MSFC
MANNED SPACE FLIGHT
PROGRAM STATUS
FOR
JANUARY 29, 1963
MANAGEMENT COUNCIL MEETING

National Aeronautics and Space Administration

NASA

Form 454 (Revised September 1961)

MSFC

MANNED SPACE FLIGHT

PROGRAM STATUS

FOR

PRESENTATION TO THE

MANAGEMENT COUNCIL

January 29, 1963

January 29, 1963

Note:

This is material prepared in support of Dr. von Braun's presentation for the January 29, 1963, Management Council Meeting - Agenda Item 1, "MSFC Status Report".

Presentation material consists of slides, a film report and narrative back-up information to support the presentation.

OUTLINE

MSFC MANNED FLIGHT PROGRAMS

		Number of Slides
1.	SATURN	
	SATURN I	4 (Plus Film, 14 min.)
	SATURN I-B	2
	SATURN V	2
2.	INSTITUTIONAL	3

SLIDES & FILM

1. SATURN I Dynamic Test Program
2. SATURN I/S-IV Battleship Testing
3. SATURN I/S-IV Test Plan Revisions
4. Micrometeoroid Experiment Contract
5. Film - Base Heating

SATURN I

SATURN I DYNAMIC TEST PROGRAM

- PHASE I DYNAMIC TESTING BEGAN AT MSFC ON JANUARY 8, 1963. DYNAMIC VEHICLE BOOSTER WILL BE SHIPPED TO AMR FOR FACILITIES CHECKOUT OF LC-37B IN LATE MARCH.

- PHASE II DYNAMIC TESTING WILL BE CONDUCTED USING S-II STAGE, INSTRUMENT UNIT AND PAYLOAD BODY DURING THIS PERIOD.

- PHASE III TESTING WILL BEGIN WHEN BOOSTER IS RETURNED TO MSFC IN LATE SECOND QUARTER 1963.

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SATURN I S-IV BATTLESHIP TESTING

- ALL RL10 A-3 ENGINES HAVE BEEN INSTALLED ON BATTLESHIP STAGE.
- COLD HELIUM BUBBLING TESTS SUCCESSFULLY CONDUCTED WEEK OF JANUARY 7.
- TURBINE SPIN-UP TESTS SUCCESSFULLY CONDUCTED ON JANUARY 17.
- HOT FIRING TESTS STARTED JANUARY 24.
- DAC REQUEST TO USE SACTO TEST STAND I THROUGH MARCH 1963 APPROVED.

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SATURN I S-IV TEST PLAN REVISIONS

- CHANGES TO S-IV TEST PLANS DUE TO EXTENSION OF BATTLESHIP PROGRAM.
  - ALL-SYSTEMS VEHICLE WILL BE TESTED ON SACTO TEST STAND 2B. VEHICLE WILL BE REMOVED IN LATE APRIL FOR ACCEPTANCE TEST OF S-IV STAGE FOR SA-5.
  - ALL-SYSTEMS VEHICLE WILL BE REINSTALLED FOR FIRST FIRING IN JUNE 1963.
  - S-IV STAGE FOR SA-6 WILL BE FIRED ON SACTO TEST STAND 1.

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MICROMETEOROID EXPERIMENT CONTRACT

- MICROMETEOROID EXPERIMENT APPROVED BY HEADQUARTERS ON DECEMBER 21, 1962. MSFC ISSUED INVITATIONS FOR BID ON SAME DATE.
- THIRTEEN BIDS RECEIVED ON JANUARY 17, 1963. EVALUATION OF BIDS WILL BE COMPLETED BY FEBRUARY 2.
- PRESENTATION TO MR. WEBB SCHEDULED FOR FEBRUARY 4.
- CONTRACT AWARD PLANNED FOR MARCH 1, 1963.

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BASE HEATING FILM

This fourteen minute film covers the problems associated with base heating in the design and development of rocket vehicles. The efforts in the area of base heating consists of analytical studies, materials testing and evaluation, and model and full scale testing. Much has been learned about base heating phenomena, which has been reflected in the recent successful Saturn launches and which will provide data for future flights.

