NOTES 5-4-64 BELEW

B 5/4

*fw H-1 ENGINE PROGRAM

Three production engines calibrated at 200K were accepted in April 1964. The remaining three engines assigned to S-IB-201 will be delivered in May 1964. Retrofit of the main propellant valves and LOX high pressure ducts of these engines will begin during the next report period with subsequent delivery to Michoud.

Gen. Phillips has promised limited funding approval of the modified injector and half-aspirator by May 1, 1964.

The first modified injector, designed to increase the specific impulse of the engine, will be tested the week of May 4, 1964.

John Hill, of our Michoud Engine Office, conducted a coordination meeting between Chrysler Corporation Space Division and Rocketdyne on the design of the inboard engine turbine exhaust duct on April 30, 1964.

*fw J-2 ENGINE PROGRAM

Engine 2003, the first fireable J-2 engine, was accepted by MSFC on April 29. It is being shipped to Douglas Aircraft Company, Inc., at Sacramento for use in the S-IVB Battleship program.

Engine 2004, intended for use in the PFRT program, suffered damage in its initial acceptance test. It appeared to be a heat exchanger leak. Initiation of the PFRT program will be delayed approximately two weeks, awaiting final assembly of engine 2005.

*fw F-1 ENGINE PROGRAM

The F-1 Turbopump Ad Hoc Committee, which consists of representation from Lewis Research Center and MSFC, reviewed the recent LOX pump explosion with Rocketdyne at Canoga Park on April 28, 1964.

At the present time the LOX pump impeller is suspected as the main cause of the explosion.

Engine and turbopump testing will not be resumed at either Huntsville or Edwards until a number of action items have been completed. These items include such things as LOX cleanliness checks of the Rocketdyne facilities for indications of contamination in the LOX system, disassembly of all LOX pumps and inspection for signs of rubbing, cracks, cleanliness, better test stand instrumentation, etc.

In addition, when testing resumes, it will be on the basis of running the turbopump under a 5800 rpm redline with the replacement of the inducer and impeller after 1000 seconds. Also, as soon as possible, all turbopumps will be retrofitted with LOX impellers that have been shot-peened. On the basis of the above, testing will probably resume at Rocketdyne in two weeks, with resumption at MSFC after receipt of a shot-peened impeller.

RL10 ENGINE PROGRAM

All six RL10 engines performed satisfactorily on the S-IV-7 acceptance firing last Wednesday.

Three tests of an RL10 thrust chamber were run last week using fluorine and hydrogen in a mixture ratio of 5.5 to 1. The longest test was 4.5 seconds which ran to fluorine depletion. This work is being done under an OART sponsored technology program.

The interstage shroud being designed in the Saturn IB third stage study is being made to accommodate the higher I_{sp} RL10 version needed for Centaur. (2.6 inches longer than the standard RL10)

Lee B

What's that? I know what a pea shooter is!

B

B 5/4

NOTES 5-4-64 CLINE

*Fw 1. S-II LH_2 TANK INSULATION FOR VEHICLES SA-501, SA-502, AND SA-503: In recent tests under simulated maximum vehicle flight conditions, several samples of the insulation have failed. Space and Information Systems Division (S&ID), North American Aviation, Inc., has attributed some of the failures to over age adhesives. The other failures are not explained and may be due to marginal designs. A meeting to review this situation is tentatively scheduled for 5-6-64 at S&ID.

2. MICROMETEOROID CAPSULE: The Saturn/Apollo Mechanical Integration Panel Ad Hoc Group convened 4-27-64 to discuss refurbishment of Boilerplate-9. Manufacturing Engineering Laboratory does not want to handle Boilerplate-9 Command Module refurbishing. An inspection team was formed to review Boilerplate-9 and make recommendations as to where and what refurbishing and updating will be done.

WKVers: Why not? May be the only way to get in on time! B

3. INSTRUMENT UNIT: International Business Machines, Inc. (IBM) procurement effectivities for Propulsion and Vehicle Engineering Laboratory components were resolved last week. IBM will have complete procurement responsibility for the following and subsequent vehicles: Environmental Control System SA-204/501, Air Bearings Supply SA-204/501, Structure SA-202/501.

4. DOUGLAS AIRCRAFT COMPANY (DAC) WELDING STUDY: Because of recurring cracks in weldments in S-IV stages, DAC has been asked to evaluate the relative merits of MIG and TIG welding on a priority basis. This is based on the Materials Division evaluation of TIG welding as being superior to MIG welding for the S-IV and S-IVB bulkhead applications. If pursued vigorously, the DAC study would allow a decision to be made by 7-1-64.

5. J-2 PRELIMINARY FLIGHT RATING TEST ENGINE DAMAGED DURING FIRST ACCEPTANCE TEST: Holes were burned through the thrust chamber and exhaust manifold and other tubing was damaged. Preliminary investigations indicate that a leak in the LOX heat exchanger caused the damage.

6. SUBLIMATOR TO BE USED AS INSTRUMENT UNIT HEATSINK: The decision has been made to use the environmental control system water sublimator on the Saturn IB and Saturn V Instrument Unit. It has been recommended that the water boiler contract with Fairchild-Stratos be terminated.

7. CRACKED SLEEVES, S-IV-6: Eight aluminum sleeves (2024) on S-IV-6 were found to have stress corrosion cracks. This probably resulted from improper heat treatment (slow cooling). Approximately 30 lines (1/2 inch, 5/8 inch, and 3/4 inch) are being changed and new sleeves installed. No delay in schedule is expected.

Fred C.
Here we go again!
What happened? B

Notes 5/4/64 CONSTAN

B 5/4

1. SATURN I & IB

SA-8 vehicle has been placed in the static test tower at MSFC and is undergoing installation and preparation for static test.

SA-10 was placed in the checkout position and is being prepared for pre-static firing testing.

2. SATURN SIC

The SIC Quarterly Management and Technical Progress Review was held at Michoud Operations on April 28-29, 1964.

Capacity for Chemical Milling of gore segments by vendors has been determined to be adequate; therefore, Boeing has been requested to discontinue efforts to provide this capability at Michoud.

Reprogramming to fully fund the tank welding position and the vertical assembly station of the Vertical Assembly Building has been completed. Boeing has the money, bids have been opened, and a contract will be let on the accelerated schedule since the cost of the acceleration is minor ($5,000).

3. GENERAL

An inspection for compliance by the Boeing Company under the Equal Employment Opportunity Program was conducted by Mr. Robert Greenwald, Central Contract Management Region, Dallas District, USAF. He was accompanied by Mr. Guy Arnett, Contract Management Procurement Division, NASA Headquarters, and Mr. Howard Blair, Purchasing Office, MSFC. Their comments indicate that their formal report will show that compliance is excellent.

Mr. Ernest Brackett, Asst. Deputy Associate Administrator (Procurement Policy), NASA Headquarters, was given a tour and briefing on Michoud Operations on Wednesday, April 29, 1964.

7w 5/4

B 5/4

NOTES 5-4-64 DANNENBERG

Negative Report

cy to B. Slattery
SN/cf

Fw 5/4

NOTES 5/4/64 FORTUNE

B 5/4

Bart S.
Request your comments
B

1. Public Speaking Engagements - may be curtailed by possible civil rights considerations, we hear. This past week I talked to over 100 key business and industrial leaders in Jackson, four additional talks being given to other Mississippi audiences by our PIO and contractor personnel. Today, in the same city, Joel Meriweather and I addressed two clubs at lunch, later appear on television for the Savings Bond Drive. Distinction between these and so-called segregated groups, non-educational or entertainment type speeches will require close coupling between Bart Slattery and myself. I sincerely believe all our public discussions are educational. We are gaining calm, dispassionate acceptance of equal employment opportunity at the site, but if we no longer can explain NASA, MSFC, Mississippi Test Operations to our neighbors, we will aggravate not ameliorate conditions here for our employees, both white and dark.

2. MSF Field Center Development Personnel: Jack Sperry and Ken Graham visited MTO Wednesday for indoctrination. They were interested as to how Dr. Silverstein's visit might affect our future. I briefed them on present plans, told them MSFC would, within personnel capabilities, do whatever NASA Headquarters deemed best in regards to FLOX testing and, although I felt it might jeopardize the Saturn V schedule, Heimburg had some ideas such as directing the exhaust gases upwards into the atmosphere that would reduce firing hazards. Mr. Hammond Smith, Regional Civil Service Director from Atlanta, came down to see us the same day with Art Sanderson, joining in the slide presentation and tour of construction sites.

3. Labor Disputes: Between operating engineers union, Farrell Construction Company and Chaney and James were mediated Thursday and Friday. Dispute is centered around hiring procedures practiced by the two companies. Union demands that only those workers referred by their hiring hall will be employed. Chaney and James agreed to this Friday. Farrell has not yet indicated concurrence. Since the operating engineers run dozers, drag lines and Euclids, eventually all jobs could be shut down if strike does occur. Bob Shepherd from Paul Styles office is at the site working on the problem along with the NLRB mediator.

4. MTF Telephone: Tentative agreements have been reached with Southern Bell Telephone & Telegraph Company of Mississippi for providing administrative telephone services at MTF. NASA Headquarters, GSA, MSFC and MTO communications personnel participated in negotiations on April 27, 1964. General Electric will install, operate and maintain all circuits within the Saturn V test complex.

Jul 3/4
B

NOTES 5/4/64 GEISSLER

B 5/4

Dave Newby
I think this calls for some interim measure to close the gap. (Continuation of Northrop or Lockheed support for a while?) B

1. Chrysler Aeroballistic Manpower Problem: Messrs Lowery, Buell, and Douyard of Chrysler met with me this week to discuss the Chrysler Aeroballistic Manpower problem. Chrysler was authorized 80 people under contract NAS8-4016, Item IIIb for FY 64. They are now 17 people short of this goal. The Newby Study results showed an additional 35 people required of Chrysler by our laboratory to do the IB job (over and above the 80 previously authorized by the above contract, which gives a total deficit of 52 people). This leaves a large volume of work which will be left undone, unless additional resources are made available to my laboratory. Mr. Lowery stated that he would personally put pressure on his personnel office to find qualified people, but he felt that a rate of 10 new hires per month would be a maximum. This means that it would be the 2nd quarter of FY-65 before Chrysler would be up to strength. Approximately 40 man years of work will have gone undone, unless we can get additional resources.

2. LIEF Briefing: A short briefing on Project LIEF was given by Dr. Speer to Col. E. Wilhoyt, Assistant Chief of Engineers for NASA Support, on April 30, 1964. A revised project development plan (including the operations support to Houston) is in preparation.

3. Saturn IB Ground Winds: Phase II of the wind tunnel tests began on April 1, 1964. High dynamic loads occurred with low values of model structural damping. At a wind azimuth of 315° and a wind speed (full scale) of 28 knots, the model failed. The cause of failure is being investigated; however, preliminary evidence indicates a fatigue failure in the LEM section of the Apollo spacecraft. Movies of the failure are available. A new model will be constructed and the tests have been rescheduled for August, 1964. E.F.

I'm interested. Please arrange showing to Bonnie B

E.F.
But criteria ought to be same for cryogenic and storable LEM landing stage?! B

4. Cryogenic LEM Study: Landing dynamics investigations have been performed to establish the necessary landing gear diameter to insure stable touchdown using LEM landing criteria. Touchdown stability of the present LEM was also checked using the MSFC methods of analysis. The present LEM appears extremely marginal in meeting the landing criteria. The surface model used is a hard surface under a thin dust layer with a slope of $5^{\circ} + \frac{12''}{L}$ (57.3) where L is the overturning radius. A lunar surface protu berance height of 24 inches is used.

5. Contractor Operation of Dynamic Test Stand: An agreement was reached between the Directors of Aero-Astrodynamics, Astrionics, and P&VE Laboratories on the responsibilities for the contractor operation of the 1B and V Dynamic Tests. All technical directions to the contractors are to be given by the Control Dynamics and Structural Feedback Committee through the contracting officer representative (COR) who is a member of and responsible to the committee. Chairman of the committee remains Mr. Horn (Aero) with Mr. Hosenthien (Astr) and Mr. Sterret (P&VE) as alternates. Mr. Sterret was agreed upon as COR with a staff consisting of one representative each from Aero., Astr., P&VE, I-1/1B, and I-V. In the discussion, it was pointed out that particularly for the IB operation by Chrysler, considerable support by the labs still will be needed.

NOTES 5-4-64 GRAU B 5/4

1. S-I-7 POST-STATIC CHECKOUT: Final electrical checkout of the S-I-7 stage was completed and the stage moved to the pressure test cell of building 4705 April 27, 1964. Final pressure and functional tests are being delayed due to missing components and documentation.

2. S-IU-7 INSTRUMENT UNIT CHECKOUT: Final checkout continues on the S-IU-7 Instrument Unit, with Guidance and Control testing presently in progress.

3. S-IV PROGRAM: The S-IV-7 stage was successfully fired for a duration of eight (8) minutes five (5) seconds April 27, 1964. It now appears that the stage will be delayed beyond the scheduled June 2 shipment to John F. Kennedy Space Center in order to accomplish, as a minimum, the scheduled 3½ weeks of post-static checkout. Eleven (11) post-manufacturing checkout procedures have been submitted and three (3) approved to date on the S-IV-8 stage. Engine alignment tests have been completed and electrical continuity tests are in progress. The S-IV-9 stage is now scheduled for shipment to Sacramento May 8, 1964. There are approximately 50 part shortages on the stage and approximately 1300 manhours of modifications will be required at Sacramento.

*4. QUALIFICATION TESTING: Qualification testing on the S-IVB stage is behind schedule by as much as ten (10) months. Of 48 GSE items scheduled for test completion, only two (2) have been completed. Of 35 stage items scheduled, only two (2) have been completed. Unless the present trend in the S-II qualification testing program is changed drastically, it is only a matter of time until MSFC will have to decide to either fly hardware on the S-II Stage which has not been qualified, or slip the schedule. To date, NAA/S&ID has qualified only one (1) item (a temperature transducer).

Bob Young
This sounds pretty bad. Any comments? B

5. DEFENSE CONTRACT ADMINISTRATION SERVICE REGION: In accordance with "Project 60," the Philadelphia Air Force Contract Management District, as well as other Department of Defense Agencies in the Philadelphia area, are in the process of combining into a group known as the Defense Contract Administration Service Region (Pilot Test).

6. NASA/DOD QUALITY AND RELIABILITY POLICY COMMITTEE: A Laboratory representative who is a member of the newly established NASA/DOD Quality and Reliability Policy Committee, attended the organizational meeting in the Quality Control and Reliability Office of the Assistant Secretary of Defense (Installations and Logistics), Washington, D.C., on April 27, 1964. The committee chairmanship will alternate on a six months' basis between DOD and NASA. DOD has the initial chairmanship. The purpose of the committee, as set forth at the meeting, is to provide a "forum" for discussion of mutual quality and reliability problems and operational methods and make recommendations for improvement or re-direction of effort by DOD or NASA (or both), as necessary. Office of the Assistant Secretary of Defense (Installations and Logistics), Department of the Air Force, Department of the Navy, Department of the Army, Defense Supply Agency, the new Defense Contract Management Service and NASA Representatives were in attendance.

NOTES 5-4-64 GRUENE B 5/4

SA-6 Status

1. During the last week, the following Overall Tests were completed. Swing Arm Overall Test: Satisfactory for Launch Vehicle, unsatisfactory for Spacecraft. To satisfy Spacecraft, we will perform our All Systems Overall Test with the plugs disconnected twice on May 4, 1964.

2. All Systems Overall Test (plugs in) completed satisfactorily April 30. We are preparing to run the All Systems Overall Test (plugs out) today, May 4.

Problems encountered:

a. The Spacecraft Escape Rocket, with the jettison part hot, necessitates clearing of the service structure when a thunder storm approaches the Cape. This caused five interruptions in our preparation schedule during last week which had to be made up with night work.

b. The activation of the RCA 110 system caused numerous kinds of problems which delayed our tests considerably. It is felt that this new technology with the higher sensitivity of solid state circuitry has to be entered into very carefully in order to achieve a safe operation (numerous valves were operated in the vehicle by the computer erroneously which scared our pad crew). We are studying, with ASTR and IBM, a way to safer operations.

c. In the S-IV stage, a number of cracked aluminum sleeves were detected. In a combined effort with DAC and Marshall (Dr. Lucas), it was decided to exchange all aluminum sleeves in the S-IV which will be done in continuous 24-hour work and hopefully will not endanger the present schedule.

d. As already mentioned, the RF Interference, caused mainly by the UDOP system, could not be completely eliminated. With agreement of Dr. Speer and ASTR, we will eliminate the UDOP system for this flight.

e. A problem still exists with the Azusa system. We received modified Azusa transponders from ASTR on Sunday night and hope that we can eliminate our problems with these modified sets.

f. Spacecraft continuously has problems with their solid state circuitry, mainly in the Ordnance area. We do not have a final decision on the sequencer situation which was mentioned last week by Dr. Shea in the Council meeting.

NOTES 5/4/64 HAEUSSERMAN

B 5/4

1. UDOP REMOVED FROM SA-6: Radio frequency interference (RFI) problem with respect to the possibility of getting a destruct signal through the command system has been thoroughly analyzed jointly by ASTR, KSC, Range personnel, and OMSF representative (Mr. Lehan). It has been determined that the possibility does exist and, therefore, it has been decided to remove the UDOP system. Impact is lessened by having ODOP system on board with the range stations convertible to ODOP system. Impact includes:

a. No down range UDOP coverage will be provided.

b. The "beat-beat" UDOP system will be lost. This has no effect on the mission.

c. The opportunity to compare the UDOP data with the ODOP data will be lost.

Similar RFI problem was detected on SA-5; analysis was conducted and risk was considered reasonable, particularly since ODOP was not on board that vehicle. UDOP is scheduled for only one more flight (SA-7). If remedial action can not be finalized and effected without schedule impact, it could be removed from that flight.

2. CLOSE OUT OF HORIZON SENSOR DEVELOPMENT: (REF. Item 3, Notes of 4/6, Copy Attached*) This item was discussed with Dr. Mueller during his visit 4/15. A memo announcing cancellation of the horizon sensor flight test plans (Saturn IB/V) has been issued to all MSFC groups involved. MSFC has invested approximately $700,000 in our current contract with Martin-Baltimore for the development of this item. For an additional estimated $200,000 FY-65 funds, this contract can be brought to completion approximately 1/65 or 2/65. These additional funds will provide for two complete production type horizon sensors, a minimum amount of test and checkout equipment, and a complete set of reproducible documentation. If you agree with this approach, we will proceed accordingly.

WH
I do, if it is not in conflict with Dr. Mueller's decision on this matter. (I don't know the details, only that he feels we should simplify the flights)
B

3. INTERCENTER MEETING ON RESEARCH AND TECHNOLOGY ON INERTIAL SENSORS: On 4/29 we had a very lively exchange of research and development trends on inertial sensors. The meeting was sponsored by OART; I had the chairmanship. All NASA Centers and JPL were represented.

4. MSC'S ORGANIZATION AND RESPONSIBILITY ASSIGNMENTS: I received the following information from Dr. Robert Clifford Duncan, formerly Navy Commander Rubel's staff, now Chief of the Guidance and Control Division, who reports to the Engineering and Development Directorate of Max Faget:

a. MSC now gives full monitoring responsibility over contracts to Technical Divisions; Dr. Duncan's Division has responsibility over approximately 500M in contracts.

b. Dr. Shea has turned over all technical G&C personnel to the in-line Division.

