necessary funding and procurement plan approval by NASA Headquarters. This is expected early in July.

3. Boeing Contract NAS 8-5606(F) for facilities equipment to support the S-IC Program was modified and increased during the report period in the amount of \$1,895,195.

4. Fiscal Year funding of Contracts NAS 8-5608 and NAS 8-5606(F) is as follows:

a. NAS 8-5608:

(1) Incremental funding by Schedule is as follows:

	<u>FISCAL YEAR REQUIREMENTS</u>	<u>THIS REPORT PERIOD</u>	<u>TOTAL FISCAL YEAR</u>
<u>Schedule I</u>	1966	\$(2,130)	\$(14,402,130)
	1967	<u>6,038,564</u>	<u>112,269,064</u>
	Net	\$ 6,036,434	\$ 97,866,934
<u>Schedule IA</u>	1967	\$18,500,000	\$ 18,500,000

(2) C of F funding for plant modification was not increased during the report period. Total funding to date is \$13,360,335.51.

b. NAS 8-5606(F) - Funding was provided in the amount of \$1,895,195. Of the amount, \$3,437.37 was a reimbursable order from GSA for the sale of four (4) obsolete forklift trucks.

c. Support Services

1. LTV, Range Systems Division, Contract NAS 8-17203 was modified in May 1967 and increased in estimated value from \$4,828,265 to \$4,834,235. Total maximum potential fee was increased from \$364,676 to \$365,213. This increase was for additional maintenance of government owned equipment. Incremental FY 67 funding during the report period amounted to \$412,637 which funded the contract through an estimated period of August 4, 1967, and also included award fee of \$48,439 for the period July 8, 1966, through January 7, 1967.

2. There was no change in the LTV Use of Facilities Contract, NAS 8-17213(F).

3. During this period, Mason-Rust Contract NAS 8-14017 was increased in value from \$21,902,570 to \$31,860,686 including base fee of \$339,149 and award fee of \$570,016. In addition, an award fee of \$224,134 for the period July - December 1966 further increased the contract value to \$32,084,820.

Incremental FY 67 funding increase of \$5,422,969 was provided for a FY 67 total of \$11,099,808. Included in this funding was the following: FY 65 C of F, in support of "other work", \$17,039; FY 66 R&D (Project 981), in support of "other work," \$11,606; FY 66 R&D (Project 932 and 933), prior year funds, \$1,120 and \$1,821; and FY 67 R&D (Project 124), in support of "other work", \$8,118.

4. Mason-Rust Contract NAS 8-4019(F) for acquisition and accountability of GFP was increased \$46,278 for a revised contract total of \$2,748,891. Funds were provided for the contract increase and the contract is fully funded at the close of the reporting period.

5. During this report period, funds were increased and/or decreased for the following purposes in support of Michoud Assembly Facility:

- a. \$(2,250) - Navy Printing for a FY 66 total of \$37,750.
- b. \$569 - RJ-1 Propellant for GFP to The Boeing Company, Contract NAS 8-5608, for a FY 67 total of \$569.
- c. \$650,000 - Utilities for a FY 67 total of \$1,325,000.
- d. \$325,000 - Communications for a FY 67 total of \$725,000.
- e. \$(1,000) - Packing and crating for a FY 67 total of \$3,000.
- f. \$(2,500) - Navy Printing for a FY 67 total of \$500.
- g. \$2,409 - Calibration services for test equipment at Computer Operations Office, Slidell, Louisiana, for a FY 67 total of \$5,009.

h. \$-0- - Maintenance services for cryptographic equipment for a FY 67 total of \$1,000.

i. \$-0- - Helium for GFP to The Boeing Company under Contract NAS 8-5608 for a FY 67 total of \$176,400.

j. \$-0- - Gasoline GFP to Mason-Rust under Contract NAS 8-14017 for a FY 67 total of \$20,428.

k. \$1,311 - Federal Telecommunications System (FTS) terminating at The Boeing Company, Seattle, Washington, and Michoud Assembly Facility, New Orleans, Louisiana, for a FY 67 total of \$33,172.

l. \$300 - Unloading Cargo Lift Trailer and F-1 Engine by U. S. Naval Construction Battalion Center, Gulfport, Mississippi, for a FY 67 total of \$300.

m. \$(69,681) - Roof rehabilitation and repair caused by Hurricane "Betsy" for a cumulative FY 67 total of \$2,366,567 (See Construction of Facility Summary for a detailed breakout.)