SATURN I PROJECT NARRATIVE

Slide
1. SATURN I DYNAMIC TEST PROGRAM

The SATURN I Dynamic Test Program (Phase I) began at MSFC on January 8, 1963. The Phase I program, to determine bending modes in pitch and yaw direction, torsional modes, resonance, and frequency responses, is scheduled to be completed by mid-March. At this time, the booster will be shipped to AMR for facilities checkout of Launch Complex 37B. Phase II will be conducted at MSFC using the S-IV-D5, [illegible] instrument unit, and payload body during this period. The booster is scheduled to be returned to MSFC late in the second quarter 1963. Phase III testing will begin when the vehicle has been reassembled.

Slide
2. SATURN I/S-IV BATTLESHIP TESTING

All RL10 A-3 engines have been installed on the Battleship stage. Cold helium bubbling tests were successfully conducted during the week of January 7. Turbine spin-up and hot firing tests were delayed in early January when technical problems such as seal leakage of the control helium system developed. Turbine spin-up tests were successfully conducted on January 17, and hot firing tests started January 24. To permit completion of the battleship test program and to meet the SA-5 launch schedule, MSFC has approved DAC's request for use of SACTO Test Stand 1 through March 1963.

Slide
3. SATURN I/S-IV TEST PLAN REVISIONS

Extension of the Battleship program at SACTO Test Stand 1 has necessitated changes in S-IV test plans. The All-Systems vehicle will undergo tests on SACTO Test Stand 2B rather than Stand 1. The propellant loading tests of the All-Systems (without engines) will be temporarily interrupted in late April to permit acceptance firing tests of the S-IV stage for SA-5. Following acceptance of S-IV-5, the All-Systems will be reinstalled and the first firing conducted in June. The S-IV stage for SA-6 will be fired on SACTO Test Stand 1.

Slide

4. MICROMETEOROID EXPERIMENT CONTRACT

Following approval of the micrometeoroid experiment by NASA Headquarters on December 21, 1962, MSFC issued invitations for bid on December 21, 1962. On January 17, 1963, 13 bids were received and are now under evaluation. It is expected that evaluation will be completed by February 2. Presentation of the results of the evaluation will be made to Mr. Webb on February 4. Contract initiation is planned for March 1, 1963.

Film

5. BASE HEATING FILM

This fourteen minute film covers the problems associated with base heating in the design and development of rocket vehicles. The efforts in the area of base heating consists of analytical studies, materials testing and evaluation, and model and full scale testing. Much has been learned about base heating phenomena, which has been reflected in the recent successful Saturn launches and which will provide data for future flights.

SATURN I-B

SLIDES

1. CCSD Contract Modification

2. SATURN I-B Dynamics Test Booster

CCSD CONTRACT MODIFICATION

- SATURN I-B/S-I PROCUREMENT PACKAGE SENT TO HEADQUARTERS FOR APPROVAL JANUARY 8, 1963. DOCUMENT WILL MODIFY BASIC CONTRACT TO INCLUDE 12 SATURN I-B BOOSTERS.

- WORK STATEMENT IS BEING PREPARED WITH FIRM DEFINITION OF VEHICLE DESIGN. STATEMENT WILL BE AVAILABLE TO P&C THIS WEEK.

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SATURN I-B DYNAMICS TEST BOOSTER

- THE SATURN BLOCK II DYNAMICS BOOSTER WILL BE MODIFIED FOR SATURN IB BOOSTER. DYNAMIC TESTING AT MSFC.

- SATURN I-B/S-I WEIGHT REDUCTION PROGRAM IS NOT EXPECTED TO AFFECT DYNAMIC RESPONSE.

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SATURN I-B PROJECT NARRATIVE

Slide
1. CCSD CONTRACT MODIFICATION

On January 8, 1963, MSFC sent the S-I/SATURN I-B procurement package to NASA Headquarters for approval. The document calls for a modification to the basic contract (CCSD/NAS-8-4016) to include 12 SATURN I-B boosters to be delivered between the second quarter of Calendar Year 1965 and the fourth quarter Calendar Year 1967.

MSFC is presently writing the Technical Work Statement giving a firm definition to the areas of vehicle redesign. The statement is expected to be available to MSFC Procurement & Contracting Office during the week of January 27.

Slide
2. SATURN I-B DYNAMICS TEST BOOSTER

The SATURN SA-D5 booster presently being used for Dynamic testing at MSFC will be modified for SATURN I-B booster dynamic testing upon completion of SATURN Block II dynamics testing. Modification, to be accomplished on the dynamic test stand, will consist of replacing the present spider beam with a revised unit which will allow installation of the S-IVB stage.