Eberhard

Obviously, we are "out-of-phase" in this area; but it is consoling that we are going "in-phase" in technical areas.

MSC wants to bring the guidance system (MIT) and the control system (NAA) responsibility into one hand. MIT will not have fabrication supervision any more.

5. MILITARY MAN ASSISTANT: Captain Freitag declined my offer for himself, but he will help me to find a project manager.

Enc:
a/s

*Attachments provided M-DIR and R-DIR only.

Jw 5/4

B 5/4

NOTES 5/4/64 HEIMBURG

1. F-1 ENGINE TESTING (STATIC TEST TOWER WEST):

We are awaiting firm recommendations from Rocketdyne on the lox pump before any further F-1 engine tests are conducted.

*Jw 2. S-I STAGE TESTING (STATIC TEST TOWER EAST):

S-I-8 has been installed in the test stand and a short duration firing is tentatively scheduled for 5/21/64. Chrysler did a good job of unloading the stage from the barge, transporting it to the test facility, and installing it in the tower.

3. S-IC-T:

During the Program Status Review meeting which was held at Michoud on 4/29, Mr. Stoner of Boeing acknowledged a 6-week delay at this time in the delivery of S-IC-T. This acknowledgement was made after Mr. Kuers very clearly presented a detailed schedule which pointed out that the present official schedule could not be met. The thrust frame is the pacing item in the buildup of the S-IC-T bird. Even at this time, not all the drawings have been released for the thrust frame.

4. MTF WORKING GROUP:

The contract with General Electric covering the first increment of Mississippi Test Facility Phase III Technical Systems for the Electronic, Instrumentation, and Materials Lab will be effective May 1, 1964.

The RFQ for Mississippi Test Facility Phase II Technical Systems covering the balance of systems required to support both positions of the S-IC stand and both S-II stands has been forwarded to General Electric. Negotiations are scheduled during June.

5. S-IC HOLDDOWN FIXTURE:

During the week of 4/27, the initial tests on one S-IC holddown arm and actuating mechanisms were successfully completed. The Philadelphia Gear "roll-ramp" actuator performed satisfactorily. This holddown arm will be utilized on the S-IC test stand to position the stage during testing. Due to manufacturing delays, this holddown arm was six months late in delivery.

7w 5/4

B 5/4

NOTES 5/4/64 HOELZER

Negative Report.

B 5/4

NOTES 5-4-64 JAMES

SA-6 Pre-Launch Review: The SA-6 Pre-Launch Review has been changed to 9:30 - 11:30, Wednesday, May 13, in the 10th Floor Conference Room, Bldg. 4200.

S-IV-6: 1/2", 5/8", and 3/4" aluminum tube assemblies had to be replaced on the S-IV-6 Stage. Problem was stress corrosion which was caused by the vendor heat treating the aluminum prior to machining. There were 6 each 1/2" tubes, 2 each 5/8" and 10 each 3/4". One of the 1/2" tubes was in the LOX Pressurization System. It is being LOX cleaned today and will be replaced tonight. The remaining 17 tubes were in the LH_2 pressurization system. 16 of those were replaced over the week-end and the remaining tube will be replaced tonight. No launch delay is anticipated. These tubes will probably be replaced on subsequent S-IV Stages.

L.W. Effective SA-6? B

Another change at AMR was caused by the loose umbilical wire connections on the S-IV-7 SACTO static firing. The change is to incorporate redundant control wiring through the S-I short cable mast to assure control of the propellant tank vent valves, propellant tank pressurization valves, and the cold helium dump valves in the event of accidental umbilical disconnect at AMR. This change was accomplished over the week-end.

S-IV-7: An attempt to static fire S-IV-7 on April 27 was aborted due to marginal electrical umbilical connections. The stage was successfully static fired on April 29 for a duration of 485 seconds. No major problems were encountered. The post static checkout schedule is being evaluated in an attempt to maintain the June 2 shipping date to KSC.

S-IVB Quarterly Review: The S-IVB Quarterly Review is scheduled for May 14 at Huntington Beach. (Proposed Agenda will be distributed this week)

S-IVB Procurement of Follow-On Stages: Contracts Office personnel are still negotiating with NASA Headquarters personnel in connection with the possible requirement for the inclusion of incentive contract provisions in the Procurement Plan and contract for additional S-IVB/IB Stages. All possible preliminary action is being taken by S-IVB Stage and Contracts Office personnel to insure furnishing prompt contractual coverage to Douglas Aircraft Company upon approval of the Procurement Plan.

S-IVB-DAC Use of PERT: As reported in the last Management Council, DAC does not properly utilize PERT for indicating current status of the S-IVB Stage. I recently pointed this out to Bromberg in a letter and asked for improvements in this area. So far, discussions of my people with DAC indicate that DAC believes MSFC is improperly using PERT rather than DAC. Action is continuing to solve this problem.

RCA-110 Computers: RCA has submitted a fixed-price proposal of $27,989,252 for the 19 additional computers to be used on the Saturn IB and Saturn V Programs. Negotiations are expected to begin in approximately 2 weeks with RCA after the proposal has been analyzed by price analysts and Astrionics for scope coverage.

FW 5/4
B

NOTES 5-4-64 Koelle

1. LAUNCH VEHICLE COST MODEL (P-100): We have received and evaluated proposals from Lockheed/Burbank and GD/Fort Worth on the continuation of our study to refine a cost model for launch vehicles. This model does have a great deal of sophistication and also includes propulsive stages of spacecraft. It is applicable to reusable launch vehicles also. We have recommended GD/FW for contract negotiation. This recommendation went to Dr. Seamans through E. Z. Gray. He has to sign off again at this point of the cycle. Until now, you could authorize negotiations on contracts of this type. We have some 40 more contracts of this type to be processed during the rest of the fiscal year. How much of our proposal evaluations do you want to be briefed on? Suggest one birds-eye view briefing of 1 hr. B HHK

2. POSITION PAPER ON REUSABLE SPACE VEHICLES: You commented on this paper on 4/26. Here are the answers to your questions:

a. Ed Gray has a copy of this paper. He also had a copy of the first draft. We discussed many aspects in some detail. By and large, I believe he will go along with us on the major issues.

b. The launch window problem is alleviated for winged reusable systems because of the throttleable engines in both stages, which permits a considerable change in ascent time (about 15 minutes), plus the aerodynamic forces available for change of the azimuth angle during the first stage flight. The losses for this added maneuverability are acceptable.

c. The noise pressure level of this size air-breathing booster is in the neighborhood of 4 pounds per square foot (2 pounds per square foot is the maximum allowable). The air-breathing vehicle has to fly low to be efficient. A rocket propelled vehicle makes a steep pull up and, therefore, has only a very local noise problem.

d. The two-stage Aerospaceplane is cost competitive during the operational period, but it is more costly to develop, will be available later, and has a higher development risk. It seems pretty clear that the two-stage rocket airplane is the better bet, and Boeing, Martin, NAA and probably Lockheed agree with me.

Fw 5/4

NOTES 5-4-64 KUERS

1. Vertical Assembly of Containers: When we decided to build Fuel and Lox Containers for the S-IC and for the S-II stages in a vertical manner we were well aware of the fact that this concept required an extension of the art of tooling and welding. The development of these techniques had to be carried out while the first containers are being built because of the short time available and because tooling and hardware for this development had to be of a representative size, gage, and configuration of the actual containers. We have now accomplished 12 horizontal welds, 33 feet diameter, on actual S-IC hardware, S&ID has accomplished one such weld after the first unsuccessful attempt. We have still to make a great number of hand repairs on each weld in order to meet the high quality required; therefore, we are still in the development phase. The process and tooling are being changed for each horizontal welding operation. This is, of course, a delaying factor in our program. S&ID plans to use our strap clamps for their next horizontal weld. Arrangements were made to loan S&ID 150 of these clamps. Because of the importance of exchange of knowledge and experience in this field, we are planning a "Welding Symposium" for the Aerospace Industry in July 1964, here in Huntsville. ✓

2. Electro-Magnetic Hammer: Mr. Bob Schwinghamer had developed a magnetic hammer using a movable capacitor bank as a power supply. We have used this hammer advantageously in our shop to correct distortion on gore segments which occurred during outlet welding. Professor Hertel of Berlin University, a high energy rate forming authority, viewed this operation and was very enthusiastic about its possibilities in the aircraft industry. We are currently committed to providing these hammers to NAA, to Boeing-Michoud, and to Douglas. ✓

3. Facilities: The contract for construction of our Hangar for Vehicle Components has been let to Sullivan, Long and Haggerty, Inc., the same company that built our Assembly Tower. The building is 180 feet long, 314 feet wide, and features two bays 125 feet wide and 70 feet high. Each bay has two bridge cranes, 90 tons capacity each. Completion date is May 21, 1965. ✓

NOTES 5-4-64 MAUS

B 5/4

1. OMSF DELEGATIONS OF AUTHORITY UNDER NASA BASIC ADMINISTRATIVE PROCESSES, NPC 107 - In February, Dr. Seamans issued a handbook, NASA Basic Administrative Processes, which stated NASA's basic delegations of authority in various principal functional areas: Procurement, Budget, Organization, Facilities, etc. We have now been asked to comment on a proposed MSF instruction, as a further delineation of NPC 107, stating the delegations of authority from the Associate Administrator for Manned Space Flight to the field centers reporting to him.

   We have definite objections to this document; we have alerted MSF by phone, and will follow up in writing this week.

2. MANPOWER

   Summer Students - Information has been received by phone that our requested 160 summer student spaces were approved, effective July 1, 1964. The program may commence earlier than that, if we have unfilled spaces within our ceiling of 7,658.

   Wage Board - On April 24, the number of MSFC wage board employees dropped below 1,500 (actually 1,499) for the first time in history. MSFC had 2,052 wage board employees when the Center was established July 1, 1960.

3. CENTER DEVELOPMENT PLAN - During the past two weeks, we have had helpful discussions on our planned concept for accomplishing Center Development Planning with Dr. Rees and Messrs. Gorman, Young, Hueter, Weidner, and Cook.

   Francis Evans is now expanding the material for review with laboratory and project office directors and heads of staff offices.

   We plan to complete these reviews prior to May 26, the tentative date for the meeting on Center Development Planning with headquarters representatives: Capt. Freitag, E. Z. Gray, and others.

7w 5/4

B 5/4

NOTES 5-4-64 McCartney

1. FY-66 CofF PROJECTS: Last week, representatives from Mr. Lilly's Requirements Group visited Marshall to familiarize themselves with R&D Operations proposed FY-66 CofF projects. Their visit was in preparation for the OMSF Facilities Review, scheduled for May 11. In coordination with Mr. Dykes' office, representatives of my Facilities and Materials Group accompanied the MSF representatives in visits to the laboratories. This week, one of my Facilities people will visit Headquarters and assist Mr. Lilly's Requirements Group during their preparation of the presentation to the Facilities Review Board.

2. MANPOWER PLANNING: On April 28, the official Manpower Plan was initially issued to all R&D Operations elements. Members of my staff are now visiting the laboratories and offices to assist them in refining our manpower-planning figures for the next two years. The current plan also reflects a transfer of 200 men to Industrial Operations within the next calendar year, in addition to the 48 spaces previously borrowed from Industrial Operations.

3. FY-64 BUDGET EXECUTION:

SATURN I: As of April 30, about $6.5M Saturn I funds remain uninitiated. This week, negotiations will continue with Industrial Operations to transfer to them $4.8M. We anticipate that the remaining $1.7M will be used to maintain routine operations for the remainder of the fiscal year.

SATURN IB: As of April 30, about $5.7M Saturn IB funds remain uninitiated. We plan to use these funds in June to pre-finance major FY-65 contracts.

SATURN V: During the past week, we have cleared accounts in the Saturn V and have retained only $4.5M to cover essential operating expenses for the rest of the fiscal year.

NON-SATURN FUNDS: As of May 1, about $4M Non-Saturn funds remain to be initiated: that total includes $2.5M SRT, $0.44M Advanced Vehicle Technology, and $1.1M Meteoroid Experiment.

B 5/4

NOTES 5/4/64 RUDOLPH

1. Boeing Mission Support - Word was received on Friday, May 1, 1964, by informal channels, which indicated that Dr. Seamans is withholding approval of the Boeing launch vehicle support assignment (MSFC letter to Dr. Mueller, dated March 23, 1964) pending a review with General Phillips. The best estimate is that two additional weeks will be required for the review. This delay means definitely that a negotiated mission with Boeing cannot be completed by July 1, 1964. The consolidated R&DO comments on the draft scope of work covering the Boeing effort have been received, and meetings are underway to reconcile differences.

2. Saturn V Back-up Program - The recommended list of Sat V back-up development tasks to be initiated in FY65 and supporting data was forwarded to MSF on April 30, 1964. These tasks support the $41 million currently programmed in FY65 for the Saturn V Back-up Program.

*fw 3. Michoud Vertical Assembly Building (VAB) - The final construction phase of the Michoud VAB underwent considerable discussion during the S-IC Quarterly Review (held on April 28 & 29) as a result of a potential slip to delivery of S-IC-D. Boeing indicated a six-week delay in the VAB would cause a corresponding slip to S-IC-D and, therefore, requested additional C of F funds to accelerate the construction schedule six weeks. Bid opening occurred on April 30, 1964, and the apparent low bidder required approximately $5,000 additional funds for construction acceleration. The VAB construction contract will be for an accelerated schedule, avoiding a schedule slippage by the S-IC-D.

*fw 4. S-II Stage Common Bulkhead - In four weeks, May 28, 1964, the common bulkhead will be ready to make final impression with the forward facing sheet. This date is now a decision date to go ahead with the programmed common bulkhead design or a change over to the strip seal method has to be made. The completion date for the first common bulkhead which will be attached to the static test vehicle (structural test vehicle) is now predicted to be June 19, 1964.

*fw 5. S-IVB Quarterly Review - Preparations are now in process for a S-IVB Quarterly Review to be held on May 14, 1964, at Huntington Beach, Calif.

6. Instrument Unit Prime Contract - The scope of work was completed and submitted to Contracts Office on April 27, 1964, as an exhibit for the forthcoming RFQ to IBM.

*fw 7. RCA 110A Computer Systems - Negotiations with RCA took place on April 30, 1964. Of primary concern to Saturn V was the negotiations of delivery dates of display units for the RCA 110A computer systems. Delivery dates proposed by RCA were unacceptable. RCA is to come up with a new proposal by May 6, 1964.

FWG 4

B 5/4

NOTES 5-4-64 - SHEPHERD

Army Building 4722: This building, located on Rideout Road, served as your old Headquarters. During the review of the FY-66 CofF budget, you requested that the possibility be investigated of obtaining this structure from the Army for possible use by Astrionics for their electrical and electronic check-out equipment. We have met with Col. Cook and discussed this with him. Col. Cook stated that for the forseeable future the Army had firm requirements for this building including the high bay area located to the rear. He said their position may change with the completion of their construction, scheduled during the next 4 or 5 years. Col. Cook did not appear to be in a position to negotiate for these buildings, therefore, I do not believe it would be of any advantage to pursue it further.

W Häussermann FYI B

Bob Long: This is to confirm that Bob Long is leaving NASA Headquarters. He was not exactly clear as to the reasons he is leaving, however, he stated that he recommended to Mr. Webb that all offices of construction in NASA Headquarters be pulled together into one NASA office of Construction. Outcome of this is not known at this time. He has submitted a letter of resignation and will retire to California sometimes during the month of May. I guess that's why he's leaving. The old Man - rightfully - said NO B

JS

Col. Wilhoyt visit: Col. Wilhoyt again visited Huntsville - this time for a two day orientation trip to become better acquainted with the various laboratories and the current construction program. The problem of the Mississippi Test Facility (MTF) staffing was again discussed with Col. Wilhoyt. He agreed to continue to press for immediate assignment of those persons being transferred to MTF and will look for a greater overlap in areas where it seems to be desirable. There appears to be no further need to stress the MTF staffing with the Corps, at least not at the present time.

B 5/4

NOTES 5-4-64 Stuhlinger

1. $1.9 M FOR MMC: As Dr. Bisplinghoff directed us in his letter of April 1, we have planned to delete a number of unobligated tasks in the OART - SRT Program, the Propulsion Program, and the former RIFT Program, in order to fund the $1.9 M required by the MMC Project. Mr. D'Aiutolo, the Program Manager in OART, was advised in October that at least $1.7M additional funds above the $8.0M then authorized for FY-64 would be required. He gave verbal assurance that such money would be made available in Headquarters although it might be a little hard for OART to get it together. Therefore, the April 1 letter by Dr. Bisplinghoff directing MSFC to absorb the additional costs from our research funds was not expected. Today (May 4) Bob Young will make an attempt to obtain support from Gen. Phillips for a reprogramming of the deleted tasks under MSF Funding.

2. MMC TESTING SCHEDULE: The MMC is now moving along quite rapidly toward prototype assembly and testing. Most of the electronics subsystems have been assembled and tested with only minor deviations. The data subsystem is still the critical item in the electronics area, but it will be complete in time to permit beginning prototype tests before June 1. The mechanical structure is now complete. Some minor modifications to the deployment system to give smoother operation are underway and will be incorporated prior to prototype testing. No major subsystem failures have been encountered up to this point in the test program.

3. UNIVERSITY OF ALABAMA: Dr. Stuhlinger, Dr. Shelton, and Mr. F. Williams met with Mr. Reeves on April 30 to discuss the University of Alabama operation in Huntsville. The University plans to establish a new building for undergraduate courses here. This plan should not be discussed publicly before President Rose makes an announcement. You will be given a short briefing on May 5.

4. SRT PROGRAM STATUS: The status of the SRT program managed by RPL is, as of May 1, as follows:

	PROGRAM PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED	CHANGE IN OBLIGATED SINCE APRIL 27
OART	10,498,000	10,498,000	10,398,000	1,999,700	0
OMSF	14,163,000	14,133,000	14,016,976	700,000	113,000
OSSA	675,000	675,000	665,859	29,378	12,113
	25,336,000	25,306,000	25,080,835	2,729,078	125,113

5. VISIT BY MR. CRONE, OMSF: On April 29, Mr. Norman Crone of OMSF visited RPL to obtain additional information on the Space Vehicle Research Laboratory building for use in a facilities meeting at Headquarters this week. Summary material, floor layouts, and photos of overcrowed conditions have been prepared and submitted.

May 11, 1964

NOTES 5-11-64 BELEW

B 5/14

*fw J-2 ENGINE

Engine 2003 is currently undergoing receiving inspection and checkout at DAC, Sacramento, prior to its utilization in the S-IVB battleship program.

Negotiations of the production Contract NAS 8-5603 have been underway for four weeks. All items of the contract have been negotiated except the cost of the basic engine. A basic disagreement in pricing philosophy may delay completion of negotiations several weeks.

*fw F-1 ENGINE

Efforts toward solution of the recent F-1 engine LOX pump explosion continue with no additional clear-cut clues. Resumption of testing at Edwards is currently scheduled for next week, with the turbopump 5800 rpm redline in effect. MSFC's participation and assistance has expanded with the semi-permanent assignment of a representative from TEST Lab and P&VE Lab at the contractor's plant for evaluation of records, analyses, etc. These people have been integrated into the Rocketdyne team effort. In addition, vibration analyses will be conducted by P&VE Lab.

One of the significant decisions reached at last week's program review with Rocketdyne was to delete the armored electrical harness from the F-1 engine in favor of the type used on the J-2.

A strike took place this past week at EAFB in the AF area. However, sympathetic walk-outs across the board affected the F-1 stand repairs and construction. A court order has been issued and nearly all workers are back on the job.