6. Obligations for digital equipment rental, EAM rental, and equipment maintenance, in support of the Computer Operations Office, during this period increased \$229,420 for a FY 67 total of \$5,229,795. Also during the report period, selected components of an IBM 7094 DCS System were purchased at a cost of \$349,233.

7. During this reporting period the Program Operating Plan (POP) 67-1b dated April 14, 1967, was submitted to MSFC. This submission provided time phasing of the FY 67 program by month (actual through March), refined FY 68 budget by month for the first six months and by quarter for the second six months, and revised FY 69 budget and runout requirements for R&D projects.

d. PERT

1. S-IB:

a. Chrysler Corporation Space Division did not implement additional networks during this report period, and none were reported complete.

b. PERT schedule assessment at the close of this report period forecasts vehicles S-IB-5, 7, 8, 9, 10, 11 and 12 to be delivered on or ahead of schedule.

c. CCSD PERT networks as of the end of this report period contain a total of approximately 500 activities against which bi-weekly schedule assessment is being made.

2. S-IC:

a. The Boeing Company implemented additional networks supporting the S-IC-11 through 15 vehicles. The incentive milestone "Completion of the Simulated Static Firing Acceptance Test" was achieved for the S-IC-5 vehicle on March 7, 1967.

b. PERT schedule assessment at the close of this report period forecasted the S-IC-3 to be delivered to KSC on the August 23, 1967 schedule date. The S-IC-4, 5, 6, 7, 8 and 9 vehicles are forecasted to be delivered to KSC on or ahead of schedule.

c. Boeing PERT networks as of the end of this report period contain a total of approximately 6,500 activities.

e. PERSONNEL STAFFING:

No change was made in the personnel staffing during the period of this report. Personnel staffing at the close of this report is six personnel. Subsequent to the close of this report, specifically on July 11, 1967, the Programs Office was eliminated by reorganization within the Michoud Assembly Facility.

f. CONSTRUCTION OF FACILITIES SUMMARY:

1. The following changes in C of F funding to Contract NAS 8-5608 with The Boeing Company were made during this report period. All changes were within Project 6303:

a. Roads and Parking Areas	-	\$(15,000.00)
b. Utility Connections	-	10,096.84
c. Site Development	-	(5,279.08)

d. Foundation for Control Building	-	17,000.00
e. Control Building	-	4,719.00
f. Instrumentation and Controls	-	(3,168.50)
g. Liquid and Gaseous Nitrogen System	-	(8,368.26)

2. The following changes in C of F funding to Contract NAS 8-4016 with the Chrysler Corporation Space Division were made during this reporting period. All changes were within Project 6309:

a. S-IB Hardware Reliability Facility	-	\$(2,933.53)
b. Additional Cranes for Production, S-IB	-	(479.60)
c. Manufacturing Area Offices	-	(6,632.72)
d. Additions to Existing Facilities	-	(22,594.08)

3. During this reporting period there were no funding actions, neither C of F nor R&D, affecting C of F projects relating to Mason-Rust contracts.