The upper stage hardware (S-IVB and I.U.) is planned for use initially on SATURN I-B and later on the SATURN V Dynamics Vehicle. The SATURN I-B/S-I Stage weight reduction program is not expected to significantly affect the dynamic response.

SLIDES

1. SATURN V/S-IC STAGE

2. SATURN V/S-II STAGE

SATURN V

SATURN V S-IC STAGE

- NEGOTIATIONS WITH BOEING ON LONG TERM CONTRACT COMPLETED. CONTRACT PROPOSAL PACKAGE SENT TO HEADQUARTERS FOR APPROVAL JANUARY 15, 1963.

  IMPACT STATEMENT FOR PLAN V INCLUDED SINCE CONTRACT NEGOTIATED FOR PLAN II. BOEING'S BUDGETARY & PLANNING ESTIMATE FOR PLAN V BEING REVIEWED BY MSFC.

- CONSTRUCTION CONTRACT AWARDED TO ROSS CORPORATION, NEW ORLEANS IN DECEMBER 1962 FOR MICHOUD VERTICAL ASSEMBLY BUILDING. COMPLETION SCHEDULED FOR OCTOBER 1963.

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SATURN V S-II STAGE

- LH_2 THERMAL STRATIFICATION PROBLEM DISCOVERED BY S&ID. APPEARS THAT A 4.3° TEMPERATURE DIFFERENTIAL EXISTS THROUGHOUT TANK INSTEAD OF 1° DESIGN SPECIFIED. 13,000 POUNDS HYDROGEN WILL BE THERMALLY TRAPPED AT END OF BOOST PERIOD.

- MSFC PRESENTLY REVIEWING S&ID RECOMMENDATIONS TO:
  1. ADD STEP PRESSURIZATION SWITCH TO OPERATE AT 36 PSIA.
  2. INCREASE PROPELLANT LINE DIAMETER TWO INCHES.

- WEIGHT PENALTY OF THESE RECOMMENDATIONS IS 1500 POUNDS - 700 TRAPPED PROPELLANT, 800 PROPELLANT LINES.

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SATURN V PROJECT NARRATIVE

Slide
1. SATURN V/S-IC STAGE

Boeing and MSFC negotiations on the long term contract (NAS8-5608) proposal have been completed. The contract proposal package, including a Boeing impact statement on incorporating Plan V into the contract, was forwarded to NASA Headquarters for approval on January 15, 1963. The impact statement was included because the contract negotiations were based on Plan IV. Boeing's Budgetary and Planning estimate for modifying the contract to Plan V has been received by MSFC and is being reviewed by the Saturn Systems Office.

In mid-December 1962, MSFC awarded a contract to the Ross Corporation, New Orleans, Louisiana to construct an S-IC Stage vertical assembly, hydrostatic test, and cleaning facility at the Michoud Operations plant. The steel frame, corrugated asbestos-covered building will permit Boeing to assemble, hydrostatic test, and clean S-IC Stages in one location. Building completion is scheduled for October 1963.

Slide
2. SATURN V/S-II STAGE

S&ID recently obtained information indicating that there is an S-II Stage LH_2 Tank thermal stratification problem. It appears that a 4.3 degree temperature difference exists throughout the tank instead of the design specified one degree. This difference will thermally trap 13,000 pounds of hydrogen at the end of the S-II boost period. After a preliminary investigation of several possible solutions, S&ID recommended adding a step pressurization switch to operate at 36 psia and increasing the propellant line diameter two inches. The weight penalty of this solution, which is being reviewed by MSFC is 1500 pounds: 700 pounds of trapped propellant and 800 pounds from the increase of the propellant lines.