RL10 ENGINE

An RL10 chamber was fired last Friday for 60 seconds using fluorine and hydrogen at a mixture ratio of 8.0 to 1.

*fw Data from the S-IV-7 acceptance firing indicates that the fuel NPSH fell to 6.7 psi. (The specification minimum is 8 psi.) Pump performance was not affected.

H-1 ENGINE

Notes of May 4, 1964, stated that the first improved performance injector would be tested this week. These tests were delayed because safety personnel would not allow high thrust level bombing on over-aged engines. A new engine was assembled and is currently being installed into the test stand.

The first two 200K production engines have been retrofitted with main propellant valves and LOX high pressure ducts.

ECP negotiations (approximately $6.0 M) are in progress on the H-1 Engine Production Contract. All presently outstanding ECP's will be negotiated prior to conversion of this contract to CPIF.

F-1 Engine (Answer to question: What is shot-peening) - NOTES 5-4-64

Shot-peening is a process to work harden the surface of metal by controlled impingement of metal balls (BB's) at relative high velocity. This puts the metal surface in stress compression.

Fw 5/14

B 5/14

NOTES 5-11-64 CLINE

1. 120-INCH DIAMETER SOLID MOTOR FAILURE: Failure of the Titan III solid motor at United Technology Corporation last week resulted from a design change which called for omission of 60 pounds of "gunk" normally used to bond the insulation flaps at segment joints. The failure occurred seven inches back of the head to first segment joint. The burnthru followed a six- to eight-second period of outer wall heating. The burnthru then proceeded circumferentially around the case, cutting it into two sections.

Inspection showed the nozzle to be in fair shape; however, the thrust stand was damaged extensively.

This motor was one of the development motors and not one of the Preliminary Flight Rating Test units.

2. KIWI REACTOR TEST: The first hot reactor test since 11-62 will take place 5-13-64 at Nuclear Rocket Development Station on a redesigned Los Alamos Scientific Laboratory KIWI B-4-D reactor. Test objectives are 80% design power for 480 seconds. MSFC observers will be present. FC Request detailed report. Understand test went off very well! B

3. F-1 TURBOPUMP EXPLOSION INVESTIGATION: Rocketdyne has requested support and assistance from MSFC in the following areas to support their LOX pump explosion investigation: (a) Design and improvement studies, (b) Hydro-dynamic investigation, (c) Instrumentation and testing procedures, (d) Fabrication and other data analysis, (e) Advance materials studies.

Personnel from this Laboratory and the Test Laboratory have already arrived at Rocketdyne to assist in the above areas. These are Mr. Goetz, Test Laboratory, Mr. Gross, Mr. Tinius, Mr. Green, and Mr. Tovar, this Laboratory.

4. DUMMY TURBINE EXHAUST FAIRINGS FOR SATURN I, BLOCK II VEHICLES: The roll unbalance noticed on SA-5 flight, caused by the unsymmetric location of four turbine exhaust fairings, can be eliminated by adding four dummy fairings to make the base configuration symmetrical. Installation studies revealed that a major change effort is not required and not feasible for SA-6. The Configuration Change Board is reviewing installation of dummy fairings for SA-7. The SA-6 flight may verify criticality of the roll problem and the urgency of a change for SA-7.

5. CRACKED SLEEVES, S-IV-6: (Reference paragraph 7, NOTES 5-4-64 CLINE) Improperly heat treated.

6. PROPOSED BELCOMM DETONATION STUDY: (Reference paragraph 2, NOTES 4-27-64 CLINE) Contacted Dr. Hornbeck again. He will talk to Dr. Mueller and call us.

Attachment #1: NOTES 5-4-64 CLINE
Attachment #2: NOTES 4-27-64 CLINE

NOTES 5/11/64 CONSTAN

Negative Report

B 5/14

Tw 5/11

fw 5/11

NOTES 5-11-64 DANNENBERG

1. Hot/Coldwire Cutoff and Crew Safety - Based on launch vehicle malfunction analysis available at this time, MSFC has selected a coldwire cutoff system as the safer EDS design. To prove this recommendation, a short special report comparing hot and coldwire systems has been prepared, copy of which you will receive this week. No similar analysis is available from MSC, except "opinions" stated in the Crew Safety Panel. (Unofficially, however, the astronauts share the MSFC position). Please withhold your reaction to Shea until you have our input. Will be glad to brief you if you have questions. Not necessary. I've got the message and am in full agreement with cold wire B

2. S-IC-2 Checkout Schedule - The checkout schedule problem has been alleviated by reducing the pre-static checkout time from 20 to 16 weeks.

3. Astronauts Visit - The group described this visit as the most impressive they have had so far. They were delighted that you spent the time to discuss all their questions.

fw 5/11

NOTES 5/11/64 FORTUNE B 5/14

1. Public Speaking Can Be Handled by General Electric - in areas where NASA official status might preclude our presence as you intimated to Bart Slattery. Bill Eaton is in accord, his Section Manager of Employee Relations to make a speech for me in Meridian June 8. There will be others, I'm sure, where they can help.

2. Labor Disputes - were quiescent at MTO, but twelve union personnel ended up in Hancock County Jail Tuesday night for trying to set up closed shop in housing development near here. Farrell Construction Co., who has about 80% union operating engineers, had mutterings but no overt trouble last week.

3. Dick Shetler, General Manager, Command Systems Division, GE - visited MTO Thursday. I joined him and Bill Eaton in a helicopter tour of construction sites, pointing out our different projects to him.

4. Senator Stennis - came down Saturday, was briefed by me, then escorted to key construction scenes and ate lunch with us before going on to Coast Electric REA shareholders meeting near Kiln. Mrs. Fortune was hostess at lunch, and the two of us were invited to sit on a platform with him when he delivered his talk to the REA shareholders.

5. MTO Managers of Boeing, North American Aviation and General Electric - meet with Henry Auter and myself today, to review activation planning, work out overlapping occupancy periods to make sure GE and NAA particularly will not bring in non-union personnel to work along side of union brick and mortar or technical systems workers.

* fw 6. FY-65 Negotiations with GE - opened here at 8:00 a.m. this morning.

7w 5/11

NOTES 5/11/64 GEISSLER B 5/14

1. Cryogenic LEM Study: Reference your comment on item 4, Notes 5/4/64 Geissler, copy attached as enclosure: The landing criteria for both cryogenic and storable stages are the same. The slope is 5 degrees with an irregular protuberance - depression of $\pm$ 12 inches. This results in an effective slope of $5^\circ + \frac{12''}{L}$ (57.3°/rad) where L is the overturning radius. The LEM does not show any safety margin within the accuracy of the analytical methods used. The cryogenic LEM has a safety margin of about 2 degrees additional slope capability.

2. Saturn V Performance Improvement by Trajectory Shaping: The payload at lunar transit injection of the Saturn V can be increased by approximately 1200 lbs by using lift (rather than zero angle-of-attack) during the first stage power flight after the maximum dynamic pressure point. The price, and the reason why this was not proposed before, is an increase in bending moment. Detailed studies are required to establish complete trade-offs, but indications are that the moment increase will be well below 10%. The use of refined aerodynamic data and mass distributions indicates a reduction in the maximum bending moment (close to the C. G.) from 330×10^6 in-lbs to 280×10^6 in-lbs. The reduction at other stations may be considerably less, but still will be substantial. We propose using these reductions to cover the increases resulting from the lift trajectories, rather than using all of them to reduce design loads. P&VE was contacted, and together we are trying to establish the most favorable cross-over point between gaining payload through reduction in design loads and subsequent weight reductions and between accepting larger bending moments and gaining payload by use of lift trajectories.

3. Saturn IB Ground Winds: Reference this item on Notes 5/4/64 Geissler, copy attached: We tentatively plan to show you the films of the Saturn IB model failure during the week of May 18. Firm date depends on your schedule; we will keep in touch with Bonnie.

4. Saturn IB/Centaur Performance: A performance study was conducted on three configurations of Centaur as a third stage for Saturn IB. The three configurations and resulting escape payloads are: (a) Existing Centaur, using existing Centaur guidance for the Centaur burn, is capable of 12,811 lbm payload. (b) Existing Centaur using Agena guidance for the Centaur burn instead of the Centaur guidance yields a 13,327 lbm payload. (c) MSFC proposal which consists of 154 inch, 2200 pound instrument unit on top of the Centaur stage as the I. U. for the whole vehicle yields a 11,823 lbm payload. This study was based on April 1964 current weight status of the Saturn IB vehicle, a Centaur specific impulse of 434 seconds, and a sub-orbital Centaur start. The effect of a 10 second increase in the Centaur I_{sp} is also being investigated, however, results are not presently available.

22

NOTES 5-11-64 GRAU

B 5/14

1. S-IU-7 INSTRUMENT UNIT CHECKOUT: Final electrical checkout of the S-IU-7 Instrument Unit continues on schedule and the unit should be released to Manufacturing Engineering Laboratory by May 14, 1964.

2. S-IV PROGRAM: Post-static checkout of the S-IV-7 stage is now in progress. Nine of eleven procedures have been submitted and five have been approved. Hydraulic system contamination problems are still being encountered and the post-static checkout schedule is now reduced to approximately three weeks. DAC is being urged to complete all scheduled post-static checks within this compressed schedule. No reduction in the planned test program has been authorized by this Laboratory or Industrial Operations at this time. The S-IV-8 stage is undergoing post-manufacturing checkout at Santa Monica; no major problems have been encountered at this time. Twelve of fifteen checkout procedures have been submitted, five have been approved to date. The S-IV-9 is being installed in the test stand for pre-static checkout at Sacramento. Delays in the schedule for S-IV-7 now impose a compressed schedule on the S-IV-9 stage as well.

3. ATOLL (ACCEPTANCE, TEST OR LAUNCH LANGUAGE) IMPLEMENTATION: A satisfactory technical agreement has been reached by Douglas and Quality personnel in the implementation of the Launch and Checkout Computer Program Configuration and Control Plan. ATOLL is to be implemented by S-IVB/IB-2.

4. MICROMETEOROID MEASUREMENT CAPSULE TESTING: Acceptance testing of the MMC Prototype model continues. Tests have been performed on the Communication System and the Power System with only minor problems. Fairchild has had considerable difficulty in the Data Subsystem tests with cross talk. Installation of these systems into the Electronic Cannister will probably begin about 5-14-64.

NOTES 5-11-64 GRUENE

B 5/14

SA-6 Status

1. Overall systems test (plugs out) was completed unsatisfactorily on April 28. It was then partially repeated satisfactorily on Saturday, May 9. A noisy control system caused by an external test instrument was traced as the culprit in the first test.

2. H_2/O_2 Loading Tests: The S-I part was completed late, but successfully on May 7. The S-IV part of the test had to be repeated on May 8 because of a leaking umbilical H_2 connection. An additional problem was encountered in the H_2 overfill sensor which was finally eliminated in the circuit for the test and the launch count. We feel that the operation can be performed on launch day successfully without this switch (DAC/LVO agreement).

3. Aluminum tubing containing aluminum sleeves in the S-IV, as reported in last week's notes, was exchanged during the week.

4. The reported Azusa problem was eliminated by R-ASTR by modification of a filter.

5. Spacecraft reported being ready for Simulated Flight Test.

6. Simulated Flight Test will be performed on May 14.

7. The final countdown was published. The last part (launch day) was cut to nine hours, 5 minutes. The cut was accomplished by advancing some tests (e.g., power transfer, hydraulic) to the preceding day. We know that we take somewhat of a greater risk in the possibility of scrubbing the launch, but have to come to the conclusion one day that we cannot do all tests again on firing day.

NOTES 5/11/64 HAEUSSERMANN

B 5/14

1. STATUS REPORT - REORIENTATION OF FUEL CELL DEVELOPMENT: A work scope has been prepared and coordinated with MSC, LeRC, OMSF, and OART for expanding the R&D fuel cell effort with Allis-Chalmers. We have been informed by Mr. Esenwein (OMSF) that 1.5M has been transferred to OART for this purpose and that an additional 1.0M is in the process of being transferred from OMSF to OART. Since OART has a fiscal expenditure ceiling set by Congress, OART must receive Congressional approval to spend this additional 2.5M before it can be transferred to MSFC. This sum corresponds to the yearly rate of our original development request of the fuel cell for Saturn IB/V, not considering costs associated with quality and reliability requirements. The implementation of NPC 200-2 and 250-1 is not necessary in this current approach. These documents will be provided the contractor for information with implementation required as applicable for any future flight/man-rated hardware.

2. STATUS REPORT - CRYOGENIC GYRO: Gyro evaluation tests have shown the Project SPIN cryogenic gyro to have an extremely high degree of constancy of behavior. This is one of the most significant results of the program to date.

The next major accomplishment will require demonstration of improved acceleration force capability of the suspension system. This, however, must await a niobium coated ceramic rotor and an improved bearing design. Thirty g's now appears possible using present materials.

Funding limitations on this contract have prevented continuation of materials investigations in recent months although earlier progress has lead to a successful process for deposition of excellent superconducting niobium films. Continued materials support provided on the Air Force cryogenic gyro contract, however, has now resulted in completion of ceramic rotor deposition facility the operation of which will be of future benefit to this program.

While the final success of this development cannot be predicted with certainty, as is true with any program that pushes into many unknown areas of scientific knowledge, the progress made to date makes the future of this gyro look promising. The advantages originally sought from the cryogenic environment still exist and no fundamental barriers to eventual success have been uncovered.

3. STATUS REPORT - S-IVB VEHICLE INSTRUMENTATION WORKING GROUP: (VIWG) Working Group meeting was held at DAC on 4/28 and 29. The agenda called mainly for status reports. Lengthy discussion concerning schedules and programing of an operational stage resulted in an action to form an operational telemetry subgroup. This subgroup will meet for the first time at MSFC on 5/12 and inturn report to the VIWG, the concepts, design requirements, and the time phasing for an operational instrumentation system for Saturn IB and Saturn V vehicles. DAC indicated that the instrumentation for the S-IVB is on schedule and that no problem was foreseen.

J.H. I'd like to meet him. Please arrange. B

4. MILITARY MAN ASSISTANT: On the recommendation of Captain Freitag, I received an excellent application by Commander William P. Horton, presently Deputy Director of Astronautics Department, Navy Missile Center, Point Mugu, California. He will retire August 1 and wants to get the project manager job.

fw 5/11

NOTES 5/11/64 HEIMBURG

B 5/14

1. S-IC Tail Service Mast:

The prototype tail service mast (known as the "Dickie Bird") for use on Launch Complex 39 has been set up at the holddown arm test site north of building 4481. Preliminary checkout has been completed; however, the tests of the mast and couplings will be delayed due to the late delivery of the umbilical couplings and vehicle skin segments from Boeing. P&VE Laboratory is pushing Boeing.

*fw 2. S-IC Transporter:

The first "taxi tests" of the S-IC transporter with the simulated booster vehicle were made last week. Performance of the transporter was considered to be very satisfactory, with only minor adjustments being required. However, the side road from the vehicle assembly area to the main road could not take the load, and one set of wheels sank 17 inches into the roadbed. This was an unexpected, but very good test of the hydraulic load leveling system on the transporter, which worked very well keeping the load level in spite of the fact that one set of wheels sank below the roadbed. The main Saturn V road carried the load satisfactorily; however, the surface coat was picked up by the wheels. Facilities and Design Office has been advised of this problem.

3. MTF Working Group:

Air Products and Chemicals, Incorporated (APC), is making satisfactory progress in the planning, design, and preparation of specifications for the LH_2 plant in the vicinity of Michoud. Start of construction is tentatively scheduled late in July or early in August 1964.

4. S-IC-T:

This week (5/11), Messrs. Cline and Grau and myself, together with Boeing, will visit subcontractors of Boeing in the Los Angeles area to investigate their inability to meet certain requirements on schedule. Exceptions to specifications, specifically for the "T" bird, will be considered and evaluated during this trip.

Fw 5/11

NOTES 5-11-64 HOELZER

B 5/14

Negative Report

NOTES 5-11-64 JAMES

B 5/14

*fw SATURN I - SA-6 - Checkout of SA-6 is proceeding toward the schedule launch date.

S-IV-7 - We have been concerned with the post-static checkout time. In a meeting several weeks ago with Quality people, six weeks of checkout time was requested because of the inefficiency in the Sacramento operation. Because of the tight schedule throughout Saturn I, we are only able to give Quality 3 1/2 weeks. We have maintained the position since then that it is mandatory that this time not be reduced. Subsequent to these decisions, we have lost 13 days in the static firing. This would appear, if we are to give Quality 3 1/2 weeks, to correspondingly reduce checkout time available. However, upon the arrival of Mr. Duval to take over Sacramento, over a weeks time has already been made up in the overall operation. Further, he has demonstrated to the satisfaction of Mr. Grau, that in the remaining 3 weeks time for checkout, he can accomplish all the checks which they require. Therefore, 3 instead of 3 1/2 weeks time is being scheduled for post-static checkout and Quality Laboratory is entirely satisfied with this. 3 1/2 weeks is still before the original shipping date, however, the improvement at Sacramento has been so pronounced, that everyone agrees the shipping date could be moved forward from the June 2nd date now scheduled to May 28.

S-IV All Systems Explosion - The Air Force Plant Representative at DAC has been requested to conduct and direct an investigation of this explosion and to submit to MSFC a complete report of findings including a determination regarding the assessment of liability. The Debus committee report on the all systems vehicle will probably be distributed this week.

S-IV Stages - The S-IV-7 Stage has been removed from the stand and is in post static checkout. Shipping date to KSC is June 2 via "Pregnant Guppy". S-IV-9 was shipped to SACTO on May 8 and erected in test stand 2B on Saturday.

*fw S-IVB - All additional information requested by NASA Headquarters in connection with their review of the Procurement Plan for additional S-IVB/IB Stages has been furnished. No date for completion of Headquarters review is available from Contracts Office. No contract action can be initiated with DAC until the Procurement Plan is approved. DAC had indicated April 15 as a required date, however, it is understood that they have now accelerated work on certain S-IVB/V Stages consistent with S-IVB/IB schedules. This appears to relieve the immediate problem of lack of contract coverage, however, without contract authority, it is not possible to insure that all necessary work to meet schedules is being carried out.

*fw SATURN IB - S-IB Turbine Exhaust - The S-IB Engine Turbine Exhaust can be incorporated on SA-203 but retrofit to SA-201 and 202 does not appear feasible due to S-IB program schedule impact.

*fw H-1 Increased I_{sp} - The reprogramming of funds to the Engine Project Office for studies to uprate the H-1 engine Isp by five seconds has been approved by a TWX from General Phillips. This increased Isp is seen to be effective on SA-201 by both the Engine Project Office and the S-I/IB Stage Office.