4. The following NASA (MSFC) contractors, whose activities are managed by MAF, were provided C of F funds as indicated:

<u>CONTRACTOR</u>	<u>CONTRACT</u>	<u>PURPOSE</u>	<u>PROJECT</u>	<u>FUNDING</u>
Johnson Service Company	NAS 8-17142	Utility Extension Alteration & Rehabilitation to support S-IB & S-IC Production	6314	\$3,856.00
South Central Heating & Plumbing Company	NAS 8-17881	Same as above	6314	15,370.11

<u>CONTRACTOR</u>	<u>CONTRACT</u>	<u>PURPOSE</u>	<u>PROJECT</u>	<u>FUNDING</u>
Fromherz Eng. & Associates	NAS 8-15042	Same as above	6314	\$8,462.43
deLaureal & Moses, Inc.	NAS 8-15079	Same as above	6314	6,668.68
Pittman Construction Company	NAS 8-15048	Facility Additions, Extensions, & Alterations to support S-IB & S-IC Production	6315	844.28
Quinn Construction Company	NAS 8-15026	Central Computer Facility Extensions & Alterations	6316	1,912.00

5. The following decreases to NASA contracts were made in support of damage to Michoud as a result of Hurricane "Betsy." The total cost of Hurricane "Betsy" (Project 3984) was \$2,366,566.

<u>CONTRACTOR</u>	<u>CONTRACT</u>	<u>AMOUNT</u>
Mason-Rust	NAS 8-4019(F)	\$(2,180.00)
Mason-Rust	NAS 8-14017	(65,371.69)
The Boeing Company	NAS 8-5608	(2,180.00)
		<u>\$(69,681.69)</u>

g. CONTRACTOR QUARTERLY REVIEWS:

1. The Seventeenth Quarterly Review was held on March 16, 1967 at KSC between The Boeing Company and the Michoud/MSFC management.
2. Two Quarterly Reviews were held during this report period (March 8, 1967, and June 7, 1967) between Chrysler Corporation Space Division and

the Michoud/ MSFC management. Both reviews were held at Michoud Assembly Facility, New Orleans, Louisiana.

h. USE OF MAF FOR OTHER THAN PRIME CONTRACT ACTIVITY:

1. During this and prior reporting periods, the Prime Contractors received the following contracts for "other work."

<u>CONTRACTOR</u>	<u>CONTRACT No.</u>	<u>CONTRACTING ACT.</u>	<u>SUPPORT COST</u>
CCSD	NAS 1-7303	Langley Research Center	\$ 1,697.00
CCSD	NAS 8-21107	MSFC	11,606.00
CCSD	DA 662W	Army Weapons Command	5,607.65
CCSD	NAS 9-7043	Manned Spacecraft Center	588.00
CCSD	PO #36-948426	GE/KSC Contract NAS W-410	310.00
CCSD	NAS 8-20256/60	MSFC	31,581.00
CCSD	PO #3460	Mission Valve & Pump Co.	126.00
CCSD	NAS 8-20786	MSFC	8,118.00
CCSD	NAS 8-22067	MSFC	75.00
BOEING	NAS 10-4141	KSC	17,039.00
BOEING	F-33657-67- C-1472	WRIGHT-PATTERSON Air Force	3,940.00

2. Investigation continued in the area of including "Commercial Work" under MAF Management Instruction M-I-18. A memorandum to General O'Connor on March 3, 1967 provided him with the prime contractor responses for utilizing the facility for commercial work and the remaining problems to be resolved.

i. FISCAL YEAR 1967 BUDGET PROBLEM:

The Michoud support services for FY 67 were completed at an estimated

cost of \$22.7 million which required \$21.5 million of new obligation authority. This activity was accomplished within the budget impact briefings presented to General O'Connor in August 1966.

CHAPTER VII

COMPUTER OPERATIONS

A. General

Range Systems Division, Ling-Temco-Vought Aerospace Corporation, continued as computer services contractor during 1967. At the end of the year, notification was received of a name change to Technical Services Division from Range Systems Division. Number of personnel employed ranged from 236 at the beginning of the year to 279 at the close; maximum number during the year was 294.