INSTITUTIONAL

FY-63 TOTAL PROGRAM & FUND STATUS

JANUARY 23, 1963

DOLLARS IN THOUSANDS	PROGRAM AUTHORITY			FUNDS	
	ANNUAL PLAN	APPROVED TO DATE	COMMITMENTS TO DATE	ALLOTTED TO DATE	OBLIGATIONS TO DATE
RESEARCH, DEVELOPMENT & OPERATIONS	1,036,635	945,810	595,845	943,346	427,073
ASSOCIATE ADMINISTRATOR	123,157	111,500	72,215	109,422	61,622
PERSONAL SERVICES & BENEFITS	72,000	72,000	38,000	69,922	38,000
TRAVEL	3,000	3,300	1,851	3,300	1,601
INSTITUTIONAL SUPPORT	47,357	36,200	32,364	36,200	21,821
OFFICE OF MANNED SPACE FLIGHT	778,475	756,730	461,414	756,630	318,784
OFFICE OF SPACE SCIENCES	95,049	40,353	37,052	40,353	35,462
OFFICE OF ADVANCED RESEARCH & TECHNOLOGY	21,545	21,040	15,494	20,754	5,842
OFFICE OF TRACKING & DATA ACQUISITION	3,150	2,450	92	2,450	0
OFFICE OF APPLICATIONS	200	50	8	50	8
SUPPORT OF OTHER NASA AGENCIES	12,874	11,502	9,570	11,502	5,355
SUPPORT OF OTHER AGENCIES	2,105	2,105	0	2,105	0
CONSTRUCTION OF FACILITIES	172,475	131,600	58,092	131,600	43,741
MARSHALL SPACE FLIGHT CENTER	40,654	34,257	15,278	34,257	7,057
MICHOUD	18,294	18,294	7,821	18,294	7,695
MISSISSIPPI TEST FACILITY	73,020	43,772	13,693	43,772	9,694
VARIOUS LOCATIONS	40,507	35,277	21,300	35,277	19,285
GRAND TOTAL	1,209,110	1,077,410	653,937	1,074,946	470,814
PER CENT OF ANNUAL PLAN	—	89	54	89	39

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FY-63 OMSF PROGRAM & FUND STATUS

JANUARY 23, 1963

DOLLARS IN THOUSANDS	PROGRAM AUTHORITY			FUNDS	
	ANNUAL PLAN	APPROVED TO DATE	COMMITMENTS TO DATE	ALLOTTED TO DATE	OBLIGATIONS TO DATE
OFFICE OF MANNED SPACE FLIGHT	778,475	756,730	461,414	756,630	318,784
MANNED SPACECRAFT SYSTEMS	55,221	55,221	36,518	55,221	30,486
APOLLO VEHICLE PROCUREMENT	55,221	55,221	36,518	55,221	30,486
LAUNCH VEHICLE & PROPULSION SYSTEM	723,254	701,509	424,896	701,409	288,298
SATURN I DEVELOPMENT	190,710	190,710	146,072	190,710	100,270
SATURN V DEVELOPMENT	346,754	346,754	177,638	346,754	115,299
NOVA	3,500	3,500	3,314	3,500	2,109
SATURN I-B DEVELOPMENT	18,750	18,750	6,362	18,750	3,400
H-1 ENGINE DEVELOPMENT	5,260	5,260	4,985	5,260	2,600
RL-10 (A-3) ENGINE DEVELOPMENT	32,645	32,645	26,862	32,645	16,311
F-1 ENGINE DEVELOPMENT	50,800	50,800	33,191	50,800	23,960
J-2 ENGINE DEVELOPMENT	44,542	44,542	24,300	44,542	22,863
LAUNCH VEHICLE SUPPORTING TECHNOLOGY	8,550	6,450	794	6,450	435
PROPULSION SUPPORTING TECHNOLOGY	2,300	1,980	1,360	1,980	979
LUNAR LOGISTICS SYSTEMS	18,000	0	0	0	0
M-1 ENGINE	18	18	18	18	52
SYSTEMS ENGINEERING	1,425	100	0	0	—

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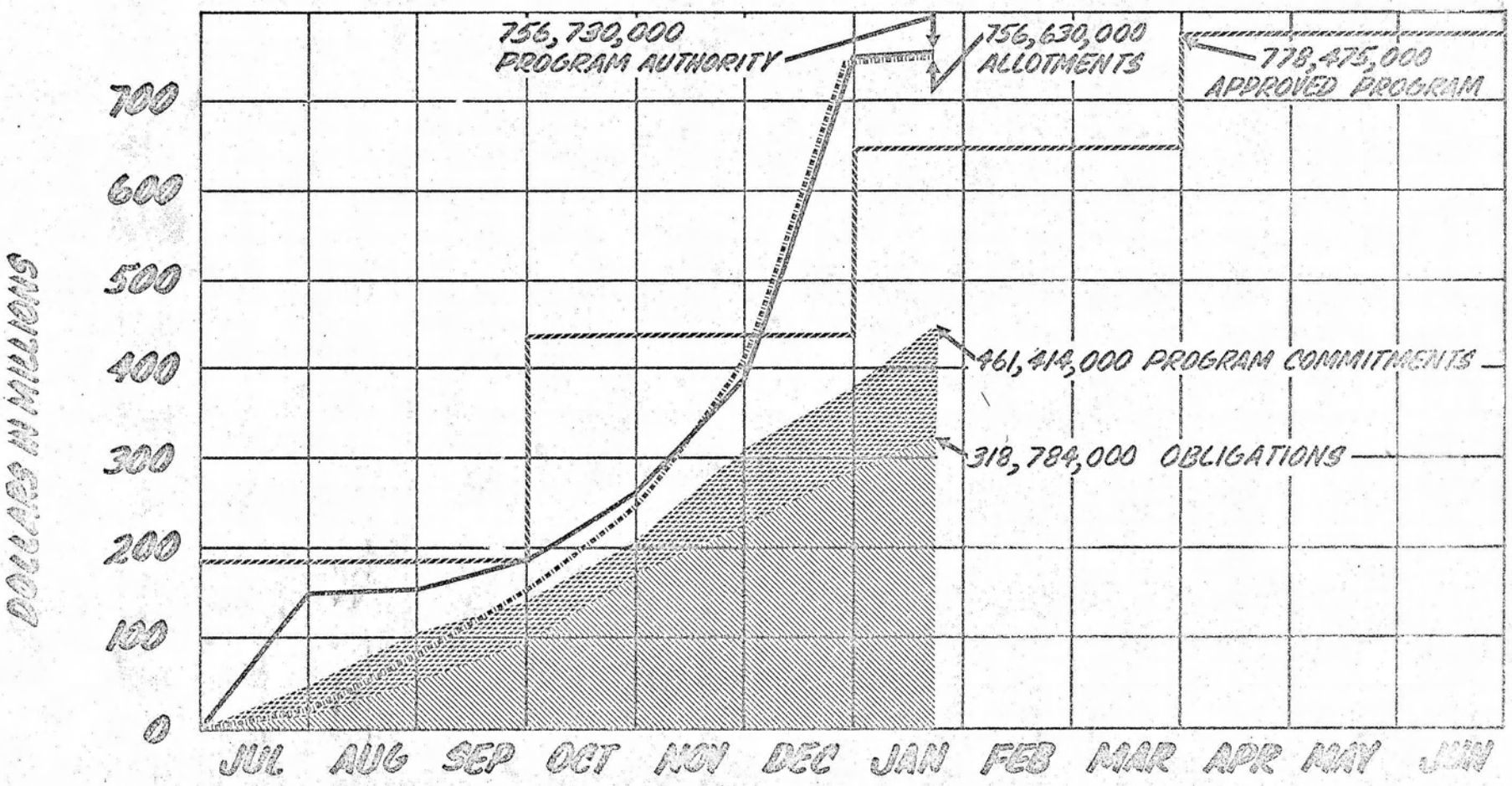
FY-63 FUND STATUS

OMSF R&D PROGRAM



NOTE: EXCLUDES SUB-ALLOTMENTS ISSUED AND RECEIVED

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INSTITUTIONAL NARRATIVE

Slide

1. FY-63 TOTAL PROGRAM AND FUND STATUS, JANUARY 23, 1963

This slide summarizes actual Program Authority and allotments received and program commitments and obligations incurred through January 23, 1963 for each funding source and Headquarters Program Office.

A. General

MSFC has been alloted $1,075 million or 89% of MSFC FY 1963 fund requirements and obligated $471 million or 44% of funds allotted as of January 23, 1963. Commitments to date total $654 million or 61% of the program authority received of $1,077 million.

There are a number of reasons why the current obligations are not higher than shown. These are summarized briefly as follows:

1. We operated under a Congressional continuing resolution for the first four months of the fiscal year and therefore had to fund all contracts and activities incrementally.

2. The FY 1963 Appropriation Bill was not passed until October 3rd, 1962, therefore, the Program Offices could not furnish MSFC an annual operating plan for planning and execution.

3. Final plans and a major portion of our program authority were not received from most Headquarters Program Offices until late December 1962 and early January 1963.

Now that we have received firm annual program plans and practically all of our program authority, we have established definite plans to commit all major contractual R&D funds by March 31, 1963 and major C of F Project actions by April 15, 1963. Obligational levels may lag possibly two to six weeks, dependent upon the type of procurement action and timing in connection with preparing the necessity paper work and distribution of procurement documents to all parties involved for recording and reporting.

B. Personnel Services and Benefits

Personnel Services and Benefits are committed and obligated at time salaries and wages are earned. Therefore, this is not the type of expense where obligations can be accelerated.

As of January 23, 1963, we had obligated #38 million or 52% of the $72 million available at a point when 56% of the year had elapsed. Actual costs will increase substantially in the second half, because of higher personnel levels and higher rates of pay, since the pay raise will be in effect all of the second half of the year. In the first half it was effective from mid-October.

The $72 million allotted is sufficient to fund the established personnel ceiling of 7,357 (Mr. Holmes memorandum of January 15, 1963, subject "New Personnel Controls and Ceilings for FY 1963").

Current MSFC ceilings are summarized as follows:

Base Permanent	7,067
Advanced Hire - College Graduates	80
Temporaries (Co-op's, Summer Students, & temporaries)	210
TOTAL CEILING	7,357

Previously only permanent personnel were subject to ceiling. Now all personnel are subject to ceiling, which practically eliminates the summer student program. We now have on board approximately 168 co-op's and 142 temporaries or a total of 310 or 100 over the authorized ceiling. The summer student program has been a source for obtaining future permanent employees and provided assistance during periods when a number of permanent employees are on vacation. The whole area is being reviewed to determine appropriate action.

C. Travel and Institutional Support

In these two areas we have experienced serious funding shortages. Headquarters has verbally agreed to provide an additional $500,000 for travel and an additional $3,000,000 for Institutional Support. We will endeavor to live within the funds allotted but anticipate problems in the Institutional Support area, especially, in the supply area.

FY-63 TOTAL PROGRAM AND FUND STATUS, JANUARY 23, 1963
CONT'D

D. OMSF

Our plans presently provide for committing all of the major contracts in the OMSF area by March 31st. The present funding level will provide for an appropriate reorder date of July 1, 1963. Since every "nickel" is programmed, we plan to have all funds obligated relatively early in the fourth quarter so we can proceed to prepare the necessary paper work to extend or amend all contracts as of July 1, 1963. This represents a substantial workload. Plans are progressing satisfactorily since all OMSF programs have been released to us with the exception of S R & T (partial release), Lunar Logistics System (unapproved program - no release) and Systems Engineering (unapproved program - no release).

E. OSS

In the OSS area, we are still planning on transferring the majority of the program (Agena Procurement) to LeRC. LeRC has requested that we fund the Agena Procurement Orders for the 3rd Quarter prior to making the transfer. We are now waiting for OSS to fund this area for the 3rd Quarter, so that we may fund the orders and transfer the program. Once this action is taken and the program transferred to LeRC, the OSS annual plan will be reduced to a level approximating $14 million.

F. OART

OART commitments and obligations are progressing well, based on the manner in which OART released program and funds to us. Some $12 million of the program which has been released to us, has been released since the end of November, with some $8.5 million of it being released as recently as this month.

G. OTDA

We are almost 7 months into FY 1963, yet the OTDA obligations are zero. The reason is that OTDA did not release their program and their initial funds to us, until November 30, 1962. Therefore, we have not had the time necessary to execute the planned contracts to the point of recorded obligations.

Slide
2. FY-63 OMSF PROGRAM AND FUND STATUS, JANUARY 23, 1963

This slide summarizes the Program Authority approved to date for OMSF Projects and the allotments, commitments and obligations through January 23, 1963.

The Commitment and Obligation Levels shown are in line with plans and we plan to have all major contractual commitments completed by March 31 and 95% of the funds obligated by April 15.

The funds available will only carry us through June 30, 1963. The balance of the year will be devoted to processing the necessary contract amendments and associated paper work up to the point of obligation so appropriate action can be accomplished to extend necessary contracts July 1, 1963.

Slide
3. FY-63 FUND STATUS, OMSF R&D PROGRAM

This slide graphically summarizes the FY-63 fund status in total dollars for the OMSF R&D Projects.