7W 5/11

NOTES 5-11-64 Koelle

1. NUCLEAR PULSE: I talked to Harry Finger again last week on this subject. He is still trying to torpedo any positive action on it. He does not want to listen to anybody but himself. Your action will be required to keep things moving. A special memo, spelling out our recommendations, is on the way to you. ✓

US See Note

2. "PROJECT PILGRIM": This is a new book just published by McGraw-Hill. It is fiction. The author is Hank Searls. It describes how we beat the Russians to the moon, using the SATURN IB. It is a lunar surface rendezvous pickup mission. It is very realistically written and extremely interesting to read. You will find yourself and many other names connected with this project. I am sure you will want to read it, if you haven't already. You can get my copy, if you want it. Yes, please B

3. DR. MUELLER LETTER ON NASA FUTURE PLANS (April 28, 1964): I propose sending to Dr. Mueller MSFC comments on his plans. While I think we substantially find ourselves in agreement with Dr. Mueller's thinking, I feel we should offer him some comments for clarification. I will draft and coordinate a reply for your signature. Is this all right with you? Yes, please do

B

For 5/11

B 5/14

NOTES 5-11-64 KUERS

1. ME Laboratory Workload Planning: I have been informed to plan for a reduction in force of approximately 5% within the next 12 months. At the same time I have to make commitments for availability of manpower for the in-house development of the S-IB third stage. In order to make both plans possible without impact on the S-IC program, I have now planned to turn the assembly of the entire Thrust Structure for -S, -1, and -2 over to Boeing. Under this plan we would dismantle the Thrust Structure assembly fixture after completion of the -T structure and ship it to Michoud. Preliminary discussions with Boeing and IO indicate that this can be accomplished without impact on schedules. Boeing would load their fixture with -S and utilize our fixture for -D, working simultaneously on both Thrust Structures. The critical item is not the Thrust Structure assembly fixture, but rather component and sub-assembly fabrication at Wichita and Michoud.

2. Saturn V, S-IC-T Stage: The progress on the -T vehicle is still slower than planned. It is not only that we are not able to recover lost time, but we are still losing more time. Here are some details of our progress and problems:

a. The fuel container is practically complete except for the lox tunnel welding. The first tunnel had been welded in place last week using automated equipment for this weld for the first time. This was unsuccessful. We had to cut the weld out. We hope to accomplish this weld next week. The fuel container has been moved into the hydrostatic station in order to make room for the lox container in the tower.

b. Baffle installation on the lower half of the lox container is well under way in a 3rd shift operation. The upper dome has been successfully welded to the Y-ring. All cylindrical sections for the lox container are complete.

c. The Thrust Structure is being worked on in two 10 hour shifts. Indications are, however, that changes will cause serious delays in this area. The CAM 218, "Modification of Propellent Support Brackets", will alone cause 2 to 3 months delay in addition to the already existing schedule slip of 4 weeks.

Karl Heimburg

This kind of delay is, of course, entirely unacceptable. What course of action do you suggest? How vital is this change for SIC-T, anyway?

B

Tw 5/11

B 5/14

NOTES 5-11-64 MAUS

1. MANNED SPACE VEHICLE COST STUDY, completed and delivered to Bill Lilly's office May 6.

2. MSFC FUNCTIONS AND AUTHORITY - On Dec. 16, 1963, we sent the proposed MSFC Mission Statement to headquarters for approval and publication in NASA Management Manual. Last week, MSFC forwarded it, with insignificant changes, to Jack Young, en route to Mr. Webb for approval.

3. FY66 PRELIMINARY BUDGET SUBMISSION FOR ADMINISTRATIVE OPERATIONS - We are working toward a May 18 deadline for submission to MSF, of our manpower plans for FY65 through FY69. Guidance from Dr. Mueller is that planning is to show a reduction in manpower requirements for existing programs as they phase out, and that this will produce the required capability for new starts.

4. MANPOWER BRIEFING FOR DR. SEAMANS - Mr. Gorman presented the briefing to Dr. Mueller last Saturday on FY65 manpower requirements. This was preliminary to the May 13 briefing to Dr. Seamans, and was prompted by a proposal by Dr. Seamans to reduce the Manned Space Flight FY65 manpower increase from 1,000 to 500 spaces.

5. MSF REVIEW OF POP 64-2 - Dr. Rees, Bill Sneed, and Jay Foster will attend the review of POP 64-2 with Dr. Mueller tomorrow. As of this morning, unofficial info is that the MSF staff's recommendation to Dr. Mueller will be as follows:

   MSFC POP (April submission) is essentially acceptable if the FY64 supplement is approved. Portions not acceptable are in the area of SRT and Advanced Studies; MSFC proposed approx. 30% increase whereas MSF wants to hold same level of effort.

   If FY64 $141M. supplement is not approved, our portion of deficit will probably be $85.7. Project offices are evaluating impact.

*Tw Baloney

6. CONGRESSIONAL INQUIRY - Rep. Montoya, (Demo., N. Mexico) inquired whether there is unnecessary duplication of guidance and control facilities between Army and NASA in Huntsville. Ray Kline, working with Mr. Kroeger of Astrionics and Army G&C people, prepared a paper explaining that no duplication exists. The paper was cleared with Army Missile Command and reviewed with Mr. Gorman prior to submission to headquarters, May 6.

fw 5/11

NOTES 5-11-64 McCartney

B 5/14

1. FY-66 CofF BUDGET: On May 5-6, a representative of my Facilities and Materials Group visited Mr. Lilly's Requirements Group in Headquarters to assist them during preparation of the May 11 OMSF Facilities Review Board presentation. We understand that the Board is expected to support most of our projects. Marshall will be given an opportunity to reclama disapproved projects before May 28 by making special presentations to the Board. The OMSF package is to be presented to Dr. Seamans on May 28.

2. RESOURCES MANAGEMENT CONFERENCE: Our monthly meeting with R&D Operations Resources Management Chiefs is scheduled for May 12.

3. CONTROL OF CONFERENCE ATTENDANCE: My Administrative Group, working with Dr. McCall, has developed a procedure for a more positive control of R&D Operations' attendance at conferences and symposia. The procedure requires R-DIR approval of conference/symposia attendance prior to appropriate action by PAO.

4. PROGRAM EXECUTION PLAN, FY-65: Representatives of Industrial Operations and my Programs and Contracts people are working together to develop a mutually agreeable FY-65 Program Execution Plan. When completed, the plan will serve as a contract between Industrial Operations and R&D Operations for a target fiscal year budget; it will also serve as the basis for the MSFC Program Authorization Plan and Seaman's Program Operating Plan.

5. FY-65 BUDGET NEGOTIATIONS WITH IO: In negotiations with Saturn I/IB project personnel, my Programs and Contracts Group has reached a mutual agreement for R&D Operations FY-65 budgetary requirements. Further discussions are continuing on the actual construction of the Saturn IB budget. Negotiations are also continuing with Industrial Operations to reach complete agreement on FY-65 budgetary requirements for Saturn V. Complete resolution is expected within 10 days.

NOTES 5/11/64 RUDOLPH B 5/14

1. Science and Technology Advisory Committee for Manned Space Flight
Coordination among the MSFC participants proposed for Houston meeting of the Science and Technology Advisory Committee (STAC) for Manned Space Flight has been accomplished and general planning has been firmed up. The meeting will be held June 29, 30, July 1, 1964. Capt. Holcomb is in charge of Washington coordination and issuance of guidelines and assignments.

2. S-IC Stage Structural Test Program - As a result of an action item from the S-IC Quarterly Review held April 29, 1964, a firm MSFC position has been established relative to the S-IC Structural Test Program. MSFC does not contemplate issuance of additional Change Orders to the Boeing Company for performance of all or part of the S-IC Structural Test Program. The award of the program to the Boeing Company is dependent upon submission, evaluation and negotiation of the Contractor's proposal.

3. S-II Stage:

*fw S-II-S Stage Common Bulkhead - During the bonding cycle (May 2-4, 1964) of the honeycomb core to the lower facing plate of the S-II-S Stage Common Bulkhead a deformation occurred in one of the twelve gore segments. This deformation can best be described as a crease-fold (due to its length to width ratio) that occurred in thin segment of one gore. The deformation is approximately 3/4" in depth and runs parallel to the thick to thin weld land in the chem-milled area of the gore thin segment. A task group comprised of NASA and NAA/S&ID personnel (manufacturing, engineering, quality, etc.) has been formed to: (a) expeditiously investigate and determine the causes of deformation, (b) establish repair action, and (c) evaluate and report impact.

Early inputs indicate: (a) A delta temperature of 62° F was recorded by point sensing pick-up between centers of the gores thin segment and thick waffle segments (thin segments hotter). This indicates that the heat cycle called out in process specification is too fast. (b) Preliminary examination of deformation area indicates: (1) no cracks in thin segment and (2) no voids in honeycomb core bond to thin segment. Preliminary information suggests that localized repair of gore segment may be possible since S-II-S Stage will not be subjected to cryogenic conditions. (If so, schedule impact can be minimized).

*fw 4. S-IVB Stage 150 Pound Thrust Attitude Control Engine Program was reviewed with TAPCO and DAC personnel at MSFC on May 6, 1964. TAPCO has successfully fired six engines, of essentially the final flight configuration, to the S-IVB/Saturn IB duty cycle. The first three engines for DAC system development tests were delivered on April 17, 1964. The final flight engine design utilizes improved fabrication techniques but does not change the operating characteristics. The first flight configuration engines are now in manufacture, with delivery to DAC scheduled for July 1964.

*fw 5. Instrument Unit Prime Contract - The RFQ to IBM for the IU prime contract was issued to IBM May 1, 1964, on schedule.

fw 5/11

B 5/14

NOTES-5-11-64-SHEPHERD

Sound Suppressor: Dr. Mueller has given us the authority ($165,000) to proceed with the foundation and substructure modification on the S-IC Test Stand at Mississippi Test Facility, as discussed in the meeting of May 1, 1964. In this approval Dr. Mueller limited us to substructure foundation work only, with the special instructions that we would not do any work toward modification of the superstructure. His intent here is both in design and construction on the superstructure. This restriction agrees with the conclusion you reached in the recent meeting. As you recall, the teletype requesting the authority stated that we would continue the R&D program to develop the techniques for sound suppression. Dr. Mueller apparently agrees with this.

FY-66 CofF Budget: The MSF Facilities Review Board has met on the Marshall FY-66 CofF budget, considering all locations except Huntsville. Our budget submission was:

Location	Dollar Amount
Michoud	$1.201M
Mississippi	2.096M
Various Locations	14.3 M
Huntsville	27.33 M

Lunar Environmental Chamber - $60M

The Board took the following actions:

Michoud - The Board concluded that adequate storm drainage could be provided for $300,000 rather than the $775,000 requested. Modifications to Slidell were deleted entirely - $426,000. The Board recommended that these items be funded from the Repairs and Alterations Program AO funds.

MTF - Deleted the Railway Terminal Building - $169,000 and the additional parking - $100,000. The Board recommended the additional parking be obtained from the Repairs and Alterations Program AO funds. The Board requested additional justification for the LH_2 storage facility - $517,000 - Why do we want land storage rather than barge.

Various Locations - The Board deleted the entire project for Facilities for Air Delivery of the S-II - $3.5M.

Lunar Environmental Chamber - $60M was referred to a NASA/Air Force Panel, chaired by Bill Fleming, to further define the requirements.

The cuts made will not seriously effect the program. A reclama may be made on some of these items. If facilities for Air Delivery for the S-II are required in the future, reprogramming action can be taken to provide the funds. The MSF Board meets today to consider the Huntsville location.

Jim Shep
Does this mean they'll put it to sleep?
B

NOTES 5-11-64 Stuhlinger

1. $1.9M FOR MMC AND VISIT BY DR. BISPLINGHOFF: A list of OART tasks, totalling $1.9 Million to cover the overrun in the MMC program, was compiled and furnished to Headquarters. The list is composed of tasks for which P&C had not yet initiated negotiations for contract. On May 18 Dr. Bisplinghoff and several members of his staff will visit MSFC for a review of the entire MMC program, including discussion of this reprogramming action.

2. SRT PROGRAM STATUS: The status of the portion of the SRT program managed by RPL is, as of May 8, 1964, as follows:

	ANNUAL PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED	CHANGE IN OBLIGATIONS SINCE MAY 4, 1964
OART	10,498,000	10,498,000	10,398,000	2,261,304	261,604
OSSA	675,000	675,000	665,859	90,000	0
OMSF	14,163,000	14,133,000	14,115,172	700,000	60,622
	25,336,000	25,306,000	25,179,031	3,051,304	322,226

3. FY-65 SRT PROGRAM: The FY-65 OSSA research program and those portions of the OART program for which this Laboratory has cognizance were forwarded to the Resources Management Office this week. This included only the MSFC requirements that came within budget guidelines. The guidelines were as follows:

OSSA: $ 620,000.00
OART: $10,550,000.00

The OMSF - MSFC research program for FY-65 ($13,000,000.00 - within guidelines) was submitted to OMSF on April 10, 1964.

4. LUNAR TECHNOLOGY MEETING: H. Schaefer from de Fries' office and I will attend a Lunar Technology meeting at OART this week. It is hoped and expected that OART support of MSFC's work in lunar technology and physics will result from that meeting.

May 18, 1964

File Bormon

NOTES TO MUELLER 5-19-64 DEBUS

1. PROJECT STABILIZATION AGREEMENT: Information received from KSC Labor is that Mr. Webb will sign agreement this week. This should release "hold" on award of P&C construction mentioned last week.

2. OPERATIONS AND CHECKOUT BUILDING, MILA: The FY-63 portion of the building is nearing completion. Beneficial occupancy inspections are scheduled beginning May 29, 1964 and extending thru mid-July 1964.

3. FEC OPERATION AND SWITCHING AGREEMENT ON GOVERNMENT OWNED MILA SPUR TRACK: The question has now been resolved on whether to implement the FEC switching arrangements through a contract based upon the Armed Services Procurement Act or an agreement based upon our leasing authority. Conferences in Washington last week concluded that the approach would be in contract form resting upon the authority of the Armed Services Procurement Act; standard language followed by DoD in its switching agreements would be used as nearly as possible.

We expect to complete a redraft of such a document early this week. Copies will be circulated to NASA Headquarters, KSC, and FEC personnel involved with a view to consummating this matter during the following week.

4. RF RADIATION HAZARD TO ORDNANCE CRITERIA: The AFMTC (now AFETR) has for the past two years been planning and working toward the establishment of 1 watt - 1 amp - for 5 minutes criteria for all ordnance used at AMR. Two hazard categories were created, namely; Category A, that which can cause injury to property and personnel (e. g. destruct charges); and, Category B, those which are more or less self contained (e. g., gas generators or explosive bolts). About a year ago all Range Users were informed that all programs on this range would be required to meet these criteria as of July 1, 1964.

For the Saturn vehicle these criteria do not create a problem since the ordnance requirements for the vehicle and all associated items have the required characteristics. Some NASA projects may be in for trouble.

5. MISSILE SITES LABOR RELATIONS COMMITTEE: A series of "show case" meetings are being held for the purpose of learning why there was a work stoppage in each of four labor disputes. The contractors and unions causing the work stoppages are requested to appear before the Committee. Two meetings have already been held with two more

scheduled. So far, the meetings have proven to be beneficial to both parties by affording an opportunity to fully discuss the problems and arrive at understandings that should reduce the chances for further work stoppages.

6. CATALYTIC - NAS10-1138: The conflict-of-interest development with Air Products was further coordinated with both the Legal Office and with Mr. Dan Linn of OMSF. Both offices have sustained the position that a conflict does exist. Telegraphic notification to Air Products informing them of our decision was dispatched on May 11.

7. EMERGENCY POWER FOR 37 STRUCTURE: Portable diesel generator power for the structure is now available and part of the move for RF tests was conducted on emergency power to prove out the transfer of power. Performance was satisfactory.

8. COMPLEX 36B (CENTAUR): The checkout of the new service structure has progressed very well, but the foundations for the tie-downs and the rail track are separate and a settlement difference has caused problems. Possible modification is being investigated to make the tie-downs adjustable.

9. HELIUM PURITY CONTROL: MSFC recommends, and we will receive a memo to this effect, that we should procure a mass spectrometer to check sample of the helium gas (est. cost $100, 000). The Range now has some of the equipment required and we have an agreement that we will use it for sampling if they get their equipment set up. I am having the MSFC requirement evaluated, as it appears unreasonable if we have a cold trap for N_2 in the system.

10. HAZARDS MONITORING SYSTEM: Design contract has been initiated. System will consist of two parts: a warning and alarm system for industrial area and a warning and alarm system for LC-39 and VAB area. Principal hazards included in this study are: (1) propellants, (2) ordnance and explosives, and (3) lightning and severe weather.

11. SLUSH HYDROGEN: Layout drawings of the 500 gallon slush hydrogen production tank were received from Cryovac (engineering services subcontractor to Wright-Patterson Air Force Base). Cryovac is engaged in the design and fabrication of this tank. Delivery of the tank to Wright-Patterson Air Force Base is expected in late May or early June 1964. This work is part of the study program in the development of design criteria for a slush hydrogen propellant facility.

12. LONG RANGE HELIUM TRANSPORTATION OPTIMIZATION STUDY: On May 5, 1964, two representatives of KSC attended the first progress review meeting of the "Long Range Helium Transportation Optimization Study" held at the Bureau of Mines, Amarillo, Texas. This first-phase report concerned helium gas transportation to Cape Kennedy by railroad, semi-trailer, barge, and pipeline. Based on Preliminary results, railroad tank cars, and the railroad "piggy-back" semi-trailers appear to be the most economical concepts for the next ten years. The "piggy-back" semi-trailer concept is particularly attractive to NASA and USAF logistics personnel at Cape Kennedy because of the flexibility of the system. A second progress review meeting on liquid helium transportation is tentatively scheduled for July 7, 1964.

13. UNIFIED S-BAND NETWORK, PROJECT 9144, ANTIGUA: GSFC (Greenbelt) has not completed final evaluation of the Antigua sites, scheduled for submission to KSC on May 1, 1964. To avoid facility schedule delays, KSC has sent a message to GSFC requesting immediate site evaluation decision. Further delay will cause slippage of design criteria by AFETR. Design completion is scheduled for December 31, 1964.

14. POSSIBLE INDUSTRIAL SABOTAGE: The Security Office was notified by NASA Industrial Relations Officer, John Miraglia, of an incident wherein electricians removed the fuses in a power system so that Blount Brothers could not finish pouring the concrete on one of their jobs. To complete the job, the Blount supervisor placed new fuses in the fuse box and completed the job in 45 minutes. This precluded ruining some of the concrete work. The electrical workers, upon returning to work the next day and seeing the concrete work finished, walked off the job. Investigation of the incident is being conducted to determine the individuals involved and action to be taken.

Gorman

NOTES TO MUELLER 5-12-64 DEBUS

1. P&C PENDING AWARDS: Lack of ratification of Project Stabilization Agreement by NASA continues to hold up award by KSC of the following projects:

a. Micrometeoroid Checkout Facility - Required by 1 August 1964 for support of SA-9. Available time to complete, barring unforeseen delays, is becoming critically short.

b. Air Conditioning Modifications for LC-12 Blockhouse - May have to be delayed until the first part of 1965. Schedules will be examined to determine if the work can be coordinated and performed at this time.

c. Lightning Protection for the Cable Trays Serving LC-37 - Needed at the earliest time possible. Extension of the completion date is preventing this improvement to be installed for use during SA-6.

2. PROJECT STABILIZATION AGREEMENT: Not yet effective due to conditional clause regarding administrative fund which must be reduced to agreeable form. Mr. Webb cannot make determination until Project Stabilization Agreement is effective. I understand that you have sent an impact letter to Mr. Hilburn requesting action to expedite determination under Public Law 85804. A total of ten contracts (Davis-Bacon Act involved) cannot be let until determination is made. Project Stabilization Board is inoperative pending receipt of extension of KSC Director's authority to represent the Administrator.

3. KSC POSITION ON MANAGEMENT OF STAGE CONTRACTORS AT AMR/MILA: KSC forwarded a letter to Mr. Gorman, MSFC Deputy Director Administrative, in reply to his letter to KSC concerning differences on the CCSD contract. The letter states that KSC must exercise technical direction of the MSFC stage contractors activities at AMR/MILA. This technical direction would not include direction to the contractors concerning vehicle engineering matters (hardware changes, specification changes, etc.). It further states that MSFC should include a technical direction clause in their stage contracts providing KSC this authority and, in the event that this cannot be done, we will recommend that KSC negotiate contracts with the various stage contractors for launch services. (General Phillips is fully briefed on this matter.)

4. SUMMARY STATUS OF S-IV CRACKED SLEEVE: All replacement tube assemblises installed. The sleeves were of MS 20819 specifications. This requires procurement under a military specification number. The "B"-nuts were of AN 818 specification, which also requires procurement under military procurement spec. Dr. Lucas found improper heat treat as the reason for the stress corrosion problem. The sleeves were heat treated as bar stock prior to machining. The replacement sleeve and B-nut assemblies were heat treated by DAC per agreement between DAC and Dr. Lucas. The new heat treated sleeves and B-nuts were exposed to a six hour accelerated corrosion test by DAC.

5. VAB STRUCTURAL STEEL: Approximately 5,000 tons of the 56,000 tons of structural steel have been erected. The East half of the low bay is completed, and 1,000 tons of steel have been erected in the West half of the low bay area. Steel in transfer aisle has been erected to the 190 ft. level. 1,750 tons of steel have been erected to a height of 152 ft. in Towers D and E (southeast high bay). 500 tons of steel have been erected in Tower H (southwest high bay).

6. CRAWLER-TRANSPORTERS: Structural testing of the crawler/transporter model at Southwest Research Institute, San Antonio, Texas (subcontractor to Marion Power Shovel Company) has been completed. The report on results is expected to be submitted by this subcontractor in about 30 days. On May 11, the first 750 KW, AC, diesel engine-generator set will be tested at White Motor Company, Springfield, Ohio.

7. FLAME DEFLECTOR AT LC 37: All work on contract NAS10-1287 for applying four inches of "Fondu-Fyre" refractory concrete on the flame face of one flame deflector at LC 37 (for the firing of SATURN SA-6) was completed on April 23rd. (This is a "scale test" for LC 39 deflector specs.)

8. BID PACKAGE DRAWINGS ON FABRICATIONS FOR SATURN V SERVICE ARMS - LC 39: The bid package drawings on fabrications for SATURN V service arms and related equipment for Complex 39 were prepared by KSC (Poppel, K-D). (Approximate total: 4500 drawings) We will produce a total of 55 one-half size formal packages, making a savings of 5,000 lbs. on materials and mailing costs. This is to be a fixed price contract.

9. THIRD FLOOR ADDITION TO O&C BUILDING: Bids opened April 30, 1964.

Apparent low bidder - H. J. High Construction Company - $1,012,800

One other bid received -	1, 128, 600
Government estimate -	1, 068, 462

It is significant to note that the District Engineer had attempted to negotiate this as a supplement to Hardeman's present contract for construction of the O&C Building. Hardeman's best offer was $1, 700, 000. Since the Government estimate was $1, 068, 462, the District broke off negotiations and advertised competitively. A savings of roughly $600, 000 resulted.

10. RELIABILITY TESTING OF SATURN GSE COMPONENTS: Contract NAS10-1360 was signed on April 24, 1964. This "service type" contract is to facilitate reliability testing of SATURN ground support equipment components. All work under this cost-plus-fixed fee contract is scheduled to be completed within one year by Brown Engineering Company, Huntsville, Alabama. Contract cost is approximately $477, 900. Approximately 52 companies were asked to submit proposals on their technical capability; 10 companies responded. Five proposals were technically acceptable prior to facility survey: (1) Beech Aircraft Corporation; (2) Douglas Aircraft Company; (3) Wyle Laboratories; (4) Brown Engineering Company; (5) Tapco-Roanoke Laboratories (of Thompson-Ramo-Wooldridge). After the facility survey, only three companies were considered acceptable and selected to submit cost proposals, which were rated as follows: (1) Brown Engineering Company (low bidder); (2) Wyle Laboratories (Huntsville); and (3) Beech Aircraft Company (Note: No flesh peddling!)

11. STUDY OF SOLID STATE SWITCHING CIRCUITS: A functional test of the solid state LOX propellant loading electrical systems (in conjunction with a vehicle and facility simulator) was completed satisfactorily at American Bosch Arma Corporation, Garden City, Long Island, New York. The overall purpose of this study is to determine the feasibility of replacing relay logic with solid state switching logic for propellant loading applications.

12. MODIFICATIONS TO PAD 19 - GEMINI: Approximately $425, 000 worth of modifications to Pad 19 are required for manned GEMINI flights. NASA Headquarters requested our position as to whether or not we felt that the modifications should be funded by KSC. It is our position that since we will have not control over criteria, design, or construction, we should not assume the responsibility of funding. However, in order to help MSC in starting design immediately, we have forwarded an order in the amount of $205, 000 to SSD who will accomplish the design and construction. This order will be withdrawn as soon as Houston is able to replace KSC funds with theirs.

13. UNIFIED S-BAND FACILITY: NASA Programs Division of the AFMTC has authorized its Civil Engineering office to proceed with the preliminary cost estimate and preliminary design criteria for the Unified S-Band Facility, Project 9144 at Ascension Island.

14. TRAINING: Thirty-one KSC employees participated in the "Procurement Management" seminar conducted locally May 4-8.

NOTES 5-18-1964 BELEW B 5/18

J-2 ENGINE

Engine 2006, the first ground-test engine for the S-II Battleship Program, is undergoing acceptance test checkout on test stand Delta 2B.

Negotiations with Rocketdyne were completed on May 15, 1964, for the definitization of Contract NAS8-5603 for the initial procurement of 55 each J-2 Production Engines, plus supporting hardware and services. We agreed to $83,867,025 estimated costs plus $5,650,000 (6.73%) of fixed fee, for a total contract value of $89,517,025.

H-1 ENGINE

R&D testing of the 200K H-1 engine is proceeding according to plan. The major problem now being encountered is with the beefed-up main LOX valve. Lab tests indicate that its inconsistent operating time is due to binding between the gate shaft and its needle bearings. The problem occurs under cryogenic conditions and with unfavorable tolerance build-ups. A design change is being implemented and no vehicle scheduled impact is anticipated.

F-1 ENGINE

The seventh F-1/S-IC interface meeting will be held at Canoga Park, California, on May 21, 1964.

Engine system testing at Edwards is scheduled to resume with engine 018 on May 15, 1964. Engine 020 is being installed in the test stand and testing will resume in about one week. The turbopumps on these engines will not contain the shot-peened impeller. Run times will be limited to short durations until the pumps are fitted with the modified impellers.

RL10 ENGINE

The launch date for the Centaur AC-3 vehicle is still indefinite. A review of prior successful insulation panel jettisoning test data indicates the electronic compartment experienced over-chilling due to helium leakage past seal between insulation panels. The seal is being redesigned.

Two 60-second Fluorine/Hydrogen firings of a RL10 thrust chamber were completed last week in the OART sponsored fluorine feasibility program. Mixture ratios were 11.8 to 1 for the first firing and 12.6 to 1 for the second firing.

The reduced throat-high expansion ratio chamber modification is currently in design. An IBM program to establish optimum nozzle contour has been completed, and turbine blade shapes and contours are being designed. The design will be completed by June 30, 1964.

B 5/18

NOTES 5-18-64 CLINE

1. F-1 ENGINE COMBUSTION STABILITY AD HOC COMMITTEE ACTIVITIES: A meeting was held at Rocketdyne to discuss injector development problems. The injector for the Flight Rating Test and the first flight engines is not ready for the production release. Other problems are chamber overheating and inconsistent instability damping time. Measured C* (Characteristic Exhaust Velocity) performance is well above specification requirements. These problems are being investigated; some schedule adjustments will be required. The committee members are meeting at Aerojet to discuss combustion instability in the Titan II second stage and in the Apollo Service Module engines.

2. F-1 TURBOPUMP EXPLOSION UNDER INVESTIGATION: Rocketdyne and MSFC personnel are conducting parallel investigations. A Propulsion Division representative at Rocketdyne is coordinating the program with vibration, materials, and test personnel. Emphasis is being placed on the design and operation of LOX pump rotating parts and seals.

Olly Hirsch 1.0. Why? B

3. INSTRUMENT UNIT PRIME CONTRACT: This Laboratory's comments to the scope of work were forwarded to Industrial Operations for inclusion in the Request for Quotations. The Contracts Office advised against incorporation of our comments and recommended that they be included during contract negotiations. It is hoped that these comments will be incorporated. This Laboratory's experience in having its comments incorporated into prime contract scopes during negotiations has not been exceptionally good.

4. DUMMY TURBINE EXHAUST FAIRINGS FOR SATURN I, BLOCK II VEHICLES: The addition of four dummy exhaust fairings on Saturn Block II Stages to eliminate the roll experienced on SA-5 flight is pending a decision by Astrionics Laboratory. Results of SA-6 flight test will contribute to a decision. Our Structures Division has been asked to continue preparation of documentation in case SA-7 has to be equipped with additional dummy fairings.

5. S-II UMBILICALS: North American Aviation, Inc. (NAA) informed MSFC that the 150-pound umbilical lanyard pre-tension mechanism, requested by KSC, will delay the umbilical delivery date by two months. The reason for the delay is based on modification of the carrier castings. Various pre-tension mechanism designs will be discussed between NAA and MSFC to prevent change of the carrier castings.

6. KIWI-B4D HOT REACTOR TEST: This test was completed 5-13-64. Checkout very smooth. Performance excellent. No reactor problems observed. Exit plume completely clean.

Fire on hydrogen inlet lines caused shutdown. Failure was determined to be in two-inch flexible line off main propellant line used to cool portion of reactor shell and nozzle bolt manifold.

All observers concerned with NERVA and KIWI consider test highly successful. Dr. Seamans observed from blockhouse; he and Mr. Finger were very pleased.

NERVA Technical Committee meeting was held 5-14-64. In response to Mr. Finger's request, Mr. Brooksbank of this Laboratory participated as the MSFC representative.

NOTES 5/18/64 CONSTAN

B 5/18

1. STATUS OF SI-10

SI-10 Booster is presently undergoing Final Acceptance Pre-Static Checkout. Overall testing is approximately 15% complete. Mechanical testing began this week with minor problems which Chrysler Corporation Space Division is presently in the process of correcting.

B 5/18

NOTES 5-18-64 DANNENBERG

1. Propellant Loading System - An R&DO evaluation determined that there is not sufficient justification for deleting the capacitance probes from the S-IC and incorporating a ΔP system. This change would result in a program impact (in terms of cost and possibly schedule) that is not significantly balanced by the gains.

2. Q-ball - Astrionics and Aero-Astrodynamics are preparing an analysis of the Q-ball requirement (as compared to available guidance system output) in order to satisfy Dr. Mueller's request for another briefing in the next PRB meeting. In the meantime, an MSC/MSFC group determined that ΔP measurements from Q-ball (rather than actual angle of attack indications) suffice for EDS purposes from 40 to 100 seconds flight time. There is little indication presently that the Q-ball job can be done by the present guidance system.

3. MORL Project - Arrangements have been made with Dr. Yarymovych, MSF, and Mr. Gordner, Langley, to provide you a briefing on the Manned Orbital Research Lab in early June. Dr. Yarymovych stated that he could also provide some information on the Apollo X concept and the Air Force MOL Project at this briefing. (An informal high-level briefing is being considered.)

4. Regarding your question (Notes 4-20-64, Conf.) on Gemini - Saturn IB/Centaur circumlunar mission, "What official status has this study with MSF?", no official status so far.

According to phone call with McClard on 5/20/64, this briefing is set for June 16, 1964 at 10 a.m.

B. Holmes
5/21/64

NOTES 5-18-64 FORTUNE B 5/18

1. MTO Managers - of Boeing, North American Aviation, and General Electric met with us Monday and were brought up to date on construction progress, development of individual activation plans for each facility, and possible troublesome labor relations interfaces between union brick and mortar laborers, technical systems technicians and GSE crews. Boeing, of course, will be union, but North American Aviation and General Electric not. Bob Sheppard advises a statement may soon be issued urging all construction contractors to sign the Project Stabilization Agreement regarding hiring only through the union hiring halls. The government can urge but not insist on this, and the union hiring halls must refer all applicants whether they are union or not, so we will not have a closed shop by any means. Each manager agreed to name a contact man for industrial relations to work with Aetron, MDO representatives, and us in attempting to forsee and minimize labor problems. Next manager's meeting will probably be in Huntsville in about six weeks with emphasis on Boeing's test plans, and the following one, three months or so hence, at Santa Susanna to see All-Systems and Battle-Ship test stands. ✓

2. Tuesday's visit a good one from MTO viewpoint - Have had many inquiries as to how you thought things were going here, and many comments of appreciation for probing need for improving Mississippi education, giving the employees and workers a chance to see you all, and helping us to crystallize our thinking in the areas of contractor performance, build up, fee, etc. ✓

3. Negotiations with GE - were at an impasse Tuesday because of disagreement on prior approval of staffing plans. After our discussions with you and Bob Young, I wrote a memo to Olkie Hirsch discussing your philosophies and asked that he work with us to achieve them. Negotiations resumed Wednesday, with restatement of our firm intention of maintaining positive control of the support contract. We do not have Eaton's reply yet. Thursday and Friday, component services, acoustics, central control, cryogenics and data systems were covered satisfactorily. ✓

4. Monthly Status Review Meeting with Corps of Engineers - was held at MTF Friday. Emphasis was put upon getting firm beneficial occupancy dates from the Corps of Engineers with consideration to computerizing not only brick and mortar critical paths, but also utilities, communications, other equipment such as heating or air conditioning, sanitation, access roads, sidewalks, and parking spaces so that we can better predict when facilities will be fully operational. ✓

NOTES 5/18/64 GEISSLER B 5/18

1. Research Advisory Committee Meeting at Houston: Last week I attended a meeting of the Research Advisory Committee on Space Vehicle Aerodynamics at MSC, Houston. A major portion of the meeting was devoted to a discussion of the Apollo heat shield design. It came out clearly that there is quite some uncertainty as to heat input, and even more so as to the behavior of ablator (char layer) under external shear forces. A forthcoming firing of a Scout vehicle is expected to throw some light on this, but will not give a final answer because of small scale and substantially lower stagnation temperatures. A discussion about planetary atmospheres led to a resolution calling for more systematic efforts to provide early information about the Mars atmosphere, which could be used as design input for a major manned Mars landen. In particular it was suggested to (a) modify a forthcoming Mariner C flight to perform an occultation experiment, which would reveal groundpressure (this would involve only a change in trajectory shape, but is in conflict with a Van Allen experiment, (b) try to get a balloon program started for observation of planetary atmosphere observations. (c) sponsor a simple drop test experiment proposed by Ames as part of forthcoming Mars flights.

2. Orbital Debris: The entry survivability dispersion and an impact velocity prediction for Saturn SA-8, 9, and 10 have been completed and published by LMSC. The total surviving weight of the Debris stages of these vehicles for the 95 percent confidence level, was found to be at least 3466 pounds (10.4 percent of the total orbiting weight) and consists of 53 pieces. The disconnect plate of the Service Module has the maximum down range dispersion of 2230 kilometers and a maximum cross range dispersion of 198 kilometers. The maximum down range dispersion for all pieces is 3500 kilometers.

3. Flight Control Operations Panel: The eighth FCOP meeting was held in Houston on 5/14. General Phillips will chair future Joint Operations Meetings (JOM) (succeeding W. Williams). Capt. Holcomb is proposing to dissolve the Communications and Tracking Steering Panel and Working Group and have their functions transferred to the JOM's and Apollo Panels as applicable. No objection from our side. An interesting comment was received from Bellcomm and MSC concerning the midcourse guidance scheme for Apollo missions. They are now considering ground tracking (DSIF type) and not the astronaut sightings as primary data source.

Take up with KSC

4. Frequency of Thunderstorms at Cape Kennedy: The mean number of days with thunderstorms within hearing distance (approximately a 25 mile radius) during the summer months is 15 days per month. From November through January the mean number is one thunderstorm per month. On the basis of these statistics it would appear that engineering methods or techniques should be devised to minimize the hazard due to atmospheric electricity. Otherwise, a considerable loss of time due to precautionary measures of removing personnel from the structure during potential thunderstorm conditions can be expected.

NOTES 5-18-64 GRAU

B 5/18

1. S-I-7 POST-STATIC CHECKOUT: Post-static checkout was completed on May 15, 1964, and the S-I-7 stage released to Manufacturing Engineering Laboratory for preparation to ship. The stage will be shipped short two (2) fuel sensors which are on procurement and are to be installed at Kennedy Space Center.

2. S-IU-7 INSTRUMENT UNIT CHECKOUT: Final checkout was completed on May 14, 1964, and the S-IU-7 Instrument Unit released to Manufacturing Engineering Laboratory for preparation to ship.

NOTES 5-18-64 GRUENE B 5/18

1. SA-6 Status

a. The reinforced screen in the lox sump of the S-IV Stage was exchanged last week and the lox tank cleaned. Lox loading test was successfully performed Sunday, May 17. We have not received full flight qualification from DAC on the new reinforced screen. The outcome of these qualification tests is expected today. However, we had no doubt that the screen would be qualified and, therefore, went ahead with our lox loading test.

b. The Simulated Flight Test is presently scheduled Wednesday, May 20, and the vehicle will be fueled on Saturday, May 23. The first part of our count will be started on Monday, May 25; the second and final part, midnight May 25/26.

c. Dr. Shea reported the spacecraft sequencer as flight qualified.

2. We briefed Dr. Mueller on Friday, May 15 on the SA-6 status at the Cape. He showed interest in the following points:

a. Lifetime of batteries after activation.

b. Elimination of the C-Band Beacon in the IU in future Apollo flights when two C-Band Beacons are contained in the spacecraft.

c. Debugging of RCA 110 programs using a different (7094) computer as vehicle substitute.

d. Unexplained random short period failures during checkout.

e. Exchange of gyros on the stabilizer at the Cape.

What?? B

f. Possible elimination of launch escape tower on missions SA-9, 8, and 10.

I informed Col James in detail on these points in case they should come up in the Council meeting.

NOTES 5/18/64 HAEUSSERMANN B 5/18

1. RCA-110 SYSTEM FOR SA-6: During testing of SA-6 several problems have occured with the RCA-110 system. The most serious of these was the issuing of random discrete outputs to the vehicle. (Dr. Gruene's notes of 5/4) This occurred because the programs attempted to initialize the system by turning off 504 discrete outputs from the RCA-110 simultaneously. When this is attempted the instantaneous driving capability of some of the RCA-110 circuits is exceeded and because of the resultant noise conditions, random pulsing of discrete outputs occurs. This problem arose because the programers were not adequately informed by the hardware designers concerning the system limitations. The problem will be resolved by limiting through program control the number of discrete outputs to be exercised simultaneously. In addition for SA-6 all discrete output connections to the vehicle that are not required for RCA-110 operations have been removed. No ground computer system hardware failures have been experienced during SA-6 operations. To avoid reoccurence of this problem, we are improving documentation coverage and establishing preventative procedures for the programing.

2. ST-124 SLED TESTS: The modified ST-124-1 platform performed satisfactorily through the complete series of sled test runs at Holloman AFB. Two runs were made with the X-axis down track and two with the Y-axis down track. Closed loop optical alignment of the platform used for these tests produced accelerometer data which agrees very closely with real time sled acceleration.

3. VISIT OF OTDA OFFICIAL: Mr. C. R. Morrison, Director of Program Support and Advanced Systems in OTDA, will be visiting MSFC for one or two days during the week of 5/8, for the purpose of reviewing work being done on AROD System development and on other OTDA funded tasks. Plans are being made for him to see work being done on AROD at Brown Engineering, as well as for a familiarization with capabilities of the Instrumentation and Communication Division and the Computation Laboratory in the areas of tracking, data acquisition, data reductions, etc.

4. AZUSA TRANSPONDER ON SA-6: With reference to recent note from Dr. Gruene, the difficulties with the Type C Azusa have been isolated and repaired. This is the first time the Type C Azusa has been used on the Saturn. The older Type B1A is no longer in production. As you know, all Azusas are procured from General Dynamics through the Air Force. The Air Force has flown about 50 Type C transponders and has experienced difficulties. We were not informed of ~~this~~ these difficulties by either General Dynamics or the Air Force prior to the troubles on SA-6. During checkout, it was discovered that a 500 Hz oscillation plus interference from the air bearing heater thermostat were present at the Mark II ground station. The active filter normally supplied with the transponder had an inductor that was resonate at 500 Hz, a built-in factory design fault. Removal of this inductor completely cleared up the trouble.

NOTES 5/18/64 HEIMBURG

B 5/18

1. S-I STAGE TESTING (STATIC TEST TOWER EAST):

A short-duration firing of S-I-8 will be made on Thursday, 5/21.

2. S-IC-T:

K.H Be glad to: 1 hr. Please lay on with Bonnie B

During the week of 5/11, Messrs. Cline, Grau, and Heimburg, together with five Boeing personnel, visited seven subcontractors of Boeing in the Los Angeles area to survey problems. It was determined that the principal action required is in the area of quality. A discussion of the results of this visit will be conducted with Industrial Operations (and yourself if you have time). I recommend that similar surveys be conducted for the S-II and the S-IVB stages.

3. S-IC TRANSPORTER:

(Reference NOTES 5/11/64 HEIMBURG (copy attached)). Pictures of the transporter during the tests described in the referenced NOTES are attached for your information.

4. MTF WORKING GROUP:

Messrs. Silverstein and Godman from Lewis Research Center and Sloop and Mahon from NASA Headquarters visited MTO on 4/23 to discuss facilities for Atlas vehicle tests using flox. The MTF Working Group furnished an analysis of the impact of such work to Dr. Silverstein on 5/8. We received word from Dr. Silverstein that this information had been forwarded to NASA Headquarters. A copy of the information transmitted to Dr. Silverstein has been furnished to Mr. Weidner for his information.

5. S-IC TAIL SERVICE MAST:

(Reference NOTES 5/11/64 HEIMBURG(copy attached)). The vehicle skin segments for use in the "Dickie Bird" test were received from Boeing on 5/15. The remainder of equipment for this test is still deficient.

6. F-1 ENGINE COMPONENT TESTING:

a. Gas Generator. This test facility is now back in operation following the incident which occurred in 1964. The facility was out of operation longer than originally anticipated; however, we were unable to put the necessary people on it, due to higher priority projects. A prototype generator was operated for 5.4 seconds on 5/15 with essentially satisfactory results. This test setup will be used to evaluate improvements in the F-1 gas generator.

b. 17-inch Lox Prevalve. A test series was conducted on 5/12 to evaluate the modified visor lip seal for the AiResearch Corporation valve. The results indicate that the valve can be safely operated with a closing time of 1.6 seconds at 27,000 g.p.m. LN_2 flowrates. This modification will be incorporated into the F-1 R&D engine at the Static Test Tower West.

ATTACHMENT 1: 3 photographs (attached to Dr. von Braun's copy only).
ATTACHMENT 2: NOTES 5/11/64 HEIMBURG (to Dr. von Braun's copy only).

NOTES 5-18-64 HOELZER

B 5/18

Negative Report

B 5/18

NOTES 5-18-64 JAMES

SA-6: S-IV-6 - During propellant loading test of May 11, the PU system malfunction and inspection revealed that the PU probe was shorting out due to pieces of wire screen mesh in the LOX tank. Further investigation revealed the LOX sump screen had been shredded. A reinforced upper screen and a screen filter at the LOX umbilical interface are being added. This has caused a 6-day delay in the SA-6 launch.

SA-7: S-I-7 - Due to a failure in the main bearing of the LOX flow control valve on S-I-9, the valve on S-I-7 was pulled for inspection. The valve was found to be satisfactory and was replaced, however, additional purging and testing of the GOX system has caused a slip of 6 days in the delivery of S-I-7 to KSC. The stage will be shipped on May 28.

S-IV-7 - Post static checkout is proceeding on schedule, simulated flight is scheduled to begin May 23, and due to the problem on S-IV-6, the shipment of S-IV-7 to KSC is now scheduled for June 8.

LES Tower for SA-9, 8 & 10: KSC has raised the question of flying LES tower on SA-9, 8 & 10, in a memorandum from Mathews (of Petrone's office) to Col. James and Dr. Johnson. Reasons cited for elimination are: possible failures in LES system, launch complex safety requirements during a thunderstorm within 5 miles of the complex, LES failures (particularly in the sequencer), and elimination of NAA people at AMR operations. I had hoped this problem was dead once and for all since we had previously settled this problem with Dr. Mueller and MSC (reference: Letter to Dr. Mueller from Dr. Rees, dated February 14, 1964, copy to MSC). My people are checking today to confirm the previous MSFC position on the requirement to fly LES.

S-IVB Procurement Plan for Follow-on Stages: S-IVB/IB delivery schedules are being jeopardized by delay in approval of the Procurement Plan for additional S-IVB flight stages and related GSE. The GSE is required in the SACTO Post Static Firing Checkout Building for checkout of S-IVB Stage 201 in order to release the test stand for Stage 202. Fabrication of S-IVB Stage 205 components must begin in July, requiring immediate authorization of certain engineering releases and material procurement. The procurement plan was handcarried to MSF on April 1, 1964, with a request for approval by April 13, 1964, in order to permit initiation of contractual action. (MSFC and DAC are presently meeting to define an interim contract which can be immediately implemented upon receipt of the above approval.)

See J. So had J. Seissler absolutely insists on using LEM. Reasons; Aerodynamics, need for repeat of dynamic tests, different control gain settings etc. B

Why? LES is part of overall system! B

Suggest you steam up Sam Phillips. LB

B 5/18

NOTES 5-18-64 Koelle

1. COST MODEL TO RAND? We have a preliminary cost calculation model for SATURN-type vehicles on our 7094 computer, of which the RAND Corporation would like to have a copy (deck of cards). They are under contract with NASA Headquarters to assist them and us in developing cost estimating procedures for advanced space vehicles. We concur with their request as they will help us to make better cost estimates. Would you go along with this? Yes B

2. FY 1965 MSF STUDIES FOR MSFC: The following studies have been identified by Mr. Gray for MSFC and recommended to Dr. Mueller:

(1)	Orbital Launch Operations and Support Facilities	650
(2)	LESA Space Vehicle Concepts Definition	500
(3)	LESA Payload Concepts Definition	1,500
(4)	LESA Operations Studies	400
(5)	Lunar Exploitation Concepts	200
(6)	Lunar Exploitation Space Vehicle Concepts (Nuclear Ferry)	150
(7)	Planetary Mission Requirements	200
(8)	Nuclear Electric Mars/Venus Missions (possibly LeRC)	200
(9)	Mars Surface Operations	200
(10)	Support and Logistics	200
(11)	SATURN Improvement	2,000
(12)	Reusable Orbital Transport	1,000
(13)	Post-SATURN	750
(14)	Cryogenic Tanker	250
(15)	Cryogenic Utility Space Stage	500
(16)	Payload Application Studies	300
(17)	Launch Vehicles Systems Criteria	400
(18)	Launch Vehicle Cost Studies	250
	Total 10^3	$ 9,650
	Out of	
	Total MSF 10^3	$ 22,100

Our share is about 43 per cent - a few per cent more than last year.

This list is subject to change, as it will be reviewed by Dr. Mueller, The Fleming Review Board, and Dr. Seamans.

We do not expect to receive funds and authority to proceed before Fall of this year.

In addition to the above MSF studies, we have submitted 20 studies to ART for consideration, totaling $3,125,000. This is expected to shrink considerably in the review process. All in all, we expect to have about the same amount of "business" for FY 1965 as we had for FY 1964, namely 40 studies with $10,000,000.

B 5/18

NOTES 5-18-64 KUERS

1. Micrometeoroid Capsule, Refurbishment of Boilerplate #9 Command Module: Reference NOTES of Mr. Cline 5-4-64 (Copy attached). This must be a little misunderstanding. The statement of ME Laboratory in the minutes of the Saturn/Apollo Mechanical Integration Panel Meeting reads: "If ME Laboratory is to refurbish and up-date BP-9, it will be necessary to make further investigations into facility, schedule, manpower, etc. requirements before making final commitments as to in-house capabilities." However, in the last Integration Panel Meeting, last week, after thorough analysis of the job, it was the consensus of opinions of all participants (P&VE, Test, Quality, and ME) that the refurbishment should be carried out by NAA.

2. LEM-Manufacturing Review Meeting at Grumman: MSC requested participation of ME Laboratory personnel at this meeting which took place on May 11 and 12 at the Grumman Aircraft Company. As one result of this meeting ME Laboratory was requested to participate in a review of some subcontractors to Grumman who develop Inconell and Titanium spheres for this project. Because of manufacturing and welding problems this development is already approximately 15 months in delay. MSC is forming a team for this review with a member from the Goddard Center, Lewis Research Center, and MSFC-ME. This team will visit the companies involved at Bolder, Colorado, and Los Angeles, and will then convene at Houston for a final meeting. This will take place during the last week in May.

3. Saturn V: The work on the lower fuel tank bulkhead, S-IC-S, was completely brought to a halt last week when numerous cracks in the fuel outlet elbows, manufactured by Boeing, were discovered. Ten such elbows provide for the connection to the 12 inch fuel ducts. Subject elbows were delivered in February 1964 with 6 weeks delay versus Schedule VII. They had to be shipped back for rework of excessive offset in the welded areas, which contributed 6 more weeks slippage of the -S schedule. The cracks were discovered after we had the elbows welded into the bulkhead gores and age sizing completed. Meanwhile, similar cracks are found on nearly all of the Boeing produced elbows, affecting the already completed fuel tank of the -T vehicle and the elbows in-process at Michoud. We gave the go-ahead to Boeing Management, Michoud, to go into emergency back-up production of elbows, using modified manufacturing processes. The evaluation of the nature of the cracks and repairability is presently going on at Michoud and Marshall. How far the situation will build up into a major impact on the schedules of the -S and -T vehicles has to be seen.

NOTES 5-18-64 MAUS B 5/18

1. MANAGEMENT ADVISORY COMMITTEE FOR MANNED SPACE FLIGHT - Ray Kline is coordinating the June 4 visit of the Kelly Committee. The proposed agenda has been reviewed with Dr. Rees and Messrs. Gorman and Williams. We are proposing to Dr. Mueller's office that the entire MSFC program be held at Michoud. Why? B

2. APOLLO EXECUTIVES CONFERENCE - Ray Kline is also handling local arrangements for the Apollo Executives Meeting on June 17, 18, and 19. Dr. Mueller wants to concentrate on contracting policies and procedures at the conference. HM Request briefing B

3. MARSHALL MANPOWER REQUIREMENTS - The meeting between Dr. Mueller and Dr. Seamans on impact of a 500 space reduction (from 1,000 to 500) for Manned Space Flight for FY65 is now scheduled for May 22, 1964. We are preparing additional data for Mr. Gorman's use in the briefing.

4. FY66 BUDGET CALL - We are collecting and compiling guidelines for preparation of the final MSFC FY66 budget call. We have requested guidelines including new starts from headquarters. MSFC guidelines must be frozen and the formal call issued on May 22, in order to comply with the tight schedule required to make the August 1 POP 64-3 submission deadline.

5. APOLLO DATA MANAGEMENT PROGRAM - Second meeting of the Apollo Data Management Program Task Team will be held in NASA headquarters on May 20, 1964. MSFC efforts are a little behind schedule, due to setting up the requirements survey on the computer to expedite the analysis phase.

In general the survey is progressing reasonably well. We are, however, experiencing difficulty in obtaining cooperation of some of the laboratory representatives. I do not feel that this effort should be continued unless it will be properly supported. Chris Andressen has discussed this problem with Mr. Weidner, who has assured his complete support.

B 5/18

NOTES 5-18-64 McCartney

1. MANAGEMENT POLICY FOR RESEARCH AND TECHNOLOGY PROGRAMS: In coordination with the Research Projects and Future Projects Offices, my staff has been developing an R&D Operations policy paper on management of our assigned research and technology programs. The intent is to establish a clear-cut functional management system for these programs within R&D Operations. We are now in final stages of preparation. Early in June, I expect to present the coordinated position to R&D Operations management for review and decision.

2. COMPUTATION LABORATORY RESPONSIBILITIES: During a May 7 meeting with Dr. McCall, Computation Laboratory, and members of my Operations Engineering Group, it was agreed that Computation Laboratory will provide all computer programming services for Marshall. Certain labs now provide their own programming services. Plans are now being completed to transfer these services to COMP. Necessary manpower adjustments are being made in COMP's single support contract. COMP and R-RM personnel will visit each involved laboratory to assure smooth transfer of responsibility and minimize manpower impacts.

3. SATURN I FY-64 BUDGET: On May 15, $4.5M were reprogrammed to IO. About $1.8M remains uninitiated and will be used to maintain routine operations for the balance of the fiscal year.

4. FY-65 BUDGET PLANNING: On May 12, we were advised that IO management had decided to cut the FY-65 Saturn I Vehicle Support funds in half: from $14.3M to $7.3M. We understand that the decision was made because Saturn I engineering effort was too heavy, considering the lateness of the program. A preliminary look indicates that the reduction will seriously affect the R&D Operations Mission Support requirements. My budget people are now analyzing the impact. In doing so, they are working closely with my Manpower Group, which is making a mission support study to determine total mission requirements for all the laboratories.

5. RESOURCES MANAGERS CONFERENCE: The fourth Resources Managers Conference was held May 12. My staff is following up problems disclosed during the meeting.

6. SUMMER STUDENT PROGRAM: R&D Operations has been allocated 119 (of 160) summer students. On May 12, we distributed the apportioned spaces to the laboratories.

NOTES 4/18/64 RUDOLPH

B5/18

1. Boeing Mission Support - MSFC's recommendation concerning the proposed assignments in the area of Saturn V Launch Vehicle System Engineering and System Integration to Boeing was approved by Dr. Seamans on May 8, 1964. We understand that Dr. Seamans discussed the plan with Mr. Webb on Friday, May 15, 1964. We expect Mr. Webb's approval, however, as of this morning, (May 18, 1964) we have not been able to determine the outcome of the Seamans discussion with Webb.

2. S-IC Stage:

Forward Handling Ring: The second Forward Handling Ring failed during proof load tests at Michoud. Cracks developed in the center hub joints which were welded at Wichita. The Ring was repaired and shipped from Michoud to MSFC on May 11, 1964. Future Rings will be fabricated and assembled at Michoud in view of the fact that a large number of defects in welds performed at Wichita during subassembly fabrication have been found.

Thrust Structure Assembly - It has been determined to be beneficial to the program to transfer to the Boeing Company, structural assembly of the Thrust Structures for S-IC-S, -1 and -2. Action is being initiated to effect this transfer. This transfer is a result of R-ME Lab work load.

3. S-II Stage:

NAA/S&ID Capital Facility Investment - MSFC has received NAA/S&ID letter dated May 11, 1964, outlining the NAA/S&ID proposal to NASA Headquarters for increasing capital facility investments in support of NASA space programs. The contractor proposal is contingent upon NASA providing a new general office/engineering building at Downey for an estimated cost of $2,800,000. The contractor is proposing to provide $1,600,000 in additional facilities for the S-II program.

S-II-S Stage Common Bulkhead - Localized repair of the buckle deformation, which occurred in one gore segment during the bonding cycle of the honeycomb core to the lower facing plate, is now in progress. This problem is expected to delay completion of the common bulkhead approximately two weeks; completion date was June 19, 1964, and is now expected to be July 3, 1964.

4. S-IVB Stage Battleship Program - The Cold Flow Program is now scheduled to start June 1, 1964 and the Hot Firing Program August 1, 1964. Lox and fuel tanks instrumentation installation is nearing completion. Electrical integrated checks are approximately 35 per cent complete with no major problems to date. Some difficulty has been encountered in getting an engine "cut-off" signal back from the electrical control package during the check-out of the J-2 engine. Resolution has not been determined at this time but it is probable that the control package will require repair or replacement.

NOTES-5-18-64-SHEPHERD B 5/18

FY-66 CofF Budget: The MSF Facilities Review Board met on the Huntsville FY-66 CofF budget. The actions are not final as yet, it is expected that the Board (Messrs. Lilly, Diaz, Freitag, Phillips, Gray, and Bothmer) will meet today for final action. The following is a list of the projects we submitted with a note as to the expected action:

	Estimated Cost	Anticipated Approval
Additions to Materials Laboratory, P&VE	1,173	Yes
Non-Destructive Testing Laboratory, P&VE	750.	Yes
Expansion to Computation Lab, Comp.	3,076.	No
Space Vehicle Research Lab, Res. Proj.	1,500.	Yes
Special Power Source Dev. Lab., Ast.	924.	No
Extension to High Pressure Gas Sys., Test	1,500.	?
LOX Storage Facilities for F-I Stand, Test	800.	No
Third Dual Test Position at Components Test Laboratory, Test	1,600.	No
Mission Contractors Building, Test	500.	Yes
Mods. to Special Projects Test Area, Test	900.	?
Space Systems Vacuum Facility, Test	9,710.	?
Engineering & Laboratory Bldg., Gen.	3,000.	No
Primary Utility Extension, General	1,900.	Partial
TOTAL	27,333.	

After final Board action we may be given an opportunity to reclama, to the Board, any projects cancelled. This reclama will probably be scheduled May 21 and 22.

North American Aviation's (NAA) Proposal for New Office Building at Downey: Approximately one month ago NAA proposed to NASA Hdqs. to construct a new office building at Downey, consisting of 160,000 sq. ft. and an estimated cost of $2,774,000. They requested that NASA lease to NAA the necessary land for 11 years, one year for construction, 10 years for use. At the expiration of the lease the title to the building and other improvements would pass to NASA. NASA Headquarters has anticipated difficulity in leasing the land to NAA. The latest proposal to NASA from NAA is for a trade under which NASA would construct the building and NAA would capitalize an equivalent dollar value of machinery and equipment for the S-II, F-I and J-2 programs. This does not appear to be attractive for two reasons: (1) The items which NAA proposes to furnish are items which the technical review has already indicated are not required for these programs, and (2) such a trade would materially jeopardize the negotiating position which Marshall is presently taking regarding NAA capital. The best solution for the Government appears to be the original NAA proposal, under which they would finance the building on a position of Air Force Plant 16 at Downey which NASA would lease to them.

Shep
That is MSF's position? This is a joint S II Apollo requirement, isn't it? Then could we technically make the money available? B

DIR Dr. von Braun

Reference Stuhlinger NOTES of 5-18-64 (copy attached). In view of the reported confusion in the last staff and board meeting, I wanted to make certain that you get a very clear picture of the status of our FY 64 funds. The announced move of P&C to the new office building will not be a part of this picture since it will have no effect whatsoever on our ability to accomplish what we have set out to accomplish. The move will be made at night or whatever other time will result in no interference in processing the workload.

DEP-A Harry Gorman 5-26-64

B 5/18

NOTES 5-18-64 Stuhlinger

1. STATUS OF METEOROID SENSOR: Dr. Johnson and I visited Schjeldahl, where a difficulty with the meteoroid capacitor-sensor had arisen during long-term temperature cycling. It seems that the problems (electric shorts near the places where leads are attached to the thin capacitor flakes) can be solved within the existing schedules.

2. FLIGHT TESTING OF ENVIRONMENTAL EFFECTS SENSORS FOR APOLLO: Due to the recent failure of the OSO Satellite, S-17, at Cape Kennedy, the flight experiment of environmental effects sensors is without flight carrier. The experiment, which is funded by MSC and implemented by Ames Research Center and Ball Brothers, carries the thermal control coatings to be selected for the APOLLO CMSM. RPL participated in this experiment by testing some of the samples and by helping in the selection. We were asked by Ames personnel to explore the possibilities of flying it on a SATURN I vehicle. Consequently, we will try to get it on the SA-10. Flight testing on SA-9 and SA-8 is out because of scheduling problems. → Please send me ½ page of details B

3. SRT PROGRAM STATUS: The status of the portion of the SRT program managed by RPL is, as of May 15, as follows:

	ANNUAL PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED	CHANGE IN OBLIGATIONS SINCE 5/8/64
OMSF	14,163,000	14,133,000	14,115,172	1,044,205	334,205
OART	10,498,000	10,498,000	10,398,000	2,261,304	0
OSSA	675,000	675,000	666,801	94,779	4,779
	25,336,000	25,306,000	25,179,973	3,400,288	348,984

4. MSF COMMENTS ON FY-65 SRT SUBMISSION: OMSF found our FY-65 SRT Program acceptable as written, but suggested strengthening the write-ups by indicating when the results can be incorporated in the present lunar program. Tasks of interest to OART should continue to be submitted to OMSF for transmittal to OART.

Katy Gorman

Is that wise? B

5. ASSISTANCE TO P&C: Mr. R. Doherty of RPL's Resources Management Office has moved to P&C for a period of two weeks to assist in processing of SRT procurement actions. The announced move of P&C to new quarters late in June appears to reduce the chances that all funds will be obligated prior to July 1.

6. UNIVERSITY OF ALABAMA - HUNTSVILLE CENTER: Following the announcement of the undergraduate degree in Huntsville in the areas of Mathematics, Physics, History, and English, the University of Alabama has initiated a vigorous fund raising campaign. The Army and NASA have been asked to lend support.

May 25, 1964

NOTES 5-25-64 BELEW B 5/28

*fw J-2 ENGINE

Engine 2006 completed its final acceptance test on May 20, and is currently undergoing post-test checkout. It should be delivered to S&ID within the next two weeks. This is the second delivered hot firing engine.

Engine 2005, PFRT engine, is currently being installed on Delta-2B for acceptance testing.

Three engine system tests have been conducted utilizing an experimental fast opening main LCX valve. On all three tests, the engine went through transient without the side load restraining arms being attached. These results are preliminary, but are encouraging.

*fw F-1 ENGINE

Injector 092 and 081 were released as parallel injectors for FRT. Both injectors have demonstrated good damping and high performance characteristics, and were tested in tube wall thrust chambers. Injector 092 is being installed in engine 020 and will begin testing the first part of next week.

Injector X035, a three baffle 5U triplet injector that has a history of never damping from instabilities, was modified by plugging all LCX orifices 1/4 inch from the baffles. After modification, damping occurred within one cycle.

Engine system testing has resumed at Edwards with the testing of engine 018. Resumption of testing of the F-1 at MSFC will be continued upon the receipt of a turbopump modification kit scheduled for May 29.

*fw RL10 ENGINE

An RL10 engine using an internally insulated pump has completed an "instant-start" firing (that is, no cool-down was required on either the fuel or LCX side). Kel-F insulation sprayed onto the pump internal surfaces inhibits heat flow from the metal pump parts to the propellant; the engine ran 360 seconds. This demonstration was preceeded by 22 turbopump starts using zero chilldown totaling 288 seconds of operation and 1 3/4 hours accumulated steady state testing to establish endurance of the internal insulation.

It was planned to decrease the RL10 engine throttling and low-idle work for FY '65, pending a more firm requirement; however, your comments in the board meeting indicate support may be forthcoming to continue at about the current or increased level. Lee I hope so! GEM's attitude to this is generally favorable, but he is still "counting all his money". B

GENERAL

Results of RL10 Fluorine Program 12 Firings, chamber pressure of 300 psi, MR 5 to 1 up to 12 to 1, 12 runs for a total of 370 seconds. All firings were on thrust chamber injector. Looks good at high MR relative to chamber cooling.

Tw 5/25

NOTES 5-25-64 CLINE

B 5/28

1. MAIN LOX VALVE FAILURES CONTINUE: Investigation of retrofit type Main Lox Valve failures revealed interference between the shaft bearing and the shaft. A modified valve with increased clearance was tested and it also failed. Further investigation is underway.

Bonnie Where is it? B

2. KIWI REACTOR TEST: (Reference NOTES 5-11-64 CLINE, paragraph 2.) Detailed report forwarded by Memorandum R-P&VE-N-64-60, dated May 21, 1964, subject: KIWI B4D Full-Power Test.

3. S-IVB STAGE QUARTERLY REVIEW 5-14-64: Ted Gordon, Douglas Aircraft Company (DAC), reported that the Qualification Test Program was nearly one year behind because of design and procurement problems.

DAC and MSFC were reported to have reached an agreement to relax the vibration test requirements.

Repair of the Dynamics Stage hydrostatic test structural failure is complete and the cause has been corrected.

DAC reported that the stage dry weight with all outstanding scope changes incorporated would be 27,983 pounds (Saturn V) and 24,525 pounds (Saturn IB). This is approximately 35% increase in dry stage weight since the beginning of the S-IVB (Saturn V) program.

4. S-IC STAGE FLAMEUP: It has been concluded that a GN_2 purge in the tail area of the S-IC Stage is not feasible and would not be required from a thermal standpoint to protect the vehicle from the flameup of the F-1 engine at ignition. However, this flameup around the vehicle at ignition may be undesirable from an appearance standpoint and the momentary loss of visibility in that area. Further investigation is being conducted.

F.C. Most certainly! B

5. S-II STAGE VEHICLE MECHANICAL DESIGN INTEGRATION WORKING GROUP (VMDIWG): A splinter meeting of the VMDIWG was held with Space and Information Systems Division, North American Aviation, Inc., on the S-II Stage flight sequence. During this meeting, action was initiated to determine if accelerometers will be required to initiate S-IC/S-II separation or if a timer can be used and to investigate the feasibility of supplying a signal from the S-II Stage propellant tanks just prior to the S-II cutoff to open the S-IVB prevalves.

Attachment #1: NOTES 5-11-64 CLINE

NOTES 5/25/64 CONSTAN

B 5/28

1. S-IC - FUEL SUCTION FITTING

A problem of potential seriousness is showing up in the fabrication and welding of the 2219 aluminum fuel suction elbows and fittings. Cracks at or adjacent to weld areas are showing up. Boeing is implementing actions in the following areas:

a. A metallurgical team is working at Wichita to recommend new forming techniques to attempt to reduce grain size in the parts.

b. A request to MSFC is in preparation to ask permission to weld in the T-87 heat treat condition.

c. Additional dye penetrant inspection is proposed.

2. S-IC HYDROSTATIC TEST AND CLEANING FACILITY

Mr. Dunigan of The Boeing Company has indicated that the 50 day slide in Plan VII schedule, because of late activiation for the hydrostatic test and sleaning facility, has been reduced to no slide with certain work-around solutions. All remaining facility activation is on schedule.

3. S-I-10 STATUS

S-I-10 is undergoing final acceptance pre-static checkout with the following overall estimates of completion:

Mechanical Test----------85% complete
Command Systems & T. M. Systems Check-------95% complete
Measurements----------25% complete
Composite overall test program approximately 25% complete

Tw 5/25

B 5/22

NOTES 5-25-64 DANNENBERG

Bonnie
d like to
attend this
entire
meeting,
not just
part of it.
B

1. MORL - Status/description briefing on 6-16-64 will include:
   Introduction & AF MOL - Dr. Yarymovych, MSF
   MORL Program - Mr. Gardner, Langley
   Apollo X Program - Mr. Stoney, MSC
   Large Space Stations - Mr. Stoney, MSC
   Discussion and Summary - Dr. Kuettner

   Mr. Cline, P&VE, will be prepared to discuss the Minuteman strap-on booster concept for the Saturn IB/MORL configuration during the discussion period.

2. Saturn IB/Centaur Study - An up-dated preliminary PDP is nearing completion. Every effort is being made to integrate more detailed missions within the capabilities of the Saturn IB/Centaur Vehicle. A completed draft of the PDP is expected to be available for review by May 29.

3. Documentation Survey - The survey of Level III (Contractor Originated) documentation is continuing with 5-26-64 as completion date for the initial phase of the survey. Sufficient information should be available to satisfy the President's Survey of recurring reports. Additional effort will be required to complete the NASA Headquarters survey.

NOTES 5-25-64 FORTUNE B 5/28

1. Armed Forces Week Saturday, May 16 I attended Special AM events at Keesler AFB then luncheon at nearby hotel given by local mayors. NASA contributions to Gulf Coast were recognized in the introductions and Lieutenant General James Ferguson, U. S. A. F. Deputy Chief of Staff for R & D, who was key speaker paid tribute to Saturn and the part our advanced test facilities will play in the Nations Aero-Space future. Mississippi State Bankers' Convention rounded off the week, honoring Marshall Space Programs that evening at the Buena-Vista.

2. Met with Ed Juilian and George Constan Monday, May 18 at Michoud to present Superior Accomplishment Award to Ed Ling, Michoud - MTO mutually shared lawyer. Ling has been most valuable in dealing with Hancock County Supervisors, law enforcement, roads, schools and other matters where legal council is judicious for management or community consideration.

3. Congressman Colmer - Fifth district, Mississippi Vice-Chairman, House Rules Committee, visited Wednesday. He mentioned numerous complaints he had received from displaced landowners, disgruntled fishermen (he being one), and job seekers not wanting to register with state employment security commission (for prestige purposes) or the union Hiring Halls (this being a right to work state). We are becoming concerned as to why so few registrants with estate offices in Picayune or Gulfport have been hired. A 130 some Coast Chamber of Commerce members came as scheduled around 4:30 p.m. to join Colmer, and we took the whole crowd to see the construction sites. Hap Christian, site project engineer, saved our necks being still on the job at FIC excavation, when their city type busses got stuck in moderately soft earth. He mustered up contractors bull-dozers to push them out. Mud we'd experienced before but not inadequate hydraulic transmissons that couldn't even turn the wheels.

4. GE Negotiations May also need unspicking in sub-contracting area and overly-high salary practices. NASA Headquarters telegram of last June defined 12 housekeeping functions for specified sub-contracting unless uneconomical or impracticable. GE says this U.S.U.R.P.S. management freedom, arguments are really only in two areas, maintenance and utilities. Then last week our NASA Auditor registered dismay at ten GE Supervisors drawing over 20,000 per-annum and compensation of other MTSO employees is two steps above GE average elsewhere. MTSO maintains that Mississippi is hardship area and higher salaries are necessary for recruitment. You will see pictures in the Huntsville Times which Chris Bell took Saturday showing that some of us, at least, enjoy work and recreation here at much less pay. Hope other MSFC personnel will feel same way.

Good strike-up

Use do B

fw 5/25

B 5/28

NOTES 5/25/64 GEISSLER

1. Effect of Off-loading on SA-6 Dynamic Response: An analysis of the center-barrel portion of the SA-6 flight vehicle was made at the request of MSC through the Mechanical Integration Panel, for the purpose of determining the effects of off-loading 200 lb. from the command module to the service module. The results showed a maximum frequency change of about 1.5 percent for the center-barrel only; the change for the entire vehicle will be somewhat less. This is considered to be an acceptable shift in frequency which will not endanger the SA-6 vehicle flight. Changes in mode shape are slight and present no difficulties. A TWX summarizing the study results was sent to MSC.

2. S-II Lox Tank Baffle: Experimental results from the slosh test of the S-II LOX tank indicated that the baffle orientation provided less than 1% critical damping whereas MSFC requirements for this baffle during SIC burn was 3%-5% critical damping. Recommendations have been made to North American to change the angle of orientation of the baffle to make it parallel to the liquid surface in equilibrium. Boeing has been asked to determine the minimum damping acceptable in this tank using both response and stability studies.

3. Hot Gimbaling Tests for S-II Stage at MTO: Aero-Astrodynamics Laboratory concurred in Dr. Mrazek's recommendation that the requirement for hot gimbaling tests of the S-II stage at MTO be eliminated. This concurrence was made based on the assumption that hot gimbaling tests will be conducted on the Battleship and All-Systems vehicles.

4. Saturn I Roll Moment: The unsymmetrical arrangement of the four turbine exhaust fairings produces a predictable roll torque with a peak around Mach 1. On SA-5, we observed a maximum roll attitude of 3 deg; wind tunnel tests predict 6 deg; adding the effects of 0.2 deg total fin misalignment and a 0.6 deg total thrust vector misalignment, the highest possible roll value is about 11 deg. Since the ST-90 platform allows a 15° roll limit, an additional 3° pitch deflection with one engine out could be tolerated in addition to the above extreme error limits. On SA-7 the ST-124 will generate attitude error signals. This platform is not limited in roll by any mechanical stop.

5. Guidance and Performance Sub-Panel and Reference Trajectory Sub-Panel Meetings: Action items and agreements from these sub-panel meetings, held April 28, 1964, are attached for your information.

E.G.

Isn't that a major design change?
Why do we find this only now?
Please take up with Mrazek.

B

Fw 5/25

NOTES 5-25-64 GRAU

B 5/28

1. S-I-9 POST-STATIC CHECKOUT: The S-I-9 stage is located in the pressure test cell of building 4705 undergoing post-static pressure and functional testing. Part shortages will delay completion of approximately 50 percent of the tests.

2. S-IU-9 INSTRUMENT UNIT CHECKOUT PREPARATION: Checkout of the S-IU-9 Instrument Unit will be performed utilizing a non-flight control computer in order to avoid schedule delay. Availability of the flight control signal processor has not yet been determined. Computer programs to implement ATOLL (Acceptance, Test or Launch Language) on the RCA-110 have been developed and are operational. Test procedures are being converted to the ATOLL language and will be used in the automatic checkout of S-IU-9. Mating of the Prototype MMC will probably be accomplished on S-IU-8 rather than S-IU-9 due to another two-week delay in delivery of the prototype MMC.

3. MICROMETEOROID PROJECT: Installation of electronic sub-systems into the electronic cannister of the Prototype Capsule is expected to be accomplished this week. Systems testing of the completed cannister will follow this installation. The center section and wing structure for Flight Capsule No. I are essentially complete. For Flight Capsule No. II, the center section is essentially complete and the wing structure is approximately 75 percent complete.

4. S-IV PROGRAM: Failure of the Inverter-Converter Unit on S-IV-6 has prompted some redesign of the electrical circuitry of this unit. Changes have been made to include two (2) diodes to reduce high voltage transients. An identical unit was modified at Santa Monica and tests have been run to determine the effects of high temperature and transients. DAC reports the unit functioned properly; however, we are concerned that the diodes installed do not appear on MSFC approved parts list and their construction provides susceptability to solder ball contamination. We have requested X-ray of these diodes prior to flight since they were not X-rayed prior to installation. Checkout of essentially all sub-systems has been accomplished successfully on the S-IV-7 stage at DAC, SACTO. Rework of the flex ducts and other items, and AFPR shakedown inspection will be completed before Simulated Flight Test which is scheduled for June 2, 1964. Quality Data Review will be made June 4, 1964. The S-IV-8 stage at DAC, Santa Monica, has 131 items presently on the shortage list and approximately 1500 manufacturing hours remaining to be accomplished. Continuity, engine alignment, electrical voltage checks, and electrical control checks have been completed. Instrumentation checkout, hydraulic checkout and contamination checks on all engines are in progress. The S-IV-9 stage is located on the static test stand at SACTO. Approximately 90 Class A part shortages are affecting manufacturing activities and the planned cryogenics calibration. The part shortages in this case appear to be the worst yet for S-IV stages at SACTO.

1.0.
B

Fw 5/25

B 5/22

NOTES 5-25-64 GRUENE

1. In reference to your question on my Notes dated May 18, 1964 (copy attached), I can explain this point:

a. When we received drawings of the micrometeoroid capsule in SA-9, we realized the interference possibility with a very limited access provided for work in the upper part of the vehicle. With the escape tower as provided by MSC-NAA, it would be necessary to have KSC, Fairchild, MSC, and NAA personnel working in these very close quarters.

b. Not knowing the possible impact of eliminating the escape tower with all its built-in problems (sequencer, lightning interference) as observed on SA-6 and the access difficulties, we approached Col. James to find out if either the escape tower could be eliminated altogether or at least the jettison circuit be energized from our own time sequencer in the I. U. which would make all NAA-MSC interface during the preparation unnecessary. We are expecting the answer to our proposal from Col. James.

2. Pictures of present status of the MILA construction are attached. (Copies to Dr. von Braun only.)

Lee James -

After all the pros and cons I have heard about this issue, I'm still solidly in favor of flying escape towers and Q-balls on SA-7, SA-9, SA-8 and SA-10.
All up, hurrah!
Still any doubt anywhere?

B

NOTES 5/25/64 HAEUSSERMANN

B 5/28

No submission this week.

Fw 5/25

B 5/28

NOTES 5/25/64 HEIMBURG

*Fw 1. S-I-8:

The S-I-8 short duration static firing, originally scheduled for 5/21 was cancelled due to a lox leak occurring on the rear manhole cover at the center tank. Depending on the lox leak check to be performed today, the test has been tentatively rescheduled for 5/26.

2. S-IC-T:

Reference NOTES 5/11/64 KUERS (copy attached). The status of CAM 218 will be discussed in the S-IC-T meeting scheduled for 5/26. The impact of this CAM is not as deep as outlined in Mr. Kuers' notes. I feel that satisfactory resolution of this problem can be worked out with both MSFC - Boeing effort. This is a case of someone "crying wolf" before the wolf has arrived at the sheep fold. There are many other possible wolves in the S-IC-T pasture; but this is not one of them which we can identify at this time.

3. MTF Working Group:

The S-IC test position Number 1 will not be ready for the S-IC-T on March 15, 1966, as shown on the J-1 schedule. Therefore, S-IC-3 may have to come to Huntsville for testing. The S-IC test stand is covered by three contracts. The first contract was for excavation and pile driving. This work has slipped $3\frac{1}{2}$ months, principally, due to weather. Based on a revised schedule which reflects this $3\frac{1}{2}$ month slippage, the second contract for the substructure is presently on schedule. The third contract is for the test stand superstructure. Based on the revised schedule, this work should be completed by March 17, 1966. Present indications are that the installation of the superstructure cannot be accomplished by this date. Additional time after the completion of the basic stand will be required for the installation of the Tech Systems and GSE. Any attempt to accelerate construction by means of additional funding was decided against by the Planning Board. NASA Headquarters has been informed of this situation at the Monthly MTF Status Meetings. We have received, unofficially, word that NASA Headquarters may take issue on this schedule slippage. We plan to brief you completely on this subject on 6/16.

ATTACHMENT 1: NOTES 5/11/64 KUERS (attached to Dr. von Braun's Copy Only)

OFFICE OF DIRECTOR - MSFC

CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
DIR	Dr. von Braun			

REMARKS

On your behalf, I have signed Appointment of Incentive Evaluation Board. It has been cleared with NASA Headquarters, and everything is squared away.

H. Gorman
6-16-64

CODE	NAME	DATE

MSFC - Form 495 (Rev August 1963)

MSFC ROUTING SLIP					
	CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
1	DEP-A	~~Mr. Gorman~~			
2					
3					
4					

REMARKS

Multilith master for appointment of the board named in attached draft is being circulated for formal concurrence.

This has been cleared with NASA Headquarters.

Has also been cleared informally with board members.

CODE	NAME	DATE
AST-P	W. S. Davis	6/10/64

MSFC - Form 183 (Rev. February 1961)

FW 5/25

NOTES 5-25-64 HOELZER

B 5/28

1. KSC SUPPORT IN COMPUTATION: As previously reported, a large scale computing system is being procured for installation in the Central Instrumentation Facility. This is a joint endeavor between KSC and Computation Laboratory in continuing the support as included in the agreement between you and Dr. Debus. At the present time, KSC is requesting in a letter to you a build up in the contractor support to them through the GE(Phoenix) contract with Computation Laboratory. At the time this contract was evaluated and let some three months ago, the support to KSC was included as part of the mission. Everything is in order insofar as our giving this support to KSC and reimbursement arrangements have been made with Procurement on both sides. We endorse their request and encourage this course of action.

Bruce
Have we seen this request?
B

2. INCENTIVE EVALUATION BOARD: We still do not have a Board appointed to evaluate the GE contractor for the purpose of fee award. Our Procurement people have been in contact with NASA Headquarters trying to get such a board established but as yet nothing is forthcoming from Headquarters. The contract is already two months old and it is essential that a board be appointed before we can complete our evaluation system. I believe the present guidelines from Headquarters would permit you, as Center Director, to establish this board at the local level. I suggest that you do so immediately in order that we can go ahead with our evaluation procedures. If Headquarters so desires they can modify the board later. The guidelines provide up to eight members on this board but I feel that five is probably sufficient for this contract. I suggest that you select five members from the following list:

Harry G.
Please advise.
B

complete package in process by

- Dr. J. C. McCall
- Mr. Wilbur S. Davis
- Mr. C. L. Bradshaw
- Mr. Garland G. Buckner or Mr. Andrew J. Wood
- Mr. David H. Newby or Mr. Chauncey W. Huth
- Dr. Oswald H. Lange
- Mr. Thomas H. Smith
- Mr. John F. Stone

No need for your selection
FW

I would recommend that Dr. J. C. McCall be appointed chairman. I would further recommend that you be the NASA official to whom the board makes their recommendations and who will actually award the fee.

B 5/28

NOTES 5/25/64 JAMES

SA-6: S-IV-6 - The new sump screen and filter were installed and the LOX tanking test completed satisfactorily on May 17. The inverter in the stage PU system failed during tanking preparations. A faulty transistor was the cause. A new inverter was installed with Zener Diodes in parallel with transistors as a "fix" to an unsatisfactory voltage surge problem after consultation between DAC, LVO and MSFC. MSFC (R-QUAL) requested these diodes to be x-rayed inspected. After examination of related facts, I told LVO, & DAC we would continue toward launch on schedule and not x-ray these diodes. The basis for my decision was; (a) the Mil Spec & DAC standard for these diodes does not specify x-ray inspection; (b) the same diode is used in the T/M system & similiar diodes eleswhere in the S-IV, none of which have been x-rayed; (c) failure of the diode would not cause a catastrophic failure.

Other S-IV Stages - All are progressing satisfactorily toward meeting the scheduled delivery dates to KSC.

* S-IV Negotiations - Realignment negotiations were essentially completed on May 22, at a cost of 224.8 million and 11.0 million fee (4.9%).

CCSD Mission Work - MSFC estimated there would be about 500 man years of effort required, but, CCSD submission for these system engineering missions was about twice this estimate. R&DO is evaluating this package. To date about 130 man years of effort has been turned over. To accelerate the turnover R&DO and S-I/IB will consider a task assignment for P&VE as that with AERO-Astrodynamics.

* S-IU-9 - We are recommending this unit be shipped on schedule and the RFI test with the meteoriod prototype capsule switched to IU-8 to hold the SA-9 launch schedule.

* Saturn IB IU - Design problems are still being encountered; (a) cold plates (vibration failures); (b) metal-to-metal grounding (high conductive epoxy resistance) and; (c) structural (interconnect rings require strengthening).

* S-IVB - Negotiations were completed with DAC for 6 months level of effort beginning June 1, on a set of GSE and follow-on S-IVB/IB stages. Formal contractural coverage will be authorized as soon as procurement plan approval is received from Headquarters. The deadline is June 1, or S-IVB's will be late.

RCA Computers - Headquarters will be requested to allow MSFC to issue a letter to RCA to cover 3.0 million of anticipatory costs in order to hold schedules prior to full contractural coverage.

Pre-financing - Close to 90% of the funds for pre-financing the major contracts will be obligated in May. Al FY-64 funds will be obligated by June 30.

Tu 5/25

B 5/28

NOTES 5-25-64 Koelle

1. POST-SATURN REVIEW: Last week we had a two-day review of our Post-SATURN study activities, including vehicle trade-off's, mission analysis, test facilities at MTO, and launch facilities at MILA. We now have enough information to concentrate our conceptual design on a "base line" configuration which can be described as follows:

First Stage: 18 modified hinged M-1 engines around plug nozzle, recoverable stage, separate tanks.

Second Stage: 12 high pressure engines in the 315K thrust range, possibly toroidal airspike integrated propulsion system for maximum performance. Plug used as a re-entry body. ✓

Total Vehicle:

Concept: Fully recoverable and reusable, all LH_2/LO_2 propellants, two stage to orbit, three stage to escape, (modified S-II stage is a suitable third stage).

Launch Weight: Approximately 18,000,000 lb

Diameter: Approximately 75 ft

Payload: Approximately 1,000,000 lb

Operational Target Date: 1980

Cost Effectiveness to Orbit: 60 $/lb direct
120 $/lb total

Facilities: Two test stands for each stage at MTF, 2nd stage sectional R&D testing at MSFC in our large IC test stand (modified in about 1972). Three launch positions at the Cape in hybrid fashion (enclosed tower serves as assembly building and launch site).

We will make additional trade-off studies and probably modifications to this base line as we go along. However, the planning exercise for the President, as well as our desire to make competitive study for SATURN V doing the same missions, is the reason for selecting a base line concept at this time. ✓ It might not be the very best, but it will be one of the best concepts available. ✓ Many considerations went into the selection of the new base line. We will be happy to give you a briefing on this subject, if you desire. Yes, let's have a 1½ hr briefing on this plus the nestled 10-man carrier, latest views B

HHK

It might be of interest to you that all the guidelines which we have received from Headquarters do require a Post-SATURN launch vehicle, by about 1980 for manned planetary landing and capture missions. ✓

NOTES 5-25-64 KUERS B 5/28

Saturn V, S-IC Progress and Problems:

1. Fuel container for -T is progressing farily well with no major problems encountered. The first lox tunnel has now been successfully welded. Also, installation of bracketry on this tunnel for level sensing devices has been accomplished by use of a new manipulating device. This is a hydraulic operated swing arm which can be lowered with a worker thru a manhole and enables the worker to reach all areas inside the container for installation work. This device was designed and built by Boeing on design criteria furnished by our tool engineering branch.

2. The second cylindrical section has been welded to the lower lox dome. This was the best horizontal weld we had produced so far with only 7 minor repairs on the whole circumference. There is not hold-up or problem foreseen on the lox container at the present time.

3. The Thrust Structure for -T is still progressing in a three shift operation. We hope to finish this structure in approximately 3 weeks from now so that the internal installation of tubing, suction ducts, pressure compensators, etc., can start. Clarification of CAM 218 "Modification of Propellant Support Brackets" has not been fully accomplished. The effectivity for this CAM will probably be changed, not to include the -T vehicle. Mr. Heimburg and P&VE rather prefer to modify these supports on an interim solution, carried out in-house on sketches furnished by P&VE.

4. The forward skirt section for -T has been received from Boeing.

5. Welding of bulkheads and skin sections for the -S vehicle has been started.

6. The decision was made to weld repair the S-IC-S fuel elbows and to tolerate the large number of parent material cracks adjacent to the welds. Boeing's welder started the repair work last Wednesday. Decision for the T-vehicle fuel elbows is still pending.

NOTES 5-25-64 MAUS

1. MSFC PERT OPERATIONS MANUAL - MSFC's new PERT Operations Manual has been printed in draft form and copies are being sent to headquarters, MSFC elements, and our major contractors for comments before final printing. The manual covers the current NASA PERT Operations at MSFC, and includes the latest PERT Computer Program (labeled PERT "C") now under development by MSC and headquarters.

   An effort has been initiated in conjunction with Financial Management Office (Jack Sharkey) to prepare a manual, similar to the MSFC PERT Operations Manual, covering MSFC's Contractor Cost Reporting System (Form 533). This effort will include refinement, as well as documentation of the system.

2. MANPOWER BRIEFING TO DR. SEAMANS - Bill Rutledge accompanied Mr. Gorman to Washington for the May 22 manpower presentation to Dr. Seamans arranged by Dr. Mueller. The meeting was to show Dr. Seamans the impact on the three centers of a proposed reduction of 500 FY65 spaces for MSF. Each center was requested to make a 16-minute presentation showing extent of their contracting efforts and impact of the reduction in spaces.

   The meeting went well, but ended abruptly before any conclusions were reached, when Dr. Seamans had to leave for a meeting with Mr. Webb.

3. STATUS OF FY65 APPROPRIATION BILL - The NASA portion of the House Independent Offices Appropriation bill was returned to the Appropriations Committee on the basis of points of order raised by Reps. Wydler and Teague. Mr. Teague took his action to avoid possible reductions in the R&D area. Mr. Wyman, New Hampshire, had proposed an amendment to remove approximately $1 billion from the NASA appropriation to support expenditures in areas such as medicine and poverty.

   House rules permit the removal of any portion of an Appropriation bill on a point of order raised by a single member in any case where action on the authorization bill has not been completed.

   The Authorization bill still awaits action by the Senate. Action is not expected until Fall, so we will probably be operating under "continuing resolutions" for a portion of the next fiscal year.

7w 5/25

NOTES 5-25-64 McCartney

B 5/28

FY-64 PROGRAM EXECUTION: As of May 21, our uninitiated fund balances were as follows:

a. SATURN I: (Annual Plan: $39.2M) A total of $1.57M remains uninitiated in the laboratories, but will be used for known operating expenses during this fiscal year. An additional $0.09M is held in R&D Operations contingency account.

b. SATURN IB: (Annual Plan: $42.5M) The uninitiated laboratory total of $0.6M will be used for operating expenses during this fiscal year. A total of $0.85M is held in the contingency account. In addition, $3M is being programmed to R&D Operations by Industrial Operations to finance an Astrionic's Purchase Request for follow-on procurement of RCA computers.

c. SATURN V: (Annual Plan: $165.7M) The uninitiated laboratory total of $1.6M is for operating expenses. A total of $0.2M remains in the contingency account.

d. SRT: (Annual Plan: $36.7M) About $2.8M remains to be initiated this fiscal year.

e. ADVANCED STUDIES: (Annual Plan: $9.2M) Initiation completed.

f. ADVANCED VEHICLE TECHNOLOGY & METEOROID EXPERIMENT: (Annual Plan: $16.7M) About $1.5M remains to be initiated this fiscal year: $0.5M for Vehicle Technology and $0.96M for the Meteoroid Experiment. (The $0.96M figure includes $0.9M program authority we have not yet received from OART, pending completion of reprogramming actions.)

fw 5/25

B 5/28

NOTES 5/25/64 RUDOLPH

1. S-IC Stage GSE - The Phase III design submittal for S-IC Stage GSE has been reviewed and approved by MSFC. As a result of this review some new criteria and additional items were proposed. Elements of MSFC and Boeing are evaluating the proposed changes. A resolution is expected approximately June 1, 1964.

2. S-II Stage:

Contractor Evaluation - As a result of the Bell Report issued on April 30, 1962, dealing with Government Contracting for Research and Development, the Air Force developed a procedure for determining, by evaluation, contractor performance on Research and Development Projects. This procedure was adopted by the Department of Defense and issued as a Procedures Guide, "Guide to the Evaluation of the Performance of Major Development Contractors". Later the NASA Administrator directed that all elements of NASA participate in the DOD Evaluation Project. The first MSFC evaluation performed under this procedure was on the S-II prime contractor, NAA/S&ID. The NAA/S&ID Contractor Evaluation Report was completed and submitted to NASA Headquarters on May 18, 1964. Prior to the official release of the report, the contents were discussed with the contractor.

A.R. What, in a nutshell does it say? B

Common Bulkhead - The structural repair of the failed gore segment on the first common bulkhead has been accomplished. The phenolic honeycomb core is presently being bonded to this repaired area of the common bulkhead.

3. S-IVB Stage:

100 Pound Thrust Engine Program - Personnel from the S-IVB Stage Office and P&VE Lab visited the Gemini Project Office at MSC to discuss the status of the Gemini Orbital Attitude and Maneuvering System 100 pound thrust engine program and to present delivery requirements for the engine for use on the S-IVB/V Stage. Preliminary information indicates that Rocketdyne can meet our delivery requirements to DAC, however the start of the engine qualification program at MSFC may be delayed.

PERT System - A meeting of S-IVB Stage personnel with DAC Saturn program personnel is scheduled for next week here at MSFC in an effort to improve the effectiveness of the DAC PERT System as a management tool.

4. Instrument Unit Cold-Plates - A second failure has been experienced by an AVCO produced cold-plate under vibration test. Further design changes are being considered by AVCO and P&VE in an attempt to resolve this situation, which appears to be a structural design problem rather than a manufacturing problem.

NOTES-5-25-64-SHEPHERD

B 5/28

NAA Proposal for New Office Building at Downey: (Reference Attachment # 1, NOTES 5-18-64) MSF prefers the arrangement whereby NAA would fund the building on a portion of Plant 16-Downey, which NASA would lease to them. Objections to this arrangement stems primarily from the Office of Counsel, NASA Headquarters, who feels that negotiations of a suitable lease would be difficult and that the Congress might assume that NASA was using this means to acquire a building without Congressional approval. I feel that the lease can be negotiated and that Congress needs only to be notified of the building arrangements to overcome both objections of Counsel. This is a joint S-II/Apollo requirement, however, S-II accounts for only approximately 20%. If the trade-off solution is adopted, money could be made available from FY-64 funds since an equivalent amount of equipment is already funded. If the lease arrangement is adopted no NASA funds are required.

Sleep

Please keep me posted B

Lunar Environmental Chamber: (Reference Attachment #2, NOTES-5-11-64) Not necessarily, MSF is placing the Lunar Environmental Chamber as a facility item in their package for new programs. If these programs are accepted as a package then it is assumed by MSF that this would include the Lunar Environmental Chamber. While there is nothing specific to indicate a program start, I believe that NASA will begin some criteria work and design studies in FY-65 on this chamber.

FY-66 CofF Budget: Dr. Mueller approved the MSF Facilities Review Board actions as follows:

Location - Huntsville	Cost Req.	Cost Approv.	FRB Action
Additions to Materials Lab (P&VE)	1,173.	1,173.	Approved
Non-Destructive Testing Lab (P&VE	750.	750.	Approved
Expansion to Computation Lab (Comp)	3,076.	0	Disapproved
Space Vehicle Research Lab (RPL)	1,500.	1,500.	Approved
Special Power Source Dev. Lab (Ast)	924.	0	Disapproved
Ext. to High Pressure Gas Sys (Test)	1,500,	0	Disapproved
LOX Storage Fac. for F-I Stand (Test)	800.	0	Disapproved
3rd Dual Test Position at Components Test	1,600.	0	Disapproved
Mission Contractors Building (Test	500.	616.	Approved
Mods to Special Project Test Area (Test	900	0	Disapproved
Space Sys. Vacuum Facility (Test	9,710.	0	Disapproved
Engineering & Laboratory Bldg. (R&DO)	3,000.	0	Disapproved
Primary Utility Extension (FADO)	1,900.	792.	Approved
	27,333.	4,831.	
Added by Headquarters			
Special Fluid & Mechanics Lab (Aero)	3,700.	0	Disapproved

We are scheduled to make a reclama to the MSF Facilities Review Board Tuesday, June 2. It is intended that the Lab Directors make the reclama for the projects within their area. Reclama will be made on all items.

fw 5/25

B 5/28

NOTES 5-25-64 Stuhlinger

1. MMC REVIEW: Dr. Bisplinghoff and other members of OART visited MSFC for an MMC review on May 18. Dr. Johnson and I would like to give you a briefing on the results of this visit at your convenience. Yes, but I suggest we do it only after you've settled the organiz. issue with Eberhard, B

-E.S.

2. LESA SCIENTIFIC MISSION STUDY: Mr. Robert Jones of RPL visited OMSF last week in connection with evaluation of proposals submitted for the LESA scientific mission study. This investigation will be technically directed jointly by OMSF and OSSA. RPL and FPO will assist in monitoring this study effort. Our principal Headquarters contacts in this connection are Dr. Lowman of OSSA and Mr. Beattie of OMSF.

3. GEOLOGICAL PROBLEMS IN LUNAR RESEARCH: Three members of RPL (Messrs. Heller, Bensko, and Cochran) attended, by invitation, a four-day meeting on "Geological Problems in Lunar Research," sponsored by the New York Academy of Sciences. Many papers of excellent laboratory studies of simulated lunar properties were presented. Such studies will help in establishing scientific missions on the moon as proposed by RPL (Dr. Hale).

4. FY-64 OART REPROGRAMMING FOR $1.9 MMC: The OART program was decreased by NASA Headquarters from $10,498,000 to $9,908,000. This is a result of a $590,000 (under cognizance of RPL) withdrawal from the Space Vehicle Systems Program for the MMC. This $590,000 is part of the total MSFC OART $1,900,000 reduction, requested by Dr. Bisplinghoff in his letter dated April 1, 1964, Subject: Provision of Additional Funds Required for Micrometeoroid Project Contract with Fairchild Stratos Corporation NAS 8-5615. A final program adjustment on the remaining $1,310,000 has been proposed by RPL, but not yet decided by OART.

5. SRT PROGRAM STATUS: The status of the portion of the SRT Program managed by RPL is, as of 22 May, as follows:

	ANNUAL PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED	CHANGE IN OBLIGATIONS SINCE 5/15/64
OART	9,908,000	9,908,000	9,864,000	3,386,054	257,004
OMSF	14,163,000	14,133,000	14,115,172	1,086,441	42,236
OSSA	675,000	675,000	667,104	96,340	1,561
	24,746,000	24,716,000	24,646,276	4,568,835	300,801

As of May 22, only 20% of the SRT Program was obligated. Since only five weeks are left in FY-64, we urgently suggest that P&C should accept the extension of obligating time into a fifth quarter which was offered to us by Headquarters program offices. A loss of those research tasks which P&C may not be able to obligate by June 30 would not only mean a severe curtailment of MSFC's present research program, but also a considerable increase in our difficulties to obtain Headquarters support for future research programs.