B. Third Generation Computer Operations

Preparation for the Third Generation Computer Systems dominated work efforts during 1967. Continuing efforts were also made in the accomplishment of normal digital, analog, hybrid, data reduction computation work in addition to administrative/management responsibilities. A contract with UNIVAC was signed by MSFC on August 1, 1966, for delivery of the system in three phases--June 1967, February 1968, and August 1968. The Phase I, Third Generation System, delivery date of June 1, 1967, was not met by UNIVAC. A recovery plan was formulated, negotiated, and approved by MSFC management. The plan essentially provided for the payment by UNIVAC of penalties in the form of free rental of UNIVAC 1108 computers to permit accomplishment of urgent workloads and as assistance in program conversion. Other benefits acquired by the Government included three months' free rent on Phase I beginning at acceptance date. By agreeing to a slippage of Phase I from June 1967 to February 1968, the Government took

advantage of approximately \$1 million in penalties. These penalties did not provide reimbursement for all indirect costs that resulted from the slippage, or permit as low a total budget cost for FY 68 and 69 as had been anticipated. The additional equipment provided rent-free by UNIVAC permitted release of a Honeywell 800 system on August 15, 1967, and by the end of the year, reduced weekend hours of operation on the IBM 7094 systems. Other major equipment changes included acquisition of a Government-owned IBM 7094 system (excluding tape drives) by transfer from Langley Research Center, which was used to replace installed rented components. A GE-235 computer disk file was installed the second week of January in response to Boeing requirement as stated by MSFC, Quality Laboratory. As a result of lease-versus-purchase study based upon a special price quotation, a Honeywell H-1800 system was purchased effective July 1, 1967. The IBM 7702 magnetic tape transceiver was discontinued September 30, 1967, but service was continued by use of a UNIVAC DLT 9 in conjunction with a previously installed U-1004. Computer rented components were released during the year as workload permitted. Equipment cost reductions in the amount of \$1,072,083 were submitted in 1967.

C. Manpower

The vacant position of Assistant for Analog remained unfilled throughout the year. One clerical employee resigned in September 1967, and the position remained unfilled for the remainder of the year. Reduction-in-force notice was received by Mr. John Kearney, Assistant for

Management and Engineering, but his departure was delayed until after the end of the year (February 24, 1968). In effect, three of the eight authorized positions were lost during the year 1967.

Michoud Assembly Facility

Summary of Major Activities in 1967

Public Affairs Office

	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>TOTAL</u>
News Releases & Special Articles	11	5	8	7	2	8	9	4	2	5	3	9	73
Still Pictures	5	-	4	2	2	3	5	4	-	2	3	4	34
Plant Tours	46	41	65	61	64	59	45	49	29	40	45	41	585
VIP Briefings	3	8	5	5	4	7	4	2	5	2	1	2	48
Speeches	3	3	11	6	3	2	3	-	-	5	-	-	36
Displays	-	-	-	1	-	-	-	-	-	1	-	-	2
Releases, Speeches, Technical Papers, Films, Reviewed	16	18	3	9	17	11	10	3	6	6	5	9	113
Fan Mail Answered	39	78	16	36	75	22	31	19	14	33	51	15	429
Brochures								1890	343	714	768	1240	4955
Publications Distributed								100	128	135	163	55	581
NASA Films Shown	95	92	141	111	116	37 ⁵⁷	20	30	40	92	38	24	836
Viewers	-	-	-	-	-	-	863	698	1200	890	3710	549	7910

VISITORS:

Public Affairs Off.	1150	1267	1932	1933	1941	2011	1651	1893	329	*16581	717	**19225	50630
(Press)	(5)	(10)	(2)	(2)	(2)	(32)	(2)	(1)	(2)	(5)	(6)	(72)	(141)
(Foreign)	(37)	(212)	(185)	(103)	(196)	(98)	(96)	(54)	(55)	(83)	(22)	(20)	(1161)
(VIP Visitors)							(10)	(5)	(9)	(7)	(1)	(22)	(54)
Michoud Total	2873	2692	3649	3750	4025	3960	3441	3716	1657	18000	2661	21804	72228

MINORITY ACTIVITIES

(Speeches)	-	-	350	-	300	-	-	-	-	-	-	-	650
(Tours)	-	164	161	63	100	110	715	452	5	86	14	60	1870
(Displays)	-	-	-	-	-	-	-	-	-	-	-	-	-

*15,900 NASA-contractor open house

**18,000 Presidential Visit

44